

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

FIRST YEAR EXAMS

CONTENTS

PHYSIOLOGY	Page 2
ANATOMY	Page 51
BIOCHEMISTRY	Page 100
HISTOLOGY	Page 124
ENGLISH	Page 151

MARKS DISTRIBUTION

يكون توزيع المقررات في الفرقة الاولى وعدد الساعات والدرجة المخصصة لكل مقررو وسائل الاختبار على النحو التالي:

الدرجة النهائية	الاختبارات	عدد الساعات		المقرر الدراسي
		عملي	نظري	
٢٥.	تحريرى مدته ٣ ساعات متضمنا علم الاجنة ● عملية ● شفوية	١٢.	١٢.	التشريح الامى وعلم الاجنة ويشمل علم الحياة
١٥.	تحريرى مدته ٣ ساعات ● عملية ● شفوية	٦.	٦.	الهستولوجيا
٢٥.	تحريرى مدته ٣ ساعات متضمنا الفيزياء الحيوية ● عملية ● شفوية	٦.	١٥. منها ١٠ ساعات فيزياء حيوية	الفسيولوجيا الطبية وتشمل علم الفيزياء الحيوية
١٥.	تحريرى مدته ٣ ساعات ● عملية ● شفوية	٦.	٧٥	الكيمياء الحيوية
٥.	تحريرى مدته ساعة واحدة	-	٣٠	اللغة الانجليزية

PHYSIOLOGY

Physiology Essay Questions

Answer the following questions

Start each question in a new page

- 1- Describe the role of voltage gated ion channels in the aetiology of stages of action potential of nerve. (7 marks)
- 2- compare and contrast between molecular events that initiate contraction in skeletal and smooth muscle. (7 marks)
- 3- describe structure and functions of blood platelets and explain their role in Hemostasis. (8 marks)
- 4- Explain pacemaker currents and its autocontrol. (8 marks)
- 5- Describe the phenomena of autoregulation of diameter of arterioles. (7 marks)
- 6- Explain in details the ventilatory responses to both increase carbon dioxide concentration in inspired air as well as changes in acid base balance. (7marks)

Biophysics

- 7- What is meant by compliance of the lung, explain its diagram and factors affecting It. (6 marks)

Physiology

50 MARKS (5MARKS FOR EACH QUESTION)

Give short account on each of the following items:

- 1- Pressure volume curve of the left ventricle.
- 2- Pacemaker currents.
- 3- Regulation of coronary blood flow.
- 4- chloride shift phenomena.
- 5- Cyanosis.
- 6- Functions of autonomic nerves supply to head and neck.
- 7- Mechanism of iron absorption and storage.
- 8- Strength duration curve.
- 9- Mechanism of neuromuscular transmission.

Biophysics:

- 10- Physiological phenomena explained by law of LAPLACE..

PHYSIOLOGY

SECTION A, (MCQS) (60 Q) 60 MARKS

Put the correct single answer in capital letter as (a, b, c, d, or e) in the provided computer answer sheet.

1- The characteristic of a water-insoluble substance most important in governing its diffusibility through a cell membrane is its.

- a. Hydrated diameter.
- b. Molecular weight.
- c. Electrical charge.
- d. Lipid solubility.
- e. Three-dimensional shape.

2- Intracellular fluid:

- a. Constitute about 60% of body weight.
- b. Constitute about 40% of body weight.
- c. Constitute about 20% of body weight.
- d. Contain more Na⁺ than ECF.

3- Regarding the transport mechanisms across the cellular membrane:

- a. Facilitated diffusion is an active process.
- b. Ions pass freely through protein channels.
- c. Na⁺-k⁺ pump is an example of secondary active transport.
- d. Counter transport is transporting 2 molecules in the same direction.

4- Reflex arc:

- a. Is the functional unit of nervous system.
- b. Is composed of receptors, afferent and efferent neurones only.
- c. Depends on a center inside CNS.
- d. Is the structural unit of the nervous system.
- e. a and c are correct.

5- Alpha adrenergic receptor stimulation produces all the following, EXCEPT:

- a. Contraction of the dilator pupillae muscle.
- b. Inhibition of gastro- intestinal sphincters.
- c. Contraction of the piloerector muscle.
- d. inhibition of the gastrointestinal motility.

6- Stimulation of the vagus nerve causes:

- a. Contraction of the spleen.
- b. Reduction in the strength of ventricular contraction.
- c. Bradycardia (slowing of the heart rate).
- d. dilatation of the bronchioles.

7- Sympathetic stimulation to the heart results in:

- a. an increase in the duration of systole.
- b. an increase in the duration of diastole.
- c. an increase in the activity of Ca²⁺ pump into the sarcoplasmic reticulum.
- d. a decrease in the affinity of troponin for calcium.

8- Concerning the parasympathetic:

- a. Its stimulation inhibits intestinal motility.
- b. Its stimulation increases salivary secretion.
- c. Its stimulation causes bronchodilation.
- d. Its postganglionic cell bodies are in the CNS.
- e. Its postganglionic cell bodies are located on skeletal muscles.

9- Atropine blocks the action of acetylcholine on receptors located in the following areas, EXCEPT:

- a. The gastric glands secreting HCl.
- b. Sinoatrial node.
- c. motor end plate.
- d. Iris.

10- Norepinephrine:

- a. Is the chemical transmitter at all sympathetic postganglionic endings.
- b. represent 80% of the secretion of the adrenal medulla.
- c. Acts equally on both α and β adrenergic receptors.
- d. acting on presynaptic adrenergic nerve endings to inhibit secretion of the chemical transmitter.

11- Regarding mechanism of action of adrenergic receptors:

- a. receptors produce their effect through increasing intracellular calcium.
- b. α_2 receptors produce their effect through increasing cAMP.
- c. β_2 receptors produce their effect through increasing cAMP.
- d. α_1 receptors produce their effect by increasing K⁺ ions.

12- Which of the following is adrenergic fibers:

- a. Most postganglionic sympathetic fibers.

- b. Preganglionic sympathetic fibers.
- c. preganglionic fiber to adrenal medulla.
- d. Preganglionic parasympathetic fibers.
- e. Preganglionic sympathetic fibers to sweat glands.

13- It is correct to say that:

- a. An injection of atropine typically produces an increase in salivary flow.
- b. Adrenal medulla is innervated by postganglionic sympathetic neurons.
- c. Preganglionic parasympathetic neurones originate from the thoracic and lumbar spinal cord.
- d. Stimulation of postganglionic parasympathetic neurons causes release of noradrenaline.
- e. Acetylcholine stimulates the receptors of the autonomic ganglia.

14- Regarding erythrocyte production, all the following statements are true, Except:

- a. IT takes place normally in the bone marrow of long bones during adult life.
- b. May be reduced in chronic renal failure.
- c. May slow down following gastrectomy.
- d. May be stimulated by reduction in arterial O₂ content.

15- At physiological PH, plasma proteins:

- a. Are anions.
- b. Move towards the cathode during electrophoresis.
- c. Are only found in the vascular space.
- d. Are all globulins.

16- Incompatible blood transfusion results in all the following, EXCEPT:

- a. Joint pain due to capillary blockage.
- b. Cardiac arrhythmia due to hypercalemia.
- c. Hypotension and shock due to release of vasodilators from agglutinated RBCs.
- d. Renal failure due to blockage of the renal tubules by agglutinated RBCs.

17- The hormone erythropoietin:

- a. Increases the life span of erythrocytes.
- b. Acts on reticulocytes to convert them to erythrocytes.
- c. Regulates the production of erythrocytes, thrombocytes and granulocytes.
- d. Stimulates the maturation of stem cells to proerythroblast.

18- Vitamin K deficiency:

- a. May be caused by its lack in diet.
- b. Occurs in obstructive jaundice.
- c. results in deficiency of fibrinogen.
- d. Is accompanied by prolonged bleeding time.

19- A blood count of a man aged 50 years gave the following picture:

Hb 12gm/dl, RBCs 3 millions/ mm³ and MCV of 97 u³. The following statement about the findings is true:

- a. The findings are typical of one living at high altitudes.
- b. The finding are typical of vitamin B12 deficiency.
- c. The finding are typical of iron deficiency anemia.
- d. The blood would carry about 10 ml O₂/ dl blood.

20- Which of the following is correct?

- a. WBC count in adult male is 5 million per mm³.
- b. Normal Hb concentration in females is 10 grams%.
- c. In polycythemia the hematocrit decreases.
- d. Antithrombin III is an anticoagulant.
- e. Basophils secrete (release) histamine, heparin, and serotonin.

21- Which of the following is correct?

- a. The release of tissue factor III occurs in the intrinsic pathway of blood coagulation.
- b. Hemophilia is a bleeding disorder caused by deficiency of factor VIII.
- c. The primary response (antibody response) is more potent than the secondary response.
- d. The primary response (antibody response) is more rapid than the secondary response.
- e. Both primary and secondary responses occur upon the exposure to antigen.

22- Which of the following is correct?

- a. protein C is a clotting factor.
- b. fibrin threads are soluble.
- c. plasma cells originate from T lymphocytes.
- d. Immunoglobulins are produced by T lymphocyte.
- e. The clotting factor prothrombin activator is an enzyme.

23- Which one of the following conditions will a decrease in the magnitude of a nerve membrane action potential?

- a. Decreasing the conductance of membrane to potassium.
- b. Stimulating the nerve during the relative refractory period.

- c. Increasing the extracellular concentration of sodium.
- d. Making the membrane potential more negative.
- e. Increasing the magnitude of the stimulus.

24- when comparing the contractile responses in smooth and skeletal muscle, which of the following is most different?

- a. The source of activator calcium.
- b. The role of calcium in initiating contraction.
- c. The mechanism of force generation.
- d. The source of energy used during contraction.
- e. The nature of the contraction proteins.

25- The amount of force produced by a skeletal muscle can be increased by:

- a. Increasing extracellular Ca^{2+} .
- b. Decreasing extracellular Ca^{2+} .
- c. Increasing the activity of acetylcholine esterase.
- d. Decreasing the interval between contractions.
- e. Increasing the preload beyond 2.2 μm .

26- The flow of calcium into the cell is an important component of the upstroke phase of action potentials in.

- a. Cardiac ventricular muscle.
- b. Intestinal smooth muscle.
- c. Skeletal muscle fibers.
- d. Nerve cell bodies.

27- The action potential of skeletal muscle.

- a. Has a prolonged plateau phase.
- b. Spreads inwards to all parts of the muscle via the T tubules.
- c. Causes the immediate uptake of Ca^{2+} into the lateral sacc of the sarcoplasmic reticulum.
- d. Is longer than the action potential of cardiac muscle.
- e. Is not essential for contraction.

28- Which of the following is correct?

- a. The amplitude of AP depends on stimulus strength.
- b. Graded (local) potentials can only cause membrane depolarization.
- c. The amplitude of AP does not depend on stimulus strength.
- d. Salutatory conduction occurs in unmyelinated nerve fibers.
- e. conduction of AP in the axon occurs only in one direction.

29- It is correct to say:

- a. T-tubules store Ca^{++} .
- b. Troponin T binds with Ca^{++} .
- c. Tropomyosin covers the active sites of actin.
- d. T-tubules do not transmit action potential to the inside of muscle fiber.
- e. Thick filament is composed of G actin molecules.

30- The functions of tropomyosin in skeletal muscle include:

- a. Sliding on actin to produce shortening.
- b. Releasing Ca^{2+} after initiation of contraction.
- c. Binding to myosin during contraction.
- d. Acting as a "relaxing protein" at rest by covering up the sites where myosin binds to actin.
- e. Generating ATP, which it passes to the contractile mechanism.

31- Measurement of the lecithin-sphingomyelin (L- S) ratio in amniotic fluid assesses which of the following?

- a. The placenta's ability to oxygenate the fetus.
- b. Fetal adrenal function.
- c. Fetal kidney development.
- d. Fetal brain development.
- e. Fetal lung maturity.

32- The percentage of hemoglobin saturated with oxygen will increase if.

- a. The arterial pCO_2 is increased.
- b. The hemoglobin concentration is increased.
- c. The temperature is increased.
- d. The arterial pO_2 is increased.
- e. The arterial pH is decreased.

33- The clinical sign of cyanosis is caused by which of the following?

- a. an increase in the affinity of hemoglobin for oxygen.
- b. a decrease in the percent of red blood cells (hematocrit).
- c. an increase in the concentration of carbon monoxide in the venous.
- d. a decrease in the concentration of iron in the red blood cells.
- e. an increase in the concentration of deoxygenated haemoglobin.

34- During a normal inspiration, more air goes to the alveoli at the base of the lung than to the alveoli at the apex of the lung because:

- a. The alveoli at the base of the lung have more surfactant.
- b. The alveoli at the base of the lung are more compliant.

- c. The alveole at the base of the lung have higher V/P ratio.
- d. There is a more negative intrapleural pressure at the base of the lung.

35- Complete transection of the brain stem above the pons would:

- a. Abolish Hering-Breuer reflex.
- b. Prevent voluntary holding of breath.
- c. Result in cessation of breathing.
- d. Prevent the peripheral chemoreceptors from exerting any control over breathing.

36- A 20-years medical student participates in exercise study.

> The respiratory rate = 20 breaths/min.

> Tidal volume = 1000 ml.

> Dead space = 150 ml.

The student's alveolar ventilation is

- a. 7 liters.
- b. 10 liters.
- c. 17 liters.
- d. 3 liters.

37- Intravenous lactic acid increases ventilation. The receptors for this effect are located in the:

- a. medulla oblongata.
- b. lung alveoli.
- c. carotid bodies.
- d. aortic baroreceptors.

38- The airway resistance is reduced by:

- a. a blockade of B₂ -adrenergic receptors.
- b- Increase in airway CO₂.
- c. Stimulation of parasympathetic cholinergic fibers.
- d. Release of histamine.

39- which of the following statements describes the interaction of respiratory centres in brain and their effect on respiration?

- a. Sectioning the brainstem above the pons results in immediate respiratory arrest.
- b. The apneustic and pneumotaxic centres of the pons are essential for basic rhythm of respiration the.
- c. Sectioning of the afferent vagal nerve results in deep and slow respiration.

d. Rhythmicity of the medullary centres is abolished when the brain stem is transacted above this area.

40- Which of the following is correct?

- a. Alveolar pressure is positive during inspiration.
- b. Alveolar pressure is negative during expiration.
- c. Alveolar pressure is positive between breaths.
- d. Intra-pleural pressure is positive during normal inspiration.
- e. Intra-pleural pressure is negative during normal inspiration.

41- Compliance of the lung:

- a. Measures the recoil tendency of the lung.
- b. Is expressed as change in volume per unit change in pressure.
- c. Is expressed as change in pressure per unit change in volume.
- d. IS less than the total thoracic complience (combined compliance of the lung and chest wall).
- e. Is about 5 L/cmH₂O in normal lung.

42- which of the following is correct?

- a. The barometric pressure (atmospheric p) increases at high altitudes.
- b. Ventilation perfusion ration is increased at the base of the lung.
- c. Ventilation perfusion ratio of the whole lung equals 0.8.
- d. Stagnant hypoxia is caused by cyanide poisoning.
- e. Anemic hypoxia is caused by a decrease in blood flow.

43- Chloride shift helps in maintaining:

- a. The electricity of the cell.
- b. The concentration of H⁺ in the cell.
- c. The concentration of CO₂ in the cell.
- d. The concentration of O₂ in the cell.
- e. The concentration of plasma proteins in the cell.

44- Stroke volume is increased by which of the following?

- a. A decrease in venous compliance.
- b. An increase in afterload.
- c. A decrease in contractility.
- d. An increase in heart rate.
- e. A decrease in coronary blood flow.

45- The electrocardiogram is most effective in detecting a decrease in which of the following?

- a. Ventricular contractility.
- b. Mean blood pressure.

- c. Total peripheral resistance.
- d. Ejection fraction.
- e. Coronary blood flow.

46- Regarding Starling's law of the heart:

- a. An increase in resting length of the cardiac muscle enhances the force of its subsequent contraction within limits.
- b. The increase in length of the sarcomere enhances the extent of overlapping between the actin and myosin filaments.
- c. The increase in length of the sarcomere increases the affinity of the regulatory protein (Troponin C) to Ca^{2+} .
- d. All of the above.

47- Which of the following correctly describes an event that normally occurs during the PR interval?

- a. The ventricle is contracting.
- b. The cardiac action potential passes through the AV node.
- c. There is no change in the voltage tracing on the ECG.
- d. The mitral and aortic valves are both closed.
- e. The second heart sound is heard.

48- If the ejection fraction increases, there will be a decrease in:

- a. End-diastolic volume.
- b. End-systolic volume.
- c. Cardiac output.
- d. Systolic pressure.

49- The next normal ventricular contraction that occurs after the extrasystole would produce:

- a. Increased pulse pressure because the contractility of the ventricle is increased.
- b. Increased pulse pressure because total peripheral resistance is decreased.
- c. Decreased pulse pressure because the contractility of the ventricle is increased.
- d. Decreased pulse pressure because total peripheral resistance is decreased.

50- The following measurements were obtained in a male patient.

Heart rate	= 70 beats/min.
Pulmonary vein O ₂ content	= 24 ml/dL.
Pulmonary artery O ₂ content	= 16 ml/dL.

Whole body O₂ consumption = 500 ml/min.

The patient's cardiac output equals

- a. 4.55 L/min.
- b. 5.00 L/min.
- c. 6.25 L/min.
- d. 12.00 L/min.

51- Which of the following is the result of an inward Na⁺ current:

- a. Upstroke of the action potential in the SAN.
- b. Upstroke of the action potential in the ventricular muscle fibers.
- c. plateau of the action potential in ventricular muscle.
- d. Repolarization of the action potential in SAN.

52- Which of the following does not occur as blood passes through the systemic capillaries?

- a. Its red blood cells increase in size.
- b. Its hemoglobin dissociation curve shifts to the left.
- c. Its PH decreases.
- d. Its protein content increases.

53- Regarding ventricular filling:

- a. Depends mainly only on contraction of atria.
- b. Begins during isometric relaxation phase of cardiac cycle.
- c. Gives rise to second heart sound.
- d. Is mainly due to pressure difference between atria and ventricles.

54- Which of the following is correct?

- a. CO decreases during exercise.
- b. Left ventricular failure causes pulmonary edema.
- c. Coronary blood flow (circulation) is regulated mostly by neural control.
- d. In right ventricular failure the CO of the RV increases.
- e. The AV node is the pacemaker of the heart.

55- Regarding dystrophin, the following are true, except:

- a. It connects the actin filaments with the extracellular matrix.
- b. Congenital defect causes muscle weakness.
- c. It binds myosin to the Z disk.
- d. It provides structural support to the muscle fibril.

56- Concerning the cardiac cycle:

- a. The duration of the systolic phase is longer than the duration of the diastolic phase.

- b. The duration of the systolic phase equals the duration of the diastolic phase.
- c. a wave of the atrial pressure curve occurs during atrial contraction.
- d. c wave of the atrial pressure curve occurs during atrial contraction.
- e. v wave of the atrial pressure curve occurs during atrial contraction.

57- The following data were collected from an individual:

@ Pulse rate	= 83 beats/min.
@ Bp	= 120/80.
@ Oxygen consumption	= 1200 ml/12 min.
@ Pulmonary artery O ₂ content	= 16 ml/100 ml
@ Aortic artery O ₂ content	= 20 ml/100 ml

The stroke volume of this individual is:

- a. 90 ml
- b. 70 ml
- c. 60 ml
- d. 30 ml

58- Which of the following would be expected to raise blood pressure?

- a. Prostacyclin.
- b. A drug that inhibits angiotensin conversion enzyme.
- c. A drug that inhibits NO synthetase.
- d. A drug that inhibits V1 vasopressin receptors.
- e. A drug that inhibits endothelin-converting enzyme.

59- An increase in capillary hydrostatic pressure can be caused by:

- a. An increase in arteriolar resistance.
- b. A decrease in venous resistance.
- c. A decrease in venous pressure.
- d. An increase in venous pressure.
- e. A decrease in arterial (arteriolar) pressure.

60- The highest coronary blood flow would occur:

- a. At beginning of diastole.
- b. when the aortic pressure is highest.
- c. When the aortic blood flow is highest.
- d. When the ventricular pressure is highest.

SECTION B CASESTUDY 5 MARKS

A male patient aged 70 years, suffered from fracture neck femur of the left side. He was operated for the fracture. After the operation, he was unable to move even in bed although he was encouraged to move.

Three days after the operation, the doctor observed swelling in his left leg and was diagnosed as deep venous thrombosis.

1- mention two causes of occurrence of deep venous thrombosis in this patient

- a.
- b.

2- The patient received heparin three times daily and dicumarol once daily.

- a. What is the mode of action of dicumarol?
.....
- b. How heparin is given
 - ° Orally.
 - ° By injection.

3- After two days, heparin treatment was stopped and dicumarol treatment continues How efficacies of dicumarol treatment can is adjusted.

- a. By measuring bleeding time.
- b. By measuring prothrombin time.
- c. By measuring platelet count.
- d. By measuring fibrinogen level in plasma.

4- Ten days later, the patient suffers from severe bleeding from a slight cut in the face. The clotting of blood does not occur. This was diagnosed as a complication of dicumarol therapy. Choose a substance to give to the patient.

- a. Injection of sodium citrate.
- b. Injection of vitamin K.
- c. Injection of calcium chloride.
- d. Injection of active protein C.

C- MATCHING ITEMS QUESTIONS 2 items 5 marks for each one

1- THEME O2 CARRAGE BY BLOOD

- a. Deoxygenation.
- b. Haldane effect.
- c. O2 saturation.
- d. O2 content.
- e. Carbonic anhydrase.
- f. Cl shift.
- g. Carbamino group.

- h. bicarbonate group.
- i. pH fall.

For each of the descriptions in the lower list (1-5) choose the most appropriate option from the upper list (a- i). There is only one correct answer for each question. Each option may be used once, more than once or not at all.

- 1- Increases the H⁺ buffering power of hemoglobin. ()
- 2- Is decreased by a fall in p O₂ but not by anemia. ()
- 3- Decreases the O₂ affinity of hemoglobin.
- 4- Results from increased HCO₃ production in erythrocytes. ()
- 5- Is increased at any given P O₂ in fetal compared to adult hemoglobin ()

2- THEME CARDIAC ACTION POTENTIALS

- a- Activated when all other currents are blocked.
- b- Activated by acetyl choline.
- c- Under physiological conditions cause outward current.
- d- Prolongs the terminal part of the plateau.
- e- Blocked by dihydropyridine (DHP).
- f- Cause influx of Na and K ions.
- g- Activated at +20 mV and deactivated at +10 mV.
- h. Its outer gate closed after re-establishment of the resting membrane potential.
- i- Influx of ions cause outward current.

For each of the descriptions in the lower list (1-5) choose the most appropriate option from the upper list (a- i). There is only one correct answer for each question. Each option may be used once, more than once or not at all.

- 1- Inward rectified K⁺ channels (IRK) . ()
- 2- Funny current (I_f) channels. ()
- 3- Fast voltage gated Na⁺ channels. ()
- 4- Chloride ion channels. ()
- 5- Long lasting Ca⁺⁺ channels. ()

FIRST YEAR PHYSIOLOGY

This examination paper consists of 2 parts (to be answered in the provided answering copybook)

Part I: Short Essay Questions **(Total marks: 50 Marks)**

Give an account on the following:

- 1- Sites of cholinergic fibres explaining types, site and stimulation of cholinergic receptors (8marks)
- 2- Platelet release and aggregation functions (7marks)
- 3- Sources of Ca^{2+} and excitation- contraction coupling in smooth muscle (7 marks)
- 4- Structure, cells secreting and functions of surfactant (7marks)
- 5- The changes in both the atrial and ventricular pressure and ventricular volume during left ventricular systole (7marks)
- 6- The effect of decreased renal blood flow on arterial blood pressure (7marks)

Biophysics: .

- 7- Starling law (length-tension relationship) and its application in skeletal muscle (7marks)

Part II: Case study and Diagram **(Total marks: 10 marks)**

8- Case study: **(5marks: each question 1 mark)**

A 23-year-old man was injured in a car accident and was badly cut.

Before the ambulance arrives he lost a lot of blood. When he arrives to the hospital, examination revealed low blood pressure (85/60), tachycardia (110 beats/min), pale cold skin. The doctor also noticed that the patient is anxious, confused, and generally weak.

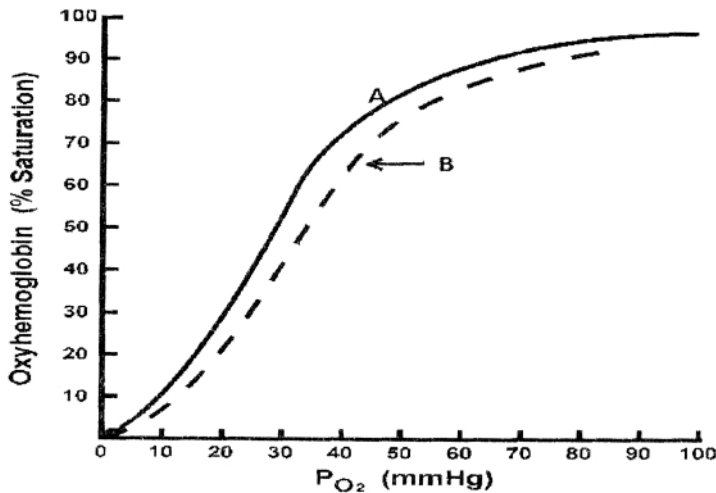
He has rapidness in breathing. The patient was diagnosed as being in shock and started treatment immediately.

Questions:

- 1- What type of shock is this patient having? Mention 2 other causes that can produce it.
- 2- What is the cause of hypotension and tachycardia of this patient?
- 3- What is the cause of pale cold skin and rapid respiration?
- 4- What do you expect the blood pH of this patient is? Explain why.
- 5- Does antidiuretic hormone play a role in this situation? Explain your answer.

9- Diagram question: (5marks: each question 1mark)

Study the O₂ dissociation curve below, and then answer the following questions:



Questions:

- 1- What are the causes of shift of curve A to curve B?
- 2- How much is P_{50} in curve A and curve B? What does this change mean?
- 3- Why is the O₂-dissociation curve not linear (S shaped)?
- 4- What is the significance of the flat portion of the curve?
- 5- What is the coefficient of O₂ utilization? What does it depend on?

N.B: Oral Exams will be held at 8.30 a.m.

Final Exam First Year Physiology

Instructions

- Please read the instructions before answering the questions.
- You should count the number of pages that include the MCQs and Matching questions.
- No questions Clre allowed.
- Number of pages: 10 (from 1-10)
- **Questions include:**
 - 1- Section (A): 60 MCQs (Select a single answer) (60 marks)
 - 2- Section (B): Matching question (5 marks)

SECTION A: MCQs (60 Questions 1 mark each)

Mark the correct single answer (A,B,C,D,E) in section A of the provided computer answer shase fill.the circle completely:

1- Concerning the autonomic nervous system (ANS):

- a- The ratio of the number of preganglionic: postganglionic is about 20:1
- b- The adrenal medulla secretes hormones with actions like those of the postganglionic nerves of sympathetic nervous system
- c- The highest centre involved in the control of ANS is in the medulla
- d- Transmission velocity in the postganglionic ANS fibers is the same as somatic nerves
- e- The cell bodies of preganglionic fibers are present in the anterior horn of spinal cord

2- The sympathetic division of ANS is characterized by:

- a- Adrenergic preganglionic fibers
- b- The vagus nerve, which is the major component
- c- Lumbo-sacral outflow of the spinal cord
- d- Short postganglionic fibers
- e- Thoraco-lumbar outflow of the spinal cord

3- Parasympathetic stimulation produces:

- a- Increased cardiac contractility .
- b- Micturition .
- c- Sweating
- d. Ejaculation of semen .
- e- Dilation of the pupil .

4- Alpha and beta receptors are:

- a- Differentiated by blockade by atropine and curare
- b. Differentiated on the basis of different sensitivities to norepinephrine and nicotine
- c- Adrenergic receptors
- d- Cholinergic receptors
- e. Found in the autonomic ganglia

5- Sympathetic:

- a- Ganglionic transmission is mediated by acetylcholine
- b- Neuromuscular transmission at the heart is mediated by adrenaline
- c- Neuromuscular transmission in skin arterioles is mediated by acetylcholine .
- d- Neuromuscular transmission at sweat glands is mediated by noradrenaline
- e- Neuromuscular transmission at the iris is mediated by dopamine

6- Increased activity of the sympathetic nerves to the thoracic viscera produces:

- a- An increase in the coronary blood flow
- b- Inhibition of atrial properties
- c. Decrease in the oxygen consumption of the heart
- d. Vasodilation of pulmonary vessels e- Bronchoconstriction

7- As regard the parasympathetic supply to the head and neck:

- a- Preganglionic fibers are provided through the vagus and facial nerves
- b. Postganglionic fibers dilate the pupil and prepare the eye for far vision.
- c- Preganglionic fibers relay in superior cervical ganglion.
- d- Postganglionic fibers enter the eye as short ciliary nerves
- e- Postganglionic fibers decreases salivary glands secretion and blood flow

8- Grey rami communicans are:

- a- Myelinated preganglionic sympathetic fibers
- b- Myelinated postganglionic sympathetic fibers.
- c- Unmyelinated sympathetic fibers to blood vessels, sweat glands and piloerector muscles.
- d- Unmyelinated postganglionic sympathetic fibers to pelvic region.
- e- Myelinated preganglionic parasympathetic fibers.

9- Oncotic pressure: .

- a- Is colloidal pressure of plasma proteins mainly globulins
- b- Normally prevents edema
- c- Cause osmosis of water outward through capillary from intravascular to extravascular
- d- Is about 25 mmHg at arterial end and 10 mmHg at venous end of capillary ,
- e- Increases in liver diseases

10- Albumin:

- a- Has the smallest molecular weight of all plasma proteins.
- b- Has smallest concentration of all plasma proteins.
- c- Is responsible for the normal viscosity of blood.
- d-Is normally positively charged in plasma.
- e- Is formed mainly by plasma cells.

11- Erythrocytes:

- .a- Are rigid biconcave discs
- b- Release erythropoietin after hemolysis to stimulate the production of more red cells
- c- Count is higher in newly born infants
- d- Contain carbonic anhydrase enzyme needed for transport of oxygen
- e- Make a major contribution to the protective capacity of blood

12. Concerning Hemoglobin:

- a- Each molecule can carry 8 molecules. of oxygen.
- b- Binds oxygen tightly
- c- Forms oxyhemoglobin with carbon monoxide
- d- Contains iron in the ferrous state.
- e- Oxyhemoglobin is a better buffer than deoxyhemoglobin

13- Regarding erythropoiesis:

- a- It occurs in the bone marrow of all bones after age of 40.
- b- Erythropoietin acts through receptors on committed stem cells .
- c- Beta adrenergic receptors blockers stimulate erythropoietin secretion .
- d- Iron absorption occurs via a basolateral membrane transporter called DMT1.
- e- Vitamin B12 absorption occurs mainly in the duodenum and upper jejunum.

14- Platelets:

- a- Synthesize ADP which produces vasoconstriction
- b- Granules contain Von-Willebrand factor needed for platelet survival in circulation.

- c- Aggregation is a self- propagating process which is stimulated by serotonin
- d- Release and aggregation are inhibited by prostacyclin
- e- Synthesize the protein thromboxane A₂ which stimulates adenylate cyclase enzyme

15- Proteins produced by platelets include:

- a- Plasminogen .
- b- Fibrinogen.
- c- Prothrombin .
- d- Thromboplastin
- e- Albumin

16- Factor VIII:

- a- Acts a cofactor to increase proteolytic efficiency of IXa and Xa
- b- Deficiency occurs in vitamin K deficiency
- c- Is stable on storage of blood
- d- Deficiency affects the extrinsic rather than intrinsic pathway for blood coagulation .
- e- Is present on serum .

17- Regarding blood coagulation:

- a- Extrinsic pathway activation follows contact of blood with collagen
- b- It results from conversion of thrombin to prothrombin
- c- Intrinsic pathway Occurs in vivo only "
- d- Thrombin catalyzes the conversion of fibrinogen to fibrin
- e- Intrinsic pathway is initiated by release of tissue thromboplastin

18- Blood clotting Is delayed or prevented in vitro by all the following, except:

- a- Sodium citrate.
- b- Heparin
- c- Dicumarol.
- d- Placing blood in non-wettable coated silicone tubes.
- e- Oxalate ions.

19- Concerning white blood cells:

- a- Neutrophils have granules that contain heparin and histamine
- b- Monocytes lose their nucleus and lysosomes and change to tissue macrophages
- c- Eosinophils are strong phagocytic cells
- d- Basophils are similar to mast cells
- e- Lymphocytes contain granules filled with proteolytic enzymes

20- As regard resting membrane potential (RMP) of a nerve fiber:

- a- There is a higher concentration of K⁺ outside the nerve than inside

- b- The potential across a nerve fiber is largely determined by the log of the ratio of K^+ ions inside: outside
- c- Is due to diffusion of intracellular proteins to outside the nerve fiber
- d- If the Na^+/K^+ pump is inhibited the membrane potential falls to zero
- e- Active transport of ions is the main factor which determines RMP

21- Nerve impulse:

- a- Can travel in one direction only in a nerve fiber
- b- Can travel in one direction only in a synapse
- c- Travels with a speed that is inversely proportional to the square root of nerve fiber .
- d- Is conducted with a decrease in magnitude
- e- Is transmitted with more energy consumption in myelinated nerves

22- Nerve action potential:

- a- Occurs when its membrane potential is hyperpolarized to a critical level
- b- Is associated with a transient decrease in membrane permeability to potassium.
- c- Is associated with a transient increase in membrane permeability to sodium .
- d- Has an amplitude which is directly proportional to the intensity of stimulus.
- e- Begins by changing the positive resting potential to a negative potential

23- As regard the nerve relative refractory period:

- a- During it the nerve excitability is increased
- b- A stimulus weaker than threshold is required to generate an action potential.
- c- It occupies all the descending limb of action potential.
- d- During it all voltage gated Na^+ channels are inactivated.
- e- During it there is a state of hyperpolarization

24- Regarding skeletal muscle fibers (SMF):

- a- Their membrane is negatively charged on the outside with respect to the inside.
- b- A reduction in the extracellular Ca^{2+} concentration decreases excitability of SMF
- c- An increase in the extracellular Ca^{2+} concentration increases strength of contraction ,
- d- Each single muscle fiber is normally innervated by more than one motor neuron .
- e- Contraction strength is related to the initial length of SMF

25- The action potential of skeletal muscle:

- a- Spreads inward to all parts of muscle via the T tubules
- b- Causes the immediate uptake of Ca^{2+} into lateral sac of the sarcoplasmic reticulum.

- c- Has a prolonged plateau phase
- d- Is longer in duration than action potential of cardiac muscle
- e- Is not essential for contraction

26- The contractile response in skeletal muscle:

- a- Occurs when its pacemaker cells depolarize sufficiently to reach threshold for firing
- b- Occurs when actin and myosin filaments shorten
- c- Produces more tension when the muscle contracts isometrically than isotonicly.
- d- Produces more work when the muscle contracts isometrically than isotonicly.
- e- Decreases in magnitude with repeated stimulation

27- Concerning skeletal muscles:

- a- Distance between two Z lines remains constant during contraction
- b- Width of the (A) band is decreased during contraction
- c- Tension developed is maximal when actin and myosin just fail to overlap.
- d- Motor units in red muscle are more resistant to fatigue than those of white muscle.
- e- During a prolonged but submaximal contraction the motor units used in tile contraction are changed alternatively

28- Smooth muscles contraction is increased by all of the following, except:

- a- O₂ lack .
- b- Alkalies .
- c- Stretch .
- d- Excess K⁺ .
- e- Cold.

29- Visceral smooth muscle fibers are characterized by:

- a- Formed of separate muscle fibers with completely separate cell membranes.
- b- Each fibers contracts independently of the others.
- c- Their contraction depends on binding of Ca²⁺ with calmodulin .
- d- Controlled mainly by nervous control .
- e- Action potential is mainly absent .

30- A property shared by:

- a- Skeletal and smooth muscle is their striated microscopic appearance.
- b- Skeletal and cardiac muscle is that they are paralyzed by cutting their motor nerves.
- c- Cardiac and visceral smooth muscle is their spontaneous activity when denervated .

- d- Skeletal and cardiac ventricular muscle is their unstable resting membrane potential.
- e- All varieties of muscle is that their contraction strength is related to extracellular Ca^{2+} .

31- All about cardiac muscles is correct, except:

- a- Spontaneous phase 4 depolarization is characteristic of a pacemaker cell in the heart .
- b- The conduction through the atrio-ventricular node (A VN) is very slow
- c- Ventricular muscle fibers have a prolonged phase 2 depolarization.
- d- The activation of K^+ channels at the SAN occurs more rapidly than the rest of heart .
- e- If the connection between the SAN and AVN is blocked the rate of ventricular contraction will decrease .

32- Regarding the excitation-contraction coupling in cardiac muscle:

- a- Cardiac cells directly trigger Ryanodine (Ry) channel Ca^{2+} release.
- b- Is an example of Ca^{2+} induced Ca release (CICR) similar to all excitable muscles.
- c- Is blocked by dihydropyridine (DHP).
- d- Calcium is mainly reuptaken by mitochondria .
- e- Relaxation begins when the calcium diffuses out of the cell .

33- Which of the ion channels is responsible for the inward current of plateau phase of the cardiac action potential?'

- a- Cl^- channels.
- b- K^+ channels.
- c- Na^+ channels.
- d- L-type Ca^{2+} channels.
- e- T - type Ca^{2+} channels.

34- It is impossible to tetanize a heart because:

- a- There is a long mechanical refractory period.
- b- The electrical refractory period and the mechanical contractile response are of almost equivalent duration.
- c- The mechanical response is usually shorter than the duration of the electrical depolarization.
- d- The Ca^{2+} transport mechanism in heart muscle is responsible for the prolonged refractoriness.
- e- Heart muscle do not contain Ca^{2+} .

35-During the late part of reduced ejection phase of the left ventricle:

- a- Left atrial pressure remains unchanged.

- c- A vasodilation and an increase in cardiac output .
- d- A vasodilation and a decrease in cardiac output .
- e- A decrease in venous return of blood to the heart .

41- Angiotensin II has the following effects, except:

- a- Stimulates antidiuretic hormone release.
- b- Stimulates renin release .
- c- Stimulates thirst .
- d- produces powerful constriction .
- e- Stimulates aldosterone secretion .

42- Atrial natriuretic peptide:

- a. Enhances renal sodium retention.
- b. Increases renin release.
- c- Causes elevation of blood pressure.
- d. Decreases blood volume and cardiac output .
- e- Secretion is stimulated by decreased blood volume .

43- According to the myogenic theory of autoregulation of blood flow, increasing arteriolar blood pressure leads to:

- a- An elevation of tissue blood flow.
- b- A decreased vascular resistance .
- c- An increased vascular resistance .
- d- Decreased vascular tone .
- e- Release of vasodilator substances from endothelium .

44- Low resistance shock:

- a- Occurs when the size of the vascular system is increased by vasodilatation of arterioles and capillaries.
- b- Is characterized by an increase of the venous return.
- c- Is characterized by cold and pale skin in septic shock.
- d- Is characterized by decreased blood volume
- e- Is characterized by marked vasoconstriction in neurogenic shock

45- The coronary blood flow:

- a- Is about 500 ml/min at rest ..
- b- Increases in the endocardium during systole
- c- Decreases by adenosine.
- d- of left ventricle, increases in systole .
- e- Is mainly adjusted by autoregulation.

46- Pulmonary vascular resistance Is decreased:

- a- By releasing nitric oxide .
- b- By breathing low oxygen.
- c- At high lung volumes .
- d- With increased pulmonary blood flow .
- e- At high PCO₂ levels .

47- The respiratory membrane:

- a- Is about 0.7 microns in thickness
- b- Is composed of about 9 million alveoli in both lungs
- c- Is surface area is about 100 square meters.
- d- Is formed of many layers of epithelial cells on the alveolar side.
- e- Contains only one basement membrane, namely that of the alveolar epithelium.

48- Between breaths the intra-alveolar pressure is:

- a- +1 mmHg.
- b- 0 mmHg.
- c- -1 mmHg.
- d- - 4 mmHg .
- e - - 6 mmHg.

49- The apex of the lungs shows all the following, except:

- a- A lower ventilation than the base .
- b- A lower perfusion than the base.
- c- A higher V_A/Q than the base.
- d- A higher ventilation than perfusion.
- e- Less inflated alveoli than at the base.

50- Concerning lung surfactant, all the following are correct, except:

- a- It increases the surface tension of the fluid lining the alveoli .
- b- It increases lung compliance .
- c- It prevents pulmonary oedema .
- d- In the absence of normal surfactant there will be greater tendency for alveoli to collapse .
- e- It decreases by long term inhalation of 100% oxygen

51- During normal inspiration:

- a- Intra-pleural pressure is positive.
- b- The volume in the lungs is less than the functional residual capacity.
- c- The intra-pulmonary pressure is equal to atmospheric pressure.
- d- The intra-pulmonary pressure is higher than atmospheric pressure.
- e- Intra-pleural pressure is more negative than it is during expiration.

52- All of the following about lung compliance is true, except:

- a- Increased in emphysema.
- b- Decreased in pulmonary congestion.
- c- Decreased in hyaline membrane disease.
- d- Decreased in lung fibrosis.
- e- Decreased in old age

53- All the following affect the airway diameter, except:

- a- Histamine.
- b- Inspiration.
- c- Sympathetic stimulation.
- d- A rise in alveolar P_{O_2} .
- e- A decrease in alveolar PCO_2

54- In the transport of CO_2 from the tissues to the lungs, which of the following occurs in venous blood? .

- a- Conversion of CO_2 and H_2O to H^+ and HCO_3^- in the RBCs
- b- Buffering of H^+ by oxyhemoglobin
- c- Shifting of HCO_3^- into the RBCs from plasma in exchange for cr.
- d- pH of RBCs becomes alkaline.
- e- The hematocrit value decreases

55- A patient has a dead space volume of 125 ml, a respiratory rate of 14 breaths / min and a tidal volume of 450 ml. How much is his alveolar ventilation?

- a- 8050 ml/min.
- b- 6525 ml/min .
- c- 5420 ml/min .
- d- 4550 ml/min.
- e- 504 ml/min

56- As regard Hering- Breuer reflexes:

- a- They result in inhibition of inspiration when the lungs are inflated .
- b- They result in excitation of inspiration when the lungs are inflated .
- c- Initiated by J-receptors in alveolar wall .
- d- They result in inhibition of inspiration when the lungs are deflated.
- e- They contribute to the sensation of dyspnea in lung diseases .

57- The activity of the central chemoreceptors is stimulated by:

- a. An increase in the PCO_2 of blood flowing through the brain.
- b. A decrease in the PO_2 of blood flowing through the brain .
- c. A decrease in the oxygen content of blood flowing through the brain.
- d. A decrease in the metabolic rate of the surrounding brain tissue .
- e. An increase in the pH of the CSF.

58- Variations in which of the following components of blood or cerebrospinal fluid do not affect respiration:

- a- Arterial HCO_3^- concentration .
- b- Arterial H^+ concentration.
- c- Arterial Na^+ concentration .
- d- Cerebrospinal fluid CO_2 concentration .
- e- Cerebrospinal fluid H^+ concentration.

59- Intravenous lactic acid increases ventilation. The receptors responsible for this effect are located in:

- a- Medulla oblongata.
- b- Carotid bodies.
- c- Lung tissue.
- d- Aortic baroreceptors
- e- Trachea and large bronchi.

60- Hypoxic hypoxia:

- a- Is characterized by normal oxygen tension in arterial blood and normal saturation of hemoglobin with oxygen.
- b- Is accompanied with cyanosis.
- c- Is produced by carbon monoxide poisoning.
- d- Is accompanied with low hemoglobin content.
- e- Is produced by inhibition of tissue oxidative enzymes by toxic agents.

SECTION B

Matching

Total marks: 5 MARKS

Answer in capital letters as (A. B. C. D. E. F. G. H. I. J) in section B of your provided computer answer.

For each blood coagulation related disorder below, select the most suitable . description of a case: (Use each item once)

- a- Consumption of many clotting factors
- b- Deficiency of factor VIII .
- c- Increased fibrinogen level .
- d- Deficiency of prothrombin .
- e- Excessive heparin administration.
- f- Vitamin K deficiency.
- g- Low platelets count below $50,000/\text{mm}^3$.
- h- Deficiency of factor XI .

- 1- A 15-year-old child with diffuse purpura (pin-head areas of hemorrhage). Laboratory tests showed prolonged bleeding time**
- 2- A 50-year-old man who is receiving an anticoagulant therapy (warfarin, a vitamin K competitor). He is admitted to hospital complaining of hematuria (blood in urine)**
- 3- A 10-year-old child with hemophilia A complains of persistent bleeding after tooth extraction and has prolonged coagulation time**
- 4- A 30-year-old pregnant female who stopped feeling the movements of her baby for several weeks. She was admitted to the hospital with bleeding tendency and examination revealed widespread clotting**
- 5- A newly born infant with bleeding tendency, laboratory tests showed deficiency of factors II, VII, IX, X and prolonged coagulation time**

FIRST YEAR
PHYSIOLOGY

This examination paper consists of 2 parts (to be answered in the provided answering copybook)

Part I: Short Essay Questions (Total marks: 50 Marks)

Answer the following questions:

- 1- Discuss the pelvic autonomic nerves (origin- relay- functions) (6marks)
- 2- Give an account on the 3 groups of coagulation factors and describe the intrinsic pathway of coagulation (8marks)
- 3- Describe the excitation-contraction coupling of skeletal muscle fibres (7marks)
- 4- Mention role of O₂ in regulation of respiration and explain why it is a weaker stimulus than CO₂ (8marks)
- 5- Compare the effect of changing preload and afterload on cardiac muscle performance (on muscle shortening and velocity of shortening) (8marks)
- 6- Discuss hemorrhagic shock (manifestations – rapid compensatory mechanisms) (8marks)

Biophysics:

- 7- State law of Laplace and describe its applications in the cardiovascular system (5marks)

Part II: Case study and Diagram (Total marks: 10 marks)

8- Case study: (5marks: each question 1 mark)

A 20-year-old woman with a long history of asthmatic attacks was admitted to the hospital because of severe respiratory distress. The current asthmatic attack failed to respond to the usual antihistaminic drug that was self-administered. When seen by the physician, she was sitting up, obviously anxious, and desperately trying to breathe. She was

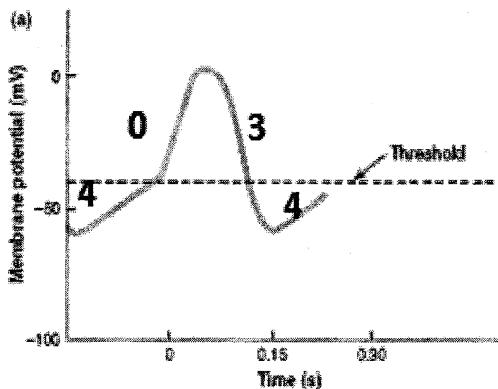
slightly cyanotic, sweating and wheezing. She was given oxygen and epinephrine, and her symptoms subsided considerably after that.

Questions:

- 1- What is the cause of difficulty in breathing in this patient? Comment on her work of breathing
- 2- The patient was using an antihistaminic drug to stop the bronchoconstrictor action of histamine. Innumerate another 2 factors which produce bronchoconstriction
- 3- Explain why she was given epinephrine. Which autonomic receptor epinephrine stimulated in this case?
- 4- Define cyanosis. In this patient what is its cause and how it was treated?
- 5- Why is asthmatic attacks associated with hyper-inflated lungs? By using the spirometer how can you diagnose bronchial asthma?

9- Diagram question: (5marks: each question 1mark)

Study the curve below, and then answer the following questions:



Questions:

- 1- What does this curve represent?
- 2- What is the name of phase [4], describe its ionic causes and explain the effect of hypokalemia on this phase
- 3- What does phase [0] represent, what are its ionic basis and why its slope is slow?
- 4- What is phase [3], mention the opened and the inactivated channels in this phase illustrating the result on membrane conductance
- 5- What is the effect of sympathetic and parasympathetic stimulation on this curve? Explain your answer

First Year
Physiology

This examination paper consists of 2 parts (to be answered in the provided answering copybook)

Part I: Short Essay Questions (Total marks: 55 Marks)

Answer the following questions:

- 1- Give an account on the function and types of autonomic ganglia. State the ganglion stimulant and blocker drugs (7marks)
- 2- Enumerate factors affecting erythropoiesis. Discuss erythropoietin hormone (sources-mechanism of action- stimulation of its secretion) (8marks)
- 3- Describe the excitability changes during nerve stimulation. Discuss the factors affecting nerve excitability (8marks)
- 4- Explain the chloride shift phenomenon (9marks)
- 5- Discuss the different changes that occur in the cardiac cycle during ventricular ejection (8marks)
- 6- Explain what is meant by mean systemic filling pressure (MSFP). Describe the venous return curve showing the effect of changes in MSFP on this curve (9marks)

Biophysics:

- 7- Enumerate the Starling forces and explain how these forces control the bulk flow across capillary membrane (6marks)

Part II: Case study and Diagram (Total marks: 10 marks)

8- Case study: (5marks: each question 1 mark)

A 70-year-old man was admitted to the hospital with shortness of breath, severe fatigue and swelling of ankles. His history revealed attacks of angina (myocardial ischemia) and progressive shortness of breath with minimal effort. On examination the main findings were mild cyanosis, increased rate of respiration (20/min), oedema at ankles and over the lower tibias. The chest x-ray showed an enlarged heart and a diffuse

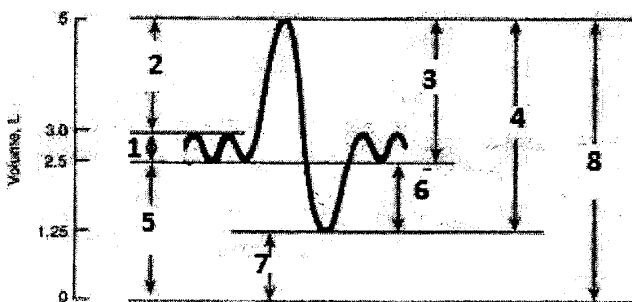
density (indicative of fluid in the lungs) at both lung bases. ECG showed left axis deviation. He was diagnosed as heart failure. Treatment included bed rest and administration of digitalis and a diuretic.

Questions:

- 1- What do you expect the effect of myocardial ischemia on the cardiac output, stroke volume and ejection fraction in this patient?
- 2- Explain why he was treated with digitalis?
- 3- Would a Ca^{2+} channel antagonist be helpful in his heart condition? Why?
- 4- Why he has increased respiratory rate and difficulty in breathing?
- 5- This patient has oedema of the lower limbs, why?

9- Diagram question: (5marks: each question 1mark)

Study the *spirometry* curve below showing different lung volumes and capacities. Answer the following questions:



Questions:

- 1- Define [1] and [2] stating their values
- 2- What is [4]? Mention its components, its value, what it indicates clinically and 2 lung diseases that decrease it
- 3- Define [6] and mention its value. What are the diseases which decrease it?
- 4- Which of the above lung capacities cannot be measured by the spirometry? Mention their representing number on the above curve, their components and values
- 5- What is [7]? Describe its importance

First Year
Physiology

This examination paper consists of 2 parts (to be answered in the provided answering copybook)

Part I: Short Essay Questions (Total marks: 55 Marks)

Answer the following questions:

- 1- Give an account on sympathetic supply to thoracic and abdominal viscera [origin- relay- functions] (8marks)
 - 2- Discuss the platelets release and aggregation functions (7marks)
 - 3- State the properties of the neuromuscular transmission. What is meant by Myasthenia Gravis? (8marks)
 - 4- Define surfactant. Explain its functions and enumerate causes of its deficiency (9marks)
 - 5- Describe (using related curves) the effect of changing the preload on, isolated cardiac muscle performance and on stroke volume (9marks)
 - 6- Explain the local autoregulatory mechanisms for regulation of diameter of arterioles (8marks)
- Biophysics:**
- 7- Nernst equation and its importance (6marks)

Part II: Case study and Diagram (Total marks: 10 marks)

8- Case study: (5marks: each question 1 mark)

In the course of a routine physical examination a 40-year-old man was found to have an arterial blood pressure of 185/95 mmHg and a heart rate of 70 beats/min. The history, physical examination, and laboratory findings disclosed nothing significant other than slight left ventricular hypertrophy (slight increase in left ventricular mass)

Questions:

- 1- Calculate the mean arterial blood pressure of this patient. If his stroke volume, cardiac output and central venous pressure were all normal, what hemodynamic factor must account for the elevated mean arterial pressure? Explain your answer with equations
- 2- Describe the changes in the baroreceptor reflex in this patient

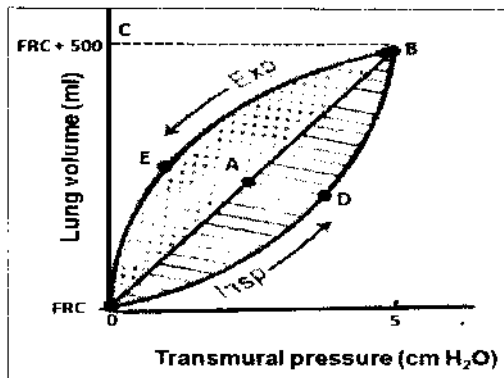
3- This patient was advised to take angiotensin converting enzyme inhibitor (e.g. captopril) as a treatment, explain how captopril can lower his elevated blood pressure

4- What is the cause of the patient's left ventricular hypertrophy

5- Assume that he was diagnosed as having secondary hypertension due to a tumor of the adrenal medulla secreting norepinephrine. Describe the effect of excess norepinephrine on various factors determining arterial blood pressure

9- Diagram question: (5marks)

Study the curve below representing the work of breathing, and answer the following questions:



Questions:

1- During inspiration:

a- Mention the 2 components of the work of breathing during inspiration explaining what the work is needed to overcome, and state their area of representation in the above curve. (1mark)

b- In normal quiet breathing mention the muscles responsible for this work and the percentage each component represents of the total work of breathing (1mark)

2- During expiration:

a- State where is the area of representation of the work of breathing during expiration in the above curve? What this work is needed to overcome? (1mark)

b- What is the source of energy of this work during normal quiet breathing? Explain why expiration is considered passive (1mark)

3- In a patient of bronchial asthma what occurs to the work of breathing during both inspiration and expiration and their areas of representation in the above curve, what does this mean? (1mark)

9- Monocytes:

- a- Originate from precursor cells in lymph nodes
- b- Stimulate the immune system by producing an antigen presenting cells
- c- Unlike granulocytes, do not migrate across capillary walls
- d- Can transform into large phagocytic cells which survive few hours
- e- Manufacture immunoglobulin M

10- When a nerve cell membrane is depolarized by 5 mV:

- a- Its permeability to K^+ decreases
- b- The firing level is reached
- c- Na^+ channels inner gates open
- d- Na^+ move into the cell to cause further depolarization
- e- An action potential is generated.

11- Excitability of the nerve is increased due to:

- a- Hyperkalemia
- b- Hyponatremia
- c- Hypercalcemia
- d- Tetrodotoxin toxin
- e- Local anaesthetics

12- Which of the following characteristics of an axon is most dependent on its diameter?

- a- The magnitude of its resting potential
- b- The duration of its refractory period
- c- The conduction velocity of its action potential
- d- The overshoot of its action potential
- e- The activity of its sodium-potassium pump

13- The resting membrane potential of a nerve fiber:

- a- Is a state of rapid change in membrane potential due to nerve stimulation
- b- Occurs due to great K^+ outflow through the inward rectifier K^+ channels
- c- is a state of complete depolarization when the neuron is unstimulated
- d- Occurs because the membrane is permeable to Na^+ more than K^+
- e- Distributes more positive ions on inner surface of the membrane than outer surface

14- The nerve action potential:

- a- Firing level is reached when voltage-gated Na^+ channels are totally activated
- b- Has an amplitude which is directly proportional to the intensity of stimulus
- c- Depolarization is due to inactivation of Na^+ and activation of K^+ channels
- d- Occurs when the membrane potential is hyperpolarized to a critical level
- e- Absolute refractory period is from the firing level until repolarization is completed

15- If transmission at the neuromuscular junction was blocked by the application of curare, which one of the events listed below would fail to occur when a motor nerve impulse arrived?

- a- Depolarization of the postsynaptic membrane
- b- Depolarization of the presynaptic membrane
- c- Entry of calcium ions into the presynaptic terminal
- d- Presynaptic release of transmitter substance
- e- Degradation of transmitter at synaptic cleft

16- An increase in sodium conductance is associated with:

- a- The plateau phase of the ventricular muscle action potential
- b- The downstroke of the skeletal muscle action potential
- c- The upstroke of the smooth muscle action potential
- d- The end-plate potential of the skeletal muscle fiber
- e- The hyperpolarization phase of nerve action potential

17- One of the following describes excitation-contraction coupling in skeletal muscle fibers:

- a- Ca^{2+} binds to tropomyosin, causing troponin to uncover the binding sites on actin
- b- The Ca^{2+} pump of the sarcoplasmic reticulum (SR) pumps Ca^{2+} into the cytoplasm
- c- Depolarization of the T-tubules results in the release of calcium from the SR
- d- For detachment to occur ADP and inorganic phosphate attach to the cross bridge
- e- Ca^{2+} influx across the muscle fiber membrane causes Ca^{2+} release from the SR

18- Which of the following enzymes normally antagonizes smooth muscle contraction?

- a- Rho-Kinase
- b- Myosin phosphatase
- c- Myosin light-chain kinase
- d- Protein kinase C
- e- Phospholipase C

19- A property shared by:

- a- Skeletal and smooth muscle is their striated microscopical appearance.
- b- Skeletal and smooth muscle is their large contents of troponin and tropomyosin
- c- Cardiac and multiunit smooth muscle is their spontaneous activity when denervated
- d- Skeletal and cardiac ventricular muscle is their stable resting membrane potential.
- e- All varieties of muscle is that contraction strength is inversely related to initial length.

20- At the end of a quiet inspiration, intra-alveolar pressure is normally:

- a- 240 cmH₂O
- b- 24 cmH₂O
- c- 0 cm H₂O
- d- 14 cmH₂O
- e- 140 cmH₂O

3- Concerning iron absorption:

- a- Hemosiderin is the aggregated deposits of transferrin containing more than 35% iron
- b- Ferrioxidase enzyme is needed for the action of DMT1 at enterocyte apical border
- c- Iron loading increases ferroportin degradation due to inhibition of hepcidin
- d- Hepcidin stimulates release of recycled iron from macrophages during hypoxia
- e- Ferritin stored in the enterocyte is quickly lost in stools if iron stores are replete

4- Vitamin B₁₂:

- a- Absorption is increased by HCl needed for activation of intrinsic factor
- b- Competes with folic acid for same site in formation of thymidine triphosphate
- c- Failure of absorption occurs in diseases with pancreatic enzymes deficiency
- d- Deficiency results in production of red blood cells with lifespan longer than normal
- e- Is needed for normal nerve cell division and degradation of myelin sheath

5- The platelets:

- a- Fusion is caused by high concentrations of ADP and thrombin
- b- Are covered by glycoprotein coat to help adherence to normal epithelium
- c- Aggregation is stimulated by ADP and prostacyclin
- d- Activating factor is a cytokine that stimulates multiplication of vascular endothelium
- e- Membrane phospholipid; Thromboxane A₂; acts as a catalyst for coagulation

6- Concerning blood coagulation:

- a- The intrinsic pathway begins with activation of factor XI by exposed collagen
- b- Vitamin K is needed for synthesis of factors II, VIII, IX and X in the liver
- c- Active factor V acts as an additional accelerator for prothrombin activation
- d- Intrinsic pathway activates extrinsic pathway because factor IXa activates factor VII
- e- Ca²⁺ is required only in the first 2 steps of the intrinsic pathway

7- Regarding the specific limiting reactions:

- a- Antithrombin III binding to serine proteases is inhibited by heparin
- b- Thrombomodulin- prothrombin complex inactivates factor V and VIII
- c- Fibrinogen degradation products (FDP) produce inhibition of thrombin
- d- Active protein C and its cofactor plasmin inactivate tissue fibrinolysin activator
- e- Thrombomodulin is mainly produced by cerebral endothelial cells

8- A 30-year-old pregnant female who stopped feeling the movements of her baby for several weeks, was admitted to the hospital with bleeding tendency and examination revealed widespread clotting. The cause of her blood coagulation disorder is most probably:

- a- Consumption of many clotting factors
- b- Deficiency of factor VII
- c- Increased fibrinogen level
- d- Deficiency of prothrombin
- e- Vitamin K deficiency

Final Exam
First Year
Physiology

Instructions

- Please read the instructions before answering the questions.
- Please write the Model letter (A, B and C) in your answer sheet
- You should count the number of pages that include the MCQs and Matching questions.
- No questions are allowed.
- Number of pages: 12 (from 1-12)
- Questions include:
 - 1- Part (I): 55 MCQs (Select single best answer): 55 marks
 - 2- Part (II): Matching question 5 marks

Part I: MCQs (55 Questions 1mark each)

Answer part (I) in section A of the provided computer answer sheet

Mark only the single best answer (Please fill the circle completely):

1- Concerning plasma proteins:

- a- Albumin is rapidly filtered by the renal glomeruli due to its small molecular weight
- b- Alpha and gamma globulins are formed in the liver
- c- Fibrinogen is mainly responsible for the osmotic function
- d- Beta globulins store hormones and prevent their loss in urine
- e- At the normal pH of blood (7.4) plasma proteins act as weak bases

2- The red blood cells (RBCs):

- a- Shape allows tension on their membrane to increase rapidly in venous blood
- b- Are unable to utilize the O₂ they contain for their own ATP formation
- c- Have in their cytoplasm carbonic anhydrase enzyme needed for O₂ transport
- d- Survive in the blood for 3 days before they rupture in the spleen
- e- Contain hemoglobin which is oxidized by O₂ to produce oxyhemoglobin

21- Which of the following lung volumes or capacities would be increased in bronchial asthma?

- a- Inspiratory capacity
- b- Total lung capacity
- c- Expiratory reserve volume
- d- Functional residual capacity
- e- Vital capacity

22- Normally, the intrapleural pressure is negative throughout a tidal inspiration and expiration because of which of the following?

- a- The lungs have the tendency to recoil outward throughout a tidal breath.
- b- The chest wall has the tendency to recoil inward throughout a tidal breath.
- c- Lungs and chest wall tend to recoil away from each other throughout a tidal breath.
- d- Lungs and chest wall tend to recoil in the same direction throughout a tidal breath.
- e- A leak in the visceral pleura causing air to enter pleural space during a tidal breath.

23- A man inspires 1000 ml from a spirometer. The intrapleural pressure was - 4 cm H₂O before inspiration and -12 cmH₂O at the end of inspiration. What is the compliance of the lungs?

- a- 50 ml/cmH₂O
- b- 100 ml/cmH₂O
- c- 125 ml/cmH₂O
- d- 150 ml/cmH₂O
- e- 250 ml/cmH₂O

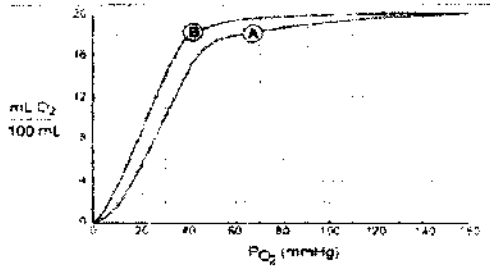
24- Which of the following is the major route for removal of particles from the alveoli?

- a- Bulk flow
- b- Diffusion
- c- Expectoration
- d- Phagocytosis
- e- Ciliary transport

25- The pH of venous blood is only slightly more acidic than the pH of arterial blood because:

- a- CO₂ is a weak base.
- b- There is no carbonic anhydrase in venous blood.
- c- The H⁺ generated from CO₂ and H₂O is buffered by HCO₃⁻ in venous blood
- d- The H⁺ generated from CO₂ and H₂O is buffered by oxyhemoglobin in venous blood
- e- Deoxyhemoglobin is a better buffer for H⁺ than is oxyhemoglobin.

26- Which of the following conditions is most likely to shift the oxyhemoglobin curve below from A to B?



- a- Increased temperature
- b- Exercise
- c- Fetal hemoglobin
- d- Increased 2, 3 diphosphoglycerate
- e- Metabolic acidosis

27- Compared with the base of the lung, the apex has:

- a- A higher perfusion
- b- A higher ventilation
- c- A higher ventilation perfusion ratio
- d- The same intra-pleural pressure
- e- Less inflated alveoli than at the base

28- Which of the following occurs if the blood flow to an alveolus is totally obstructed by a pulmonary thrombus?

- a- The V/Q ratio of the alveolus equals zero.
- b- The P_{O_2} of the alveolus will be equal to that in inspired air.
- c- The P_{O_2} of the alveolus will be equal to that in venous blood.
- d- There will be an increase in shunting (venous admixture) in the lung.
- e- There will be a decrease in alveolar dead space.

29- The clinical sign of cyanosis is caused by:

- a- An increase in the affinity of hemoglobin for oxygen
- b- A decrease in the percent of red blood cells (hematocrit)
- c- An increase in the concentration of carbon monoxide in the venous blood
- d- A decrease in the concentration of iron in the red blood cells
- e- An increase in the concentration of deoxygenated hemoglobin

30- Central chemoreceptors are:

- a- Stimulated by an arterial PO_2 of 80 mm Hg
- b- Responsible for 15% only of the respiratory drive
- c- Directly depressed by an arterial PO_2 of 60 mm Hg
- d- Strongly stimulated by elevated arterial PCO_2
- e- Stimulated by an elevated arterial H^+ concentration

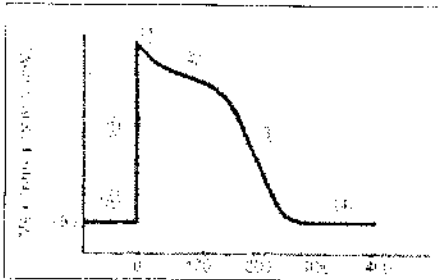
31- The dorsal respiratory group of neurons (DRG):

- a- Are unilateral in nucleus of tractus solitarius
- b- Receive inhibitory impulses from apneustic center
- c- Are composed of inspiratory neurons only
- d- Inhibit the respiratory neurons of ventral respiratory group
- e- Receive stimulatory signals from lung stretch receptors along vagus nerve

32- The peripheral chemoreceptors regulating respiration:

- a- Are stimulated in cases of severe hemorrhage and hypotension.
- b- Are connected through sensory afferents to the ventral respiratory group (VRG)
- c- Have very low blood flow
- d- Are sensitive to changes in O_2 content of blood in cases of anemia
- e- Are stimulated by brain hypoxia at PO_2 20mmHg

33- Which one of the following statements concerning cardiac myocyte action potential is correct?



- a- During phase [0] there is inactivation of inward rectifying K^+ channels
- b- The absolute refractory period lasts phase [0], [1] and half phase [2]
- c- During phase [4] the delayed rectifier K^+ channels are maximally activated
- d- Phase [2] coincides with systole due to opening of T- type Ca^{2+} channels
- e- Duration of phase [2] is prolonged by decreased activity of Na^+/Ca^{2+} exchanger

34- A 45-year-old woman faints when standing up following sitting for about 90 minutes watching a film. Which of the following increases in a healthy normal person as a compensatory mechanism after rising to an upright position?

- a- Systemic vascular resistance
- b- Parasympathetic vagal tone
- c- Venous compliance
- d- Excitatory signals of nucleus tractus solitaries (NTS)
- e- Aortic baroreceptor firing rate

35- Sympathetic stimulation of the heart:

- a- Decreases adenylyl cyclase activity in ventricular muscle
- b- Decreases transient Ca^{2+} influx (I_{CaT}) in the AV node
- c- Increases K^+ efflux in the SA node to oppose the funny current
- d- Decreases Ca^{2+} pump activity in the sarcoplasmic reticulum of atrial muscle
- e- Increases depolarizing funny current (I_f) in the SA node

36- A 30-year-old female with end-diastolic volume of 150 ml and end-systolic volume of 50 ml, and heart rate of 60 beats/minute, her cardiac output is:

- a- 600 ml/min
- b- 1200 ml/min
- c- 6000 ml/min
- d- 9000 ml/min
- e- 3000 ml/min

37- Regarding the excitation-contraction coupling in cardiac muscle:

- a- Membrane depolarization directly triggers ryanodine channel Ca^{2+} release.
- b- Normally under resting conditions Ca^{2+} release inside the muscle is not maximal
- c- Ca^{2+} is transported out of the myocyte by K^+ - Ca^{2+} exchanger located in sarcolemma
- d- Ca^{2+} needed for contraction is derived from ATP- dependent pump in sarcolemma
- e- Stimulation of muscarinic receptors (M_2) increases production of cAMP

38- Arterial compliance:

- a- Converts continuous flow in aorta to intermittent flow in peripheral vessels
- b- If increased the same volume change results in greater pressure change than normal
- c- Is mainly determined by the peripheral arteries and their branches
- d- If decreased the arterial pressure is high and the work of the heart is increased
- e- Is about 24 times the compliance of veins to accommodate large volumes of blood

39- Which of the following is not a mechanism to promote venous return?

- a- One way venous valves.
- b- Parasympathetic stimulation.
- c- Skeletal muscle pump.
- d- Thoraco-abdominal pump
- e- Atrial and ventricular sucking effect

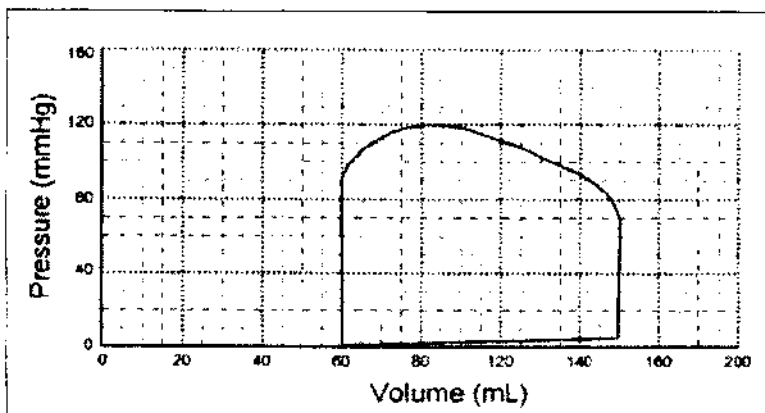
40- An increase in circulating angiotensin II concentrations:

- a- Depresses sympathetic activity
- b- Increases blood volume
- c- Inhibits aldosterone release
- d- Inhibits the release of atrial natriuretic peptide
- e- Increases renin secretion

41- A child suffering from a malnutrition disease presented with hepatomegaly (enlarged liver) and pitting edema of the lower limbs. The cause of the pitting edema is most probably:

- a- Deficiency of plasma proteins
- b- Inadequate cardiac output
- c- Lymphatic obstruction
- d- Decreased venous pressure
- e- Decreased hematocrit

42- In the pressure-volume curve illustrated below the ejection fraction is:



- a- 0.50
- b- 0.55
- c- 0.60
- d- 0.65
- e- 0.70

43- Endothelin-1:

- a- Secretion is inhibited by hypoxia and prostacyclin
- b- Is a potent vasoconstrictor (VC) mainly found in the brain
- c- Produces coronary vasoconstriction and decreased myocardial contractility
- d- Binds receptors on vascular smooth muscle cells resulting in Ca^{2+} influx
- e- Decreases the secretion of nitric oxide to prevent weakening of its VC action

44- A sudden increase in carotid artery pressure:

- a- Decreases carotid sinus baroreceptor firing rate
- b- Increases sympathetic efferent nerve activity to systemic circulation.
- c- Increases vagal efferent activity to the heart.
- d- Results in reflex tachycardia.
- e- Increases the stroke volume

45- A mechanism that may contribute to irreversible, refractory hemorrhagic shock is:

- a- Increased mean systemic filling pressure
- b- Increased capillary permeability.
- c- Increased capillary fluid reabsorption.
- d- Myocardial depression by metabolic alkalosis.
- e- Increased renin release by kidneys.

46- Increasing the inotropic state of the myocardium will:

- a- Increase end-systolic volume
- b- Increase the width of the pressure-volume loop.
- c- Increase ventricular end-diastolic volume.
- d- Shift the force-velocity relationship to the left
- e- Decrease the ejection fraction

47- The coronary blood flow:

- a- Is much lesser than that of skeletal muscle
- b- Increases in the subendocardium during systole
- c- Decreases by adenosine and prostaglandins
- d- Is mainly regulated by metabolic autoregulation
- e- Is markedly increased by increasing arterial perfusion pressure to 130 mmHg

48- The autonomic nervous system:

- a- Originates from the anterior horn cells
- b- Has no control on the skeletal and cardiac muscles
- c- Releases one type of chemical transmitters only
- d- Postganglionic fibers are mostly unmyelinated C-fibers
- e- Is voluntarily controlled during stressful conditions

49- Sympathetic fibers to the head and neck:

- a- Originate from lateral horn cells of lower 6 thoracic segments
- b- Contract the ciliary muscle to increase the field of vision
- c- Produces vasoconstriction of conjunctival vessels
- d- Increases sweat secretion through adrenergic fibers
- e- Produces secretion of large amounts of watery, diluted saliva

50- The parasympathetic:

- a- Preganglionic fibers relay on chain and terminal ganglia
- b- Fibers to lacrimal and nasal glands are secretomotor and vasodilator
- c- Represents the cranio-lumbar outflow of autonomic nervous system
- d- Postganglionic fibers are shorter and fewer than preganglionic ones
- e- Ganglia receptors are stimulated by large doses of nicotine

51- Sympathetic fibers to the abdominal viscera:

- a- Of preganglionic type relay on lower 6 thoracic paravertebral ganglia
- b- Produce inhibition of plain muscles and sphincters of small intestine
- c- Stimulate glycogen formation in the liver to produce hypoglycemia
- d- Of postganglionic type stimulate secretion of adrenaline from adrenal medulla
- e- Decrease urine volume and stimulate renin secretion

52- Parasympathetic fibers to the pelvic viscera:

- a- Produce vasodilation of blood vessels of the penis and erection
- b- Relax muscles of the wall of rectum and contracts internal anal sphincter
- c- Relax seminal vesicles and increase prostate secretion to store more semen
- d- Produce variable effects on uterine plain muscles according to menstrual cycle
- e- Of preganglionic type run mainly in the vagus nerve and end on terminal ganglia

53- Noradrenaline:

- a- Is destructed by catechol-O- methyl-transferase in adrenergic nerve endings
- b- Binds to muscarinic or nicotinic receptors
- c- Is secreted by motor neurons at neuromuscular junction
- d- Is stored in clear vesicles and released by exocytosis
- e- Secretion is increased by stimulation of β - presynaptic receptors

54- Which one of the following higher centers is not involved in the integration of the autonomic functions?

- a- Cerebral cortex
- b- Cerebellum
- c- Hypothalamus.
- d- Limbic system
- e- Medulla Oblongata

55- In Horner's syndrome there is:

- a- Lesion of oculomotor nerve on one side.
- b- Dilatation of the pupil on the same side of lesion
- c- Drooping of the upper eye lid on the same side of lesion
- d- Decreased salivary secretion on the opposite side of lesion
- e- Redness and hotness of the skin of the opposite side of lesion

Part II: Extended Matching Question Total marks: 5 marks

Answer in section B of your provided computer answer sheet

Match the following phases of the *cardiac cycle* (A- H) with their functional description mentioned below (1-5). Each option may be used once
(Each statement 1 mark)

- A- Atrial systole
- B- Isovolumetric contraction phase
- C- Rapid ejection phase
- D- Reduced ejection phase
- E- Protodiastolic phase
- F- Isovolumetric relaxation phase
- G- Rapid filling phase
- H- Reduced filling phase

1. Early in this phase the atrial pressure shows sharp small decrease due to downward pull on AV ring leading to expansion of atria
2. In this phase the flow of blood into the ventricles produces the third heart sound S_3
3. Contributes to about 30% of the ventricular filling during rest
4. The aortic pressure curve in this phase shows the dicrotic notch due to sharp drop of pressure ending by closure of aortic valve
5. During this phase the ventricular pressure exceeds low atrial pressure leading to immediate closure of AV valves, however it is still lower than arterial pressure and semilunar valves are closed

ANATOMY

Anatomy Exam. (First year)

N.B

The exam. is Composed of 9 pages.

All questions should be answered ing the aanswer book.

Answer each qestion in a separate page.

Answers are preferred to be in the same order of the questions.

Part 1: Essay Question (50 Marks)

1. A Summarize the sensory and motro nerve supply of the hand. (5 marks)
B. Describe in short the boundaries and contents of the axilla. (5 marks)
2. A GIVE an account of the venous drainage of the heart (5 marks)
B. Surface anatomy of the right and left pleurae. (5 marks)
3. A D escribe the course and branches of a typical intercostal nerve. (5 mark)
B. Give an account of the anterior and posterior cruciate ligaments. (5 marks)
4. A. Describe the course and branches of the femoral artery. Mention its clinical importance. (5 marks)
B. Mention the cutaneous nerves of the leg and foot. Give the origin and distribution of each. (5 marks)
5. A. Describe in brief the development and aomalies of the umbilical cord. (5 marks)
B. Give an account of the characters of syovial joints. (5 marks)

Part 11: (75 marks)

6. M.C.Q s. (20 marks)

Choose and encircle only one answer:

1- Regarding radial nerve injury, the following statements are correct, EXCEPT:

- A. It may be injured if the shaft of the humerus is fractured.
- b. Injury of the posterior interosseous nerve causes wrist drop.
- c. Injury of its superficial branch does not produce wrist drop.
- d. Injury of the posterior interosseous nerve is accompanied by loss of sensations.
- e. Injury of its superficial branch will produce parasthesia over lateral 2/3 of the dorsum of the hand.

2- Pronation and supination of the forearm occurs at:

- a. Elbow joint
- b. Superior and inferior radio - ulnar joints.
- c. Shoulder joint.
- d. Radio - carpal joint
- e- Mid carpal joint

3- Regarding the following statements are correct, EXCEPT:

- a. the medial side of the breast is drained into the internal thoracic group of lymph nodes.
- b. The lateral side of the gland is drained into the pectoral group of lymph nodes.
- c. THE Superior thoracic artery is one of the main arteries supplying the gland.
- d. An abscess in its lobes is drained by a radial incision.
- e. Its axillary tail lies superficial to the pectoralis major muscle.

4- The following arteries share in the anastomosis around the elbow, EXCEPT:

- A. Radial recurrent artery.
- b. Anterior circumflex humeral artery.
- c. Anterior ulnar recurrent artery.
- d. Posterior ulnar recurrent artery
- e. Superior ulnar recurrent artery

5- Ligation of the posterior tibial artery at its origin would affect all of the following branches EXCEPT:

- a. Dorsalis pedis artery

- b. Lateral plantar artery.
- c. Plantar arch.
- d. Peroneal artery.
- e. Medial plantar artery.

6- The base of the femoral triangle is formed by the:

- a. Sartorius muscle.
- b. Adductor longus muscle.
- c. Inguinal ligament.
- d. Pubic tubercle.
- e. Pectineus muscle.

7- Which of the following muscles is a flexor of the thigh:

- a- Superior gemellus.
- b. Adductor longus.
- c. Gracilis
- d. Psoas major.
- e. Obturator internus.

8- A crushing blow that breaks the anterior superior iliac spine would damage the origin of the:

- a- Biceps femoris muscle.
- b- Pectineus muscle.
- c- Rectus femoris muscle.
- d- Tensor fasciae latae muscle.
- e- Sartorius.

9- Unlocking of the knee joint to permit flexion is caused by the action of which muscle:

- a. Vastus medialis.
- b. Articularis genu.
- c. Gastrocnemius.
- d. BICEPS FEMORIS.
- e. popliteus.

10- Regarding the veins of the lower limb, the following statements are correct EXCEPT:

- a. The great saphenous vein passes behind the medial malleolus.
- b. The small saphenous vein passes behind the lateral malleolus.
- c. Perforating veins connect the great and small saphenous veins with the deep veins.

d.Perforating valves, which direct the blood flow from superficial to deep veins.

e.Incompetent valves of the perforating veins produce varicosity of the superficial veins.

11- The following statements concerning the trachea are true EXCEPT:

a. IT lies anterior to the esophagus in the superior mediastinum.

b.In deep inspiration the carina may descend as far as the level of the sixth thoracic vertebra.

e. Incompetent valves of the perforating veins produce varicosity of the superficial veins.

11- The following statements concerning the trachea are true EXCEPT:

a.It lies anterior to the esophagus in the superior mediastinum.

b. IN deep inspiration the carina may descend as far as the level of the sixth thoracic vertebra.

c.The left principal bronchus is wider than the right principal bronchus.

d. The arch of the aorta lies on its anterior and left sides in the superior mediastinum.

e. The sensory innervation of the mucous membrane lining the trachea is derived from branches of the vagi, and recurrent laryngeal nerves.

12-The following statements concerning the right lung are true EXCEPT

a. It possesses a horizontal and an oblique fissure.

b.It covering of visceral pleura is sensitive to pain and temperature.

C. The lymph from the substance of the lung reaches the hilum by to move during the movements of respiration.

d.The pulmonary ligament permits the vessels and nerves of the lung root to move during the movements of respiration.

e. The bronchial veins drain into the azygos and hemiazygos vein.

17- Regarding the skeletal muscle form parallel to the of pull, one is wrong:

a.Quadrilateral. b. Triangular.

c.Strap. like. d.fusiform.

e- Strap. like with tendinous intersections.

18- All the following glands are ectodermal in origin EXCEPT:

a. Mammary gland. b. Pancreas.

c. Pituitary gland. d.Sebaceous glands.

e. Adrenal medulla.

19- Regarding twins, all the following statements are correct EXCEPT:

- a. In case of early separation of the zygote, each of the resulting monozygotic twins has its own placenta.
- b. Ahmad and Dina were diagnosed as monozygotic twing.
- c. The dizygotic twins usually have separate placentae.
- d. The monozygotic twins have very similar finger prints.
- e. In case of separation of the bilaminar germ disc, the resulting monozygotic twins share the same amniotic cavity.

20- Regarding the amniotic fluid, the following are correct, EXCEPT:

- a. It is produced by the amniotic cells.
- b. It serves as a protective cushion.
- c. It serves as a protective cushion.
- d. Polyhydramnios occurs in cases of esophageal atresia.
- e. Oligohydramnios occurs in cases of anencephaly.

7- Cross Matching: (15 marks)

1. Select from column (B) the nerve whose injury causes the deformity in column (A):

Column A	Column B
1- Ape's hand.	a. Long thoracic nerve
2- Flat shoulder.	b) Radial nerve
3- Wrist drop and fingers drop.	c) Median nerve
4- Winging of scapula.	d) Ulnar nerve.
5- Claw hand.	e) Axillary nerve.
	f) Musculocutaneous.

11. Match the nerve supply of the following muscles:

- 1- Sartorius
- 2- Gracilis
- 3- Peroneus longus
- 4- Flexor hallucis longus
- 5- Gluteus medius
- a- Superior gluteal nerve
- b- Inferior gluteal nerve
- c- Posterior tibial nerve
- d- Superficial peroneal nerve.
- e- Obturator nerve
- f- Femoral nerve.

III. Match the following nerves with their branches:

(A)

- 1- Vagus nerve
- 2- Phrenic nerve
- 3- Sympathetic chain
- 4- Intercostal nerve
- 5- Deep cardiac plexus

(B)

- a- Cardiac branches to the heart
- b- Lateral cutaneous branch
- c- Greater splanchnic nerve
- d- Sensory branches to pleura
- e- Recurrent laryngeal nerve

8- Fill in the blanks (15 marks)

- 1- Among the branches of the lateral cord of the brachial plexus are... and.
- 2- The shoulder joint is a synovial joint of... variety. The glenoid cavity of the scapula is rather deepened by a rim of fibrocartilage called..
- 3- The blood supply of the femur comes from:... and
- 4- Adductor magnus is supplied by and nerve.
- 5- The anterior wall of the femoral sheath is formed by while its posterior wall is formed by.....
- 6- The superficial three-fourths of the gluteus maximus inserted into the while the deep fourth is inserted into the
- 7- The right principal bronchus is differed from the left one in having..... and.....
- 8- The pericardium of the heart is formed of two parts and
- 9- The superior vena cava is formed by union of and
- 10- The esophagus is related posteriorly to..... and
- 11- Types of muscle attachments include: and
- 12- Functions of superficial fascia are: a- and b-.....
- 13- The early placental barrier is formed of layers while the late placental barrier is formed of.. layers
- 14- Each somite differentiates into a dorsolateral part called and ventromedial part called.....
- 15) The part of the gut within the head fold is called.....

9- Problem Solving Questions: (15 Marks)

PROBLEM 1:

A 50 Years old woman fell on her outstretched hand. She had a fracture of the middle of the shaft of the radius.

- 1- Why in this type of fracture, the segments of the fractured bone tend to separate?

- 1- What nerve is liable to be injured?
- 3- What would be the paralysed muscles?
- 4- What movements would be affected by such paralysis?
- 5- What is the name of the resulting deformity?

problem 2:

A 55 year - old woman wity a globular swelling in her left groin. she stated the swelling became smaller wher she lay down bou nerve completely disappearnt.

- 1- What IS Your possible diagnos?
- 2- What is meant by femoa ring
- 3- What is meant by femoa canal?
- 4- Why the condition is common in females rather than males?
- 5- what are the common complicaions of such condition?

problem 3:

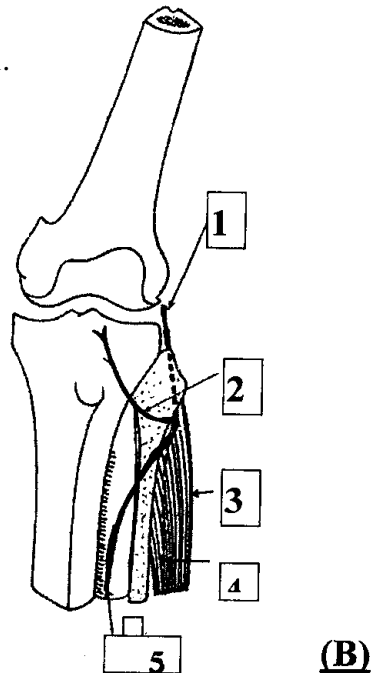
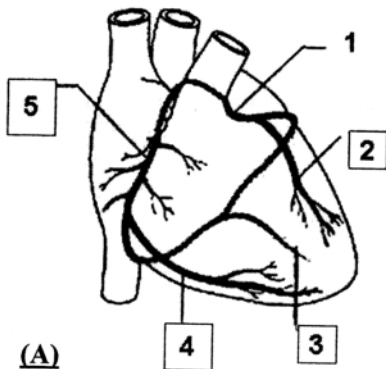
A man, was aduitted to hopital, with stab wound in the 4th left intercostals space and accumulation of blood in the pericardial cavity.

- 1- Name the condition.
- 2- How it can be treated.
- 3-Give the part of the pericardium.
- 4- Name 2 structures anterior to the pericardium.
- 5- Nam 2 arteries supplying the pericardium

10- Label the following diagrams: (10 marks)

A- Arterial supply of the heart: 1, 2, 3, 4, 5.

B- common peroneal nerve: 1, 2, 3, 4, 5



IMPORTANT INSTRUCTIONS:

- ° The exam. is composed of 7 pages.
- ° Please answer sections A & B in the answer sheet.
- ° Please answer sections C, D & E in the answer book.
- ° Answer each question in a separate page.
- ° Answers are preferred to be in the same order of the questions.

Section A:

M.C.Qs. (20 marks)

Choose and encircle only one answer:

1. The brachial artery, mark the wrong answer:

- A- Starts at the distal border of teres major muscle.
- B- Ends opposite the neck of radius.
- C- Ends by giving radial and ulnar arteries.
- D- Descends on the medial side of the humerus.
- E- It descends medial to median nerve and bicipital aponeurosis.

2. Motor loss resulting from carpal tunnel syndrom induces; mark the most acceptable answer:

- A- Loss of thumb adduction and abduction.
- B- Loss of writing position of the medial four fingers.
- C- Loss of opposition of the thumb.
- D- Loss of abduction and adduction of the medial 4 fingers.
- E- All the above.

3. The interosseous membrane, mark the wrong answer:

- A- Is attached to the interosseous borders of radius and ulna.
- B- Is tense when the hand is midway between pronation and supination.
- C- Gives origin to the deep flexors of the hand.
- D- Its fibers pass downward and laterally.
- E- Pierced by anterior interosseous vessels.

4. The principal muscles concerned in medial rotation of the shoulder, mark the wrong answer:

- A- pectoralis major.
- B- Deltoid anterior fibers.
- C- Teres major.
- D- Latissimus dorsi.
- E- Teres minor.

5. The following muscles invert the foot, EXCEPT:

- A- Tibialis anterior.
- B- Tibialis posterior.

C- Extensor hallucis longus.

D- Peroneus brevis.

E- Medial part of extensor digitorum longus.

6. Effects of common peroneal nerve injury include one of the following:

A- Foot drop and inversion of the foot.

B- Foot drop and eversion of the foot.

C- Dorsi flexion and eversion of the foot.

D- Dorsi flexion and inversion of the foot.

E- Loss of sensation of the medial side of the leg.

7. The following are important factors in maintaining arches of the foot EXCEPT:

A- Lateral longitudinal arch is supported by tibialis posterior.

B- Medial longitudinal arch is supported by abductor hallucis.

C- Abductor digiti minimi supports the lateral longitudinal arch.

D- Tendon of peroneus longus supports the transverse arch.

E- Tendon of flexor hallucis longus supports the medial longitudinal arch.

8. Regarding the popliteal fossa, the following are correct statements EXCEPT:

A- Upper part of the floor of the fossa is formed of the popliteal surface of the femur.

B- It contains the posterior cutaneous nerve of the thigh.

C- Semitendinosus forms its superior medial boundary.

D- Biceps femoris forms its superior lateral boundary.

E- popliteal artery pulsations can be felt while the knee is extended.

9. Regarding the knee joint, the following are true EXCEPT:

A- Its medial meniscus is damaged more frequently than the lateral.

B- Its lateral meniscus is attached to the lateral collateral ligament.

C- Rupture of its anterior cruciate lig. results in excessive forward movement of tibia on femur.

D- Tibia can be moved excessively backward upon rupture of its posterior cruciate ligament.

E- Stability of the joint depends largely on tone of quadriceps femoris muscle.

10. The superficial inguinal lymph nodes receive lymphatics from the following structures EXCEPT:

A- Skin of the scrotum.

B- Terminal urethra.

C- Lower half of anal canal.

D- Testis.

E- Skin of the gluteal region.

11. Regarding the trachea, mark one CORRECT statement:

A- Its thoracic part lies in the posterior mediastinum.

- B- It divides at the level of 5th thoracic vertebra.
- C- Inhaled foreign bodies pass more often to its left bronchus.
- D- Its entire source of arterial blood supply is superior thyroid arteries.
- E- It is crossed on its right side by the arch of azygos vein.

12. Regarding arch of aorta, mark ONE correct answer:

- A- It extends above the suprasternal notch.
- B- Brachiocephalic trunk is its first branch.
- C- It is connected to the pulmonary trunk by ligamentum venosum.
- D- Left vagus crosses it behind the left subclavian artery.
- E- It is in contact with mediastinal pleura of the right lung.

13. The apex of the heart is normally located at the:

- A- Left 5th intercostal space at anterior axillary line.
- B- Left 5th intercostal space 11 cm from midline.
- C- Left 5th intercostal space 9 cm from midline.
- D- Left 5th intercostal space 9 cm from midline.
- E- Left 5th intercostal space at mid-axillary line.

14. Concerning the thoracic duct; mark the wrong statement:

- A- 45 cm in length.
- B- Emerges from the cisterna chyli in abdomen.
- C- Enters the thorax via the oesophageal opening.
- D- Contains many valves.
- E- Ends in the venous system, at the angle between internal jugular and left subclavian veins.

15. Regarding the deep cardiac plexus, mark the correct statement:

- A- Lies at the bifurcation of the trachea.
- B- Consists of sympathetic fibers only.
- C- Freely connected with the superficial cardiac plexus.
- D- Consists of branches from vagus nerve only.
- E- Contains filaments from left phrenic nerve.

16. Concerning the intercostal and subcostal arteries, which of the following is true?

- A- They lie highest in the costal groove.
- B- First two posterior intercostal arteries are indirect branches of costocervical trunk.
- C- Posterior intercostal arteries are indirect branches of thyrocervical trunk.
- D- All anterior intercostal arteries are indirect branches from internal thoracic and musculophrenic artery.
- E- Subcostal artery is a direct branch from abdominal aorta.

17. One of the following is not a part of deep fascia:

- A- Retinacula.
- B- Tendon.
- C- Intermuscular septa.
- D- Interosseous membranes.
- E- Palmar and planter aponeuroses.

18. Regarding characters of the synovial joints, one is wrong:

- A- It has a joint cavity.
- B- It has a fibrous capsule.
- C- The articular surfaces of the bones are covered by yellow elastic cartilage.
- D- The intracapsular non-articular structures are covered by synovial membrane.
- E- It has supportive ligaments.

19. Regarding the functions of the yolk sac, the following items are correct EXCEPT:

- A- It has a nutritive function to the embryo.
- B- Formation of the gut.
- C- The primordial germ cells are formed in the wall of the yolk sac.
- D- Formation of blood cell in the early stages of development.
- E- The vitelline veins form the portal vein, the hepatic veins and the liver sinusoids.

20. Regarding the contents of the primitive umbilical cord, mark one correct statement:

- A- Connecting stalk.
- B- Allantois and allantoic vessels.
- C- Yolk sac stalk and vitelline vessels.
- D- All of the above.
- E- B and C only.

Section B:

Cross matching: (15 marks)

I. Select from column (B) the type of each joint in column (A): (5 marks)

- | Column A | Column B |
|---------------------------|--------------------|
| 1- Shoulder joint | a) Hinge |
| 2- Elbow joint | b) Ellipsoid |
| 3- Radio-ulnar joints | c) Ball and socket |
| 4- Wrist joint | d) Saddle |
| 5- Sternoclavicular joint | e) Pivot |

II. Select from column (B) the nerve supply of each muscle in column (A): (5 marks)

- | (A) | (B) |
|------------------------|-------------------------------|
| 6- Psoas major. | a- Tibial nerve. |
| 7- Quadriceps femoris. | b- Sciatic nerve. |
| 8- Adductor magnus. | c- Lumbar plexus. |
| 9- Semimembranosus. | d- Femoral nerve. |
| 10- Gastrocnemius. | e- Sciatic & obturator nerve. |

III. match the nerves in column (A) with their branches in column (B): (5 marks)

- | (A) | (B) |
|-------------------------|----------------------------------|
| 11- Vagus nerve | a- Cardiac branches to the heart |
| 12- Phrenic nerve | b- Lateral cutaneous branch |
| 13- Sympathetic chain | c- Greater splanchnic nerve |
| 14- Intercostal nerve | d- Sensory branches to pleura |
| 15- Deep cardiac plexus | e- Recurrent laryngeal nerve |

Section C:

Essay Questions (50 Marks)

1. A. Give an account of the attachment, nerve supply and relation of the pectoralis minor muscle. (5 marks)
B. Describe the anatomy of the cubital fossa. (5 marks)
2. A. Give an account of the anatomy of the anterior and posterior atrioventricular grooves. (5 marks)
B. Mention the surface anatomy of the right and left pleurae. (5 marks)
3. A. Describe the boundaries and enumerate the contents of the inferior mediastinum. (5 marks)
B. Give an account of the femoral artery; beginning, end, branches (only enumeration) and surface anatomy. (5 marks)
4. A. Describe the anatomy of the sciatic nerve; beginning, course, termination and branches. Mention the effect of its injury (5 marks)
B. Give an account of the type, ligaments and movements of the ankle joint. Enumerate the muscles producing these movements. (5 marks)
5. Give an account of each of the following:
A. Development of the placenta and its congenital anomalies. (5 marks)
B. Functions of the superficial fascia. (5 marks)

Section D:

6- Fill in the blanks (15 marks)

1. The branches of the roots of the brachial plexus include..... and..... .
2. The medial half of the breast receives arterial supply from the perforating branches of..... and
3. The anterior wall of the femoral sheath is formed by..... while the posterior one is formed by.....
4. The popliteal artery begins at..... and ends at.....
5. Ligaments that prevent hyperextension and hyperflexion of the knee joint are..... and.....

6. Among the structures passes through the saphenous opening are..... and.....
7. The right bronchial artery arises from..... artery, the left bronchial arteries arises from.....
8. The hilum of the left lung, above it passes..... and behind it pass.....
9. The right coronary artery gives.....,
10. The right innominate vein is formed by the union of..... and.....
11. The phrenic nerve gives motor supply to..... and sensory supply to.....
12. Intrvertebral disc is formed of two parts: a- and b-
13. By the end of the 2nd week of pregnancy the lateral plate mesoderm split into 2 layers..... and.....
14. The embryonic period extends from..... to..... weeks of development.
15. The somite period of embryonic development extends from the..... till the..... days.

Section E:

7- Problem Solving Questions: (15 Marks)

Problem I: (5 marks)

A rock climbing student fell suddenly and grasped a tree just before reaching the ground with his outstretched hands. He was found to have motor and sensory losses.

1. What nervous structure do you expect to be injured?
2. What is the name of this injury?
3. What are the paralyzed muscles?
4. What is the expected deformity?
5. Where would you test for skin sensations in such an injury?

Problem II: (5 marks)

During the courses of a football game, a football player developed locking of the knee joint due to violent abduction and extrnal rotation of the leg.

1. What is the most likely structure to be injured?
2. why it is the most likely structure to be injured?
3. Name the extracapsular ligaments of knee joint.
4. Name the ligament that prevent the heyperextension of the knee joint.
5. Name the ligament that prevent the hyperflexion of knee joint.

Problem III: (5 marks)

A 15 years old boy was hit by a car while riding a bicycle. He felt severe pain on the left side of the chest associated with severe bleeding from the wound and a sharp bone projecting out from the wound over the lower left side of the chest.

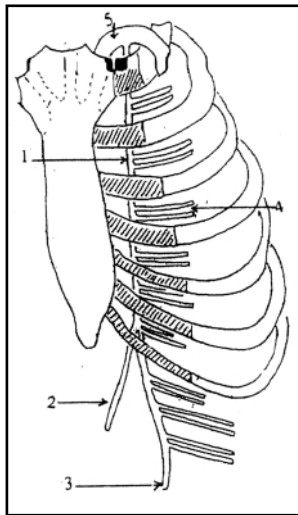
1. What was the broken bone and what structures might be perforated and injured by this broken bone? (two marks)
2. What is the abdominal organ most likely to be damaged? (one mark)
3. If you are going to insert an intercostal tube to save this patient, why the intercostal tube must be under water? (Two marks)

Section F:

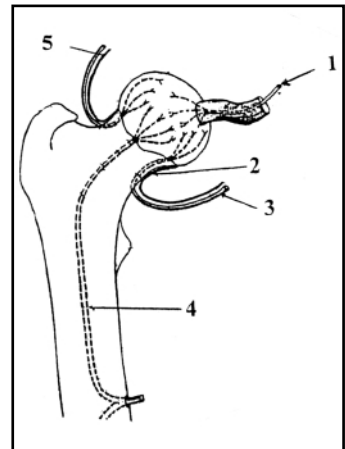
8- Label the following diagrams: (10 marks)

A. Arterial supply of anterior wall of the chest: (5 marks)

Identify 1, 2, 3, 4, 5



B. Arterial supply of head of femur: (5 marks)



Final Exam - Anatomy - First year

SECTION QA): MULTIPLE CHOICE QUESTIONS
(30 marks)

- 1. Concerning the nerves of the lower limb, which ONE of the following statements is true?**
 - A. Sciatic nerve supplies gluteus maximus muscle.
 - B. Genito-femoral nerve supplies quadriceps femoris.
 - C. Obturator nerve supplies adductor longus.
 - D. Deep peroneal nerve supplies peronei longus and brevis.
 - E. Superficial peroneal nerve supplies tibialis anterior muscle.
- 2. Regarding the arteries of the lower limb, the following statements are correct, EXCEPT:**
 - A. Femoral artery begins behind the mid inguinal point.
 - B. Profunda femoris artery gives four perforating branches.
 - C. Posterior tibial artery enters the sole behind the lateral malleolus.
 - D. Dorsalis pedis artery is continuation of anterior tibial artery on the dorsum of the foot.
 - E. Plantar arch is mainly formed by the lateral plantar artery.
- 3. Regarding muscle actions in the lower limb, the following are correct statements EXCEPT:**
 - A. Quadriceps femoris extends the knee joint.
 - B. Abduction and adduction of the toes by the interossei take place from the midline of the second toe.
 - C. Muscles inserted in tendo calcaneus are plantar flexors.
 - D. Gluteus maximus is a powerful flexor of the hip joint.
 - E. Ischial part of adductor magnus, acting with hamstrings, extends the hip joint.
- 4. Regarding veins of lower limb, following statements are correct, EXCEPT:**
 - A. They are devoid of valves.
 - B. Small saphenous vein drains into the popliteal vein.
 - C. Femoral vein lies medial to the femoral artery at the base of the femoral triangle.
 - D. Great saphenous vein pierces the cribriform fascia to enter femoral vein.
 - E. Dilatation and venous stagnation in superficial veins is called varicose veins.

- 5. Your patient was subjected to an external force to the knee. Which of the following ligaments has prevented abduction of the leg at the knee?**
- A. Oblique popliteal. B. Anterior cruciate.
 C. Posterior cruciate. D. Lateral collateral.
 E. Medial collateral.
- 6. A 75-year- old man suffered from severe pain in the right hip after falling down. Radiographic examination revealed avascular necrosis of the head of the femur. Which of the following was most likely responsible for this condition?**
- A. Dislocation of the hip with tearing of the ligament of the head of the femur.
 B. Intertrochanteric fracture of the femur.
 C. Intracapsular femoral neck fracture.
 D. Thrombosis of the obturator artery.
 E. Fracture of the extracapsular femoral neck.
- 7. A 22-year- old man was subjected to a car accident. Radiographic examination revealed avulsion fracture of the greater trochanter. Which of the following muscles would continue to function normally ?**
- A. Piriformis. B. Obturator intemus.
 C. Gluteus maximus. D. Gluteus medius.
 E. Gluteus minimis.
- 8. Upon removal of a leg cast, a 15-year-old boy complained of numbness of the dorsum of his foot and inability to dorsiflex and evert the foot. VWhich is the most probable site of the nerve compression that resulted in these symptoms?**
- A. Popliteal fossa. B. Neck of the tibia.
 C. Lateral compartment of the leg. D. Anterior compartment of the leg.
 E. Medial malleolus.
- 9. During running, a 25-year-old woman fell down with twisting of her right leg. She could not stand on her right leg due to pain. On examination, the right knee was swollen and tender. With the knee flexed, the leg could be moved several centimeters of excess anterior mobility. On standing, hyperextension was observed in the right knee. What is the most likely diagnosis?**
- A. Injury of anterior cruciate ligament.
 B. Injury of posterior cruciate ligament.
 C. Injury of medial meniscus. D. Injury of lateral meniscus
 E. Injury of medial collateral ligament.

- 10. A 72-year-old woman was admitted to the hospital with a painful right foot. Investigations revealed thrombotic occlusion of the femoral artery in the proximal part of the adductor canal. Which artery would most likely provide blood supply to the leg through the anastomosis around the knee?**
- A. Medial circumflex femoral artery. .
 - B. Lateral circumflex femoral artery.
 - C. First perforating branch of the profunda.
 - D. Inferior gluteal artery.
 - E. Descending genicular branch of femoral artery.
- 11. After surgical removal of the great saphenous vein to be used as a graft, the patient complained of lack of normal sensation on the medial surface of the leg and foot. Which nerve was most likely injured during surgery?**
- A. Common peroneal.
 - B. Superficial peroneal.
 - C. Sural.
 - D. Saphenous.
 - E. Tibial.
- 12. If you are a surgeon exploring the thorax, you will be able to identify the right pulmonary artery in which of the following locations?**
- A. Anterior to the ascending aorta and the SVC.
 - B. Anterior to the ascending aorta and posterior to the SVC.
 - C. Posterior to the descending aorta and the SVC.
 - D. Posterior to the ascending aorta and the SVC.
 - E. Posterior to the ascending aorta and anterior to the SVC.
- 13. Regarding the conducting system of the heart, the following statements are correct, EXCEPT:**
- A. The S.A.N. is present at the upper end of the crista terminalis.
 - B. The A.V.N. is present immediately above the septal cusp of the tricuspid valve.
 - C. The A.V.B. divides into two branches at the upper border of the membranous part of the interventricular septum.
 - D. The right bundle branch passes through the moderator band.
 - E. The A.V.B. is supplied by the right coronary artery.
- 14. A 48-year-old patient was admitted with chronic angina. Coronary angiography revealed nearly total blockage of the circumflex artery near its origin from the left coronary artery. When this artery was exposed to perform a bypass procedure, what accompanying vein must**

be protected from injury? ..

- A. Great cardiac vein.
- B. Middle cardiac vein.
- C. Anterior cardiac vein .
- D. Small cardiac vein.
- E. Posterior vein of left ventricle.

15. Which of the following structures prevents regurgitation of the mitral valve cusps into the left atrium during systole?

- A. Crista terminalis.
- B. Supraventricular band.
- C. Pectinale muscles.
- D. C hordne tendinae
- E. Trabeculae carnae

16. The most common site for an itthaled foreign object to lodge in the tracteobronchial tree is:

- A. The letl primary; bronchus.
- B. The right primarg,l bronchus.
- C. The beginning ofthe trachea.
- D. The superior llngular bronchus ofthe left lung.
- E. The apical bronchus of the upper lobe ofthe left lung.

17. Regarding the right lung, the following statements are true, EXCEPT:

- A. It is slightly larger than the left.
- B. It shows two fissures.
- C. It has len brnnchopulrnonarjr segments.
- D. It is usually supplied by one bronchial artery.
- E. It shows a tongue like part called lingula.

18. At the level of the sternal angle the following features are present, EXCEPT:

- A. Second rib articulates with sternurn.
- B. Trachea bifurcates.
- C. Aortic arch begins.
- D. Superior vena cava begins.
- E. Superior ntediastinurn ends.

19. The right ventricle contains all the following structures, EXCEPT:

- A. Papillary muscles.
- B. Chordae tendinae
- C. Pectinate muscles.
- D. Trabeculne carnae.
- E. Moderator band (septoniarginal trabeculac).

20. The tricuspid valve sound is best heard at:

- A. Third left sternocosal junction.
- B. The middle of the sternurn at the level of 4th intercostal space.
- C. Second right sternocostaljnncion.
- D. The xiphisternal junction.
- E. The middle ofthe sternum at the level of 6th intercostal space.

- 21. Regarding the thoracic duct, the following statements are correct, EXCEPT: `**
- A. In the root of the neck, it curves medially behind the left common carotid artery and the left internal jugular vein.
 - B. It contains a large number of valves.
 - C. In the root of the neck, it crosses the left subclavian artery.
 - D. It carries lymph from the pelvic cavity.
 - E. It ends in the left brachiocephalic vein.
- 22. A 48-year-old female was admitted to a hospital with symptoms of carpal tunnel syndrome. Which of the following muscles was most likely weakened?**
- A. Dorsal interossei.
 - B. Opponens pollicis.
 - C. Third and fourth lumbricals.
 - D. Abductor digiti minimi.
 - E. Opponens digiti minimi.
- 23. A 17-year-old male had weakness of elbow flexion and supination of the left forearm after sustaining a knife wound in that arm in a street fight. Examination in an emergency department indicated that a nerve had been severed. Which of the following conditions would also most likely be seen during physical examination?**
- A. Inability to abduct and adduct his fingers.
 - B. Inability to oppose the thumb to the other fingers.
 - C. Sensory loss over the lateral side of the forearm.
 - D. Sensory loss over the medial side of the forearm.
 - E. Sensory loss over the palmar aspects of lateral 3 1/2 fingers.
- 24. Examination of a 17-year-old female athlete with an injury of the radial nerve in the spiral groove will typically demonstrate which of the following physical signs?**
- A. Weakness of abduction of the thumb and loss of its extension.
 - B. Weakness of opposition of the thumb.
 - C. Inability to extend the elbow.
 - D. Inability to pronate the forearm.
 - E. Loss of abduction of the arm.

25. A 10-year-old male suffered a dog bite that entered the common flexor synovial sheath. Two days later, the boy suffered from elevated temperature and his palm and one digit were obviously swollen. Into which of the digits could the infection spread most easily?

- A. First. B. Second. C. Third.
D. Fourth. E. Fifth.

26. Regarding the radial artery, the following statements are correct, EXCEPT:

- A. It begins opposite the neck of radius.
B. It ends by forming the deep palmar arch.
C. Its pulsation can be felt lateral to the flexor carpi radialis.
D. It shares in the anastomosis around the medial epicondyle.
E. It is responsible to give arterial supply to the thumb.,

27. Regarding the placenta, all the following statements are correct EXCEPT

- A. Placenta previa results from implantation of the blastocyst into the lower segment of the uterus.
B. The placenta produces chorionic gonadotropins during the first four months of pregnancy.
C. Progesterone and estrogen hormones are produced by the placenta.
D. The placental barrier separates the fetal blood from the maternal blood.
E. The decidua capsularis shares in the formation of the placenta.

28. Regarding twins, all the following statements are correct EXCEPT

- A. In case of early separation of the zygote, each of the resulting monozygotic twins has its own placenta.
B. Ahmad and his sister Dina were diagnosed as monozygotic twins.
C. The incidence of dizygotic twins is about 7-11 per 1000 births..
D. The monozygotic twins Ahmed and Ali have very similar finger prints.
E. In case of separation of the bilaminar germ disc, the resulting monozygotic twins share the same amniotic cavity.

29. Regarding the amniotic fluid, the following are correct, EXCEPT:

- A. It is produced by the amniotic cells.
B. It serves as a protective cushion.
C. It allows fetal movements.
D. Polyhydramnios occurs in cases of esophageal atresia.
E. Oligohydramnios occurs in cases of anencephaly.

30. Regarding the vertebral column, the following statements are correct EXCEPT

- A. The annulus fibrosus forms the periphery of the intervertebral disc.
- B. The nucleus pulposus is a gelatinous mass at the center of the intervertebral disc.
- C. The length of the vertebral column in the adult male is about 70 cm.
- D. The ligamenta flava connect the adjacent pedicles of the vertebrae.
- E. The posterior longitudinal ligaments lie inside the vertebral canal in front of the spinal cord.

SECTION (B) : MATCHING QUESTIONS (15 marks)

Match the statements in column A with the suitable items in column B

Column A

- 1. An inverter of the foot
- 2. A flexor of the thigh
- 3. A medial rotator of the thigh
- 4. A lateral rotator of the thigh
- 5. A plantar flexor of the ankle.

Column B

- A. Obturator internus
- B. Gluteus minimus
- C. Semimembranosus
- D. Psoas major
- E. Tibialis anterior
- F. Extensor hallucis longus
- G. Soleus

Column A

- 6. The aortic valve is best heard at
- 7. The pulmonary valve is best heard at
- 8. The mitral valve is best heard at
- 9. The pulmonary valve lies opposite
- 10. The mitral valve lies opposite

Column B

- A. 2nd left sternocostal junction
- B. 4th left sternocostal junction
- C. 3rd left sternocostal junction
- D. 2nd left costochondral junction
- E. 4th left costochondral junction
- F. Apex of the heart
- G. 2nd right sternocostal junction

Column A

- I 1. Median nerve injury
- 12. Injury of upper trunk of brachial plexus
- 13. Injury of lower trunk of brachial plexus
- 14. Injury of long thoracic nerve
- 15. Injury of radial nerve

Column B

- A. Wrist drop
- B. Klumpke's paralysis
- C. Winging of scapula
- D. Flat shoulder
- E. Ape's hand
- F. Partial claw hand
- G. Erb's Duchenne paralysis

SECTION (E): CLINICAL CASES (15 marks)

- 1. A 19-year-old football player was unable to walk without assistance after he was hit on the lateral side of his knee. Investigations revealed a torn medial collateral ligament and a painful swelling on the medial side of the knee which was diagnosed as bursitis.**
 1. What are the attachments of this ligament?
 2. What structure in the knee would most likely also be injured due to its attachment to this ligament?
 3. Enumerate the bursae on the medial aspect of the knee.
 4. Mention the nerves that carry pain sensation from the knee joint
 5. Name the extracapsular ligaments of the knee joint.
- 2. A 45-year-old female was admitted to a hospital suffering from great difficulty in swallowing, severe loss of body weight and marked edema of the lower limbs. Investigations revealed cancer esophagus at the level of T6. Two days later, the patient died with severe internal thoracic hemorrhage. According to your knowledge about the anatomy of the esophagus, answer the following questions:**
 1. If there was an anterior expansion of the carcinoma, which nearby chamber of the heart was most likely involved?
 2. The edema of the lower limbs was due to obstruction of the lymphatic drainage.
What lymphatic duct was most likely obstructed?
 3. What are the sites of normal constrictions of the esophagus?
 4. The internal thoracic hemorrhage was found to be due to infiltration of a large vein that lies behind the esophagus. What, most probably, is the name of this vein?
 5. Mention the blood vessels that supply the thoracic part of the esophagus.
- 3. A 45-year-old woman noticed a hard painless lump in her breast. The case was diagnosed as carcinoma of the breast. An operation of radical mastectomy was performed.**
 1. After the operation the patient suffered from difficulty in raising the arm above the head. How can this be explained?
 2. Should the surgeon examine the other breast before the operation? Why?
 3. The surgeon had to excise the muscles on which the breast lies. Enumerate these muscles.
 4. What are the groups of lymph nodes that drain the lateral half of the breast?
 5. What are the groups of lymph nodes that drain the medial half of the breast?

Anatomy Examination First Year

N.B:

- * The exam consists of 8 pages.
- * Please answer part I (Sections A & B) in the answer sheet.
- * Please answer part II (Sections C.D & E) in the answer book.
- * Answer each question on a separate page.
- * Answers are preferred to be in the same order of the questions.

Part I

Section (A): MCQs (30 Marks) Choose only one answer:

- 1- The acromio-throacic artery gives the following branches, except:
 - a.Acromial branch.
 - b.Pectoral branch.
 - c.Lateral mammary branch.
 - d.Clavicular branch.
 - e.Deltoid branch.

- 2-The following nerves arise from the posterior cord of the branchial plexus, except:
 - a.The upper subscapular nerve.
 - b.The lower subscapular nerve.
 - c.The dorsal scapular nerve.
 - d.The radial nerve.
 - e.The axillary nerve.

- 3-Regarding the latissimus dorsi muscle, the following statements are correct, except:
 - a.It is a large triangular muscle covering the lower half of the back.
 - b. It is inserted into the floor of the intertubercular groove of the humerus.
 - c.It receives its nerve supply from the thoracodorsal nerve.
 - d.It is a powerful adductor, extensor and medial rotator of the arm.
 - e.It is an accessory muscle of inspiration.

- 4-The cubital fossa contains the following structures, except:
 - a.Termination of the brachial artery.
 - b.Beginning of radial and ulnar arteries.
 - c. Median nerve.
 - d. Ulnar nerve.
 - e. Tendon of the biceps.

5- The ulnar nerve supplies the following intrinsic muscles of the hand, except:

- a. Adductor pollicis muscle.
- b. Hypothenar muscles.
- c. The lateral two lumbricals.
- d. The palmar interosseous muscles.
- e. The dorsal interosseous muscles.

6- Regarding the external intercostal muscle, the following statements are true, except:

- a. It takes origin from the rib above.
- b. Its fibres are directed downwards and forwards.
- c. It is inserted into the superior border of the rib below.
- d. It continues backwards as the posterior intercostal membrane.
- e. It is supplied by the corresponding intercostal nerve.

7- Regarding the trachea, the following statements are true, except:

- a. It begins at the level of the lower border of C6.
- b. It lies anterior to the esophagus in the superior mediastinum.
- c. The arch of aorta lies on its anterior and left sides in the superior mediastinum.
- d. Its wall is supported by 16-20 C shaped cartilaginous rings.
- e. It ends by dividing into 2 main bronchi at the level of the 6th thoracic vertebra.

8- Regarding the thoracic duct, one statement is wrong:

- a. It measures 45 cm in length.
- b. It enters the thorax via the esophageal opening of the diaphragm.
- c. In the thorax it runs in the posterior and superior mediastinum.
- d. It ends in the neck by opening at the angle between the left internal jugular and left subclavian veins.
- e. It contains many valves.

9- All the following veins open into the Rt atrium, except:

- a. Azygos vein.
- b. Anterior cardiac vein.
- c. Coronary sinus.
- d. SVC.
- e. IVC.

10- The superior mediastinum contains all the following, except:

- a. Trachea.
- b. Ascending aorta.
- c. Arch of aorta.
- d. Left brachiocephalic vein.
- e. Vagus nerves.

11- Regarding the Rt main bronchus all the following are True, except:

- a. Wider than the Lt.
- b. Longer than the Lt.
- c. More vertical than the Lt.
- d. Foreign bodies pass through it easily.
- e. Gives off the Rt superior lobar bronchus before entering the hilum.

- 12- The following muscles produce extension of the hip joint, except**
- a. Gluteus maximus.
 - b. Gluteus medius.
 - c. Biceps femoris.
 - d. Semitendinosus.
 - e. Ischial part of adductor magnus.
- 13- The femoral artery gives the following branches, except:**
- a. Superficial external pudendal.
 - b. Deep external pudendal.
 - c. Profunda femoris artery.
 - d. Descending genicular artery.
 - e. Perforating arteries.
- 14- The adductor canal contains the following structures, except:**
- a. Femoral artery and vein.
 - b. Descending genicular artery.
 - c. Saphenous nerve.
 - d. Nerve to vastus medialis.
 - e. Nerve to vastus lateralis.
- 15- The following muscles are supplied by the sacral plexus, except:**
- a. Piriformis.
 - b. Obturator externus.
 - c. Obturator internus.
 - d. Rectus femoris.
 - e. Superior gemellus.
- 16- The following muscles flex the knee joint, except:**
- a. Semitendinosus muscle.
 - b. Semimembranosus muscle.
 - c. Gastrocnemius.
 - d. Biceps femoris.
 - e. Ischial part of adductor magnus.
- 17- The common peroneal nerve gives the following branches, except:**
- a. Sural communicating nerve.
 - b. Muscular branches to the muscles of popliteal fossa.
 - c. Articular branches to knee joint.
 - d. Lateral cutaneous nerve of calf.
 - e. Superficial and deep peroneal nerves.
- 18- During the first four months of pregnancy, progesterone is secreted by the:**
- a. Theca externa cells.
 - b. Theca interna cells and follicular cells.
 - c. Corona radiata cells.
 - d. Corpus albicans.
 - e. Corpus luteum.

19-One of the following structures is not a constituent of the tertiary chorionic villi:

- a.Cytotrophoblast.
- b.Syncytiotrophoblast.
- c.Extraembryonic mesoderm.
- d.Extraembryonic coelom.
- e.Blood capillaries.

20-The following structures are derivatives of the ectoderm, except:

- a.Central nervous system.
- b.Sensory epithelium of eye and ear.
- c. Vertebral column.
- d.Mammary gland.
- e.Hair and nails.

21-While walking to his classroom building, a first year medical student slipped on the wet pavement and fell against the curb, injuring his right arm. Radiographic images showed a midshaft fracture of humerus. Which pair of structures was most likely injured at the fracture site?

- a.Median nerve and brachial artery.
- b.Axillary nerve and posterior humeral circumflex artery.
- c.Radial nerve and profunda brachii artery.
- d.Suprascapular nerve and artery.
- e.Long thoracic nerve and lateral thoracic artery.

22. A 24-year-old medical student was bitten at the base of her thumb by her dog. The wound became infected and the infection spread into the radial bursa. The tendon(s) of which muscle will most likely be affected

- a.Flexor digitorum profundus.
- b.Flexor digitorum superficialis.
- c.Flexor pollicis longus.
- d.Flexor carpi radialis.
- e.Flexor pollicis brevis.

23-A 62-year-old male patient expresses concern that his voice has changes over the preceding months. Imaging reveals a growth located within the aortic arch, adjacent to the left pulmonary artery. Which neural structure is most likely being compressed to cause the changes in the patient's voice

- a.Left phrenic nerve.
- b.Esophageal plexus.
- c.Left recurrent laryngeal nerve.
- d.Left vagus nerve.
- e.Left sympathetic trunk.

24-A 35-year-old man is admitted to the hospital with difficulty in swallowing. Imaging reveals a dilated left atrium. Which structure is most likely being compressed by the expansion of the left atrium to result in the patient's symptom:

- a.Esophagus.
- b.Root of the lung.
- c.Trachea.
- d.Superior vena cava.
- e.Inferior vena cava.

25-A 59-year-old man is admitted to the hospital with severe chest pain. During examination a slight rhythmic pulsation on the chest wall at the left fifth intercostal space is noted in the midclavicular line. What part of the heart is responsible for this pulsation

- a.Right atrium.
- b.Left atrium.
- c.Aortic arch.
- d.Apex of the heart.
- e.Mitral valve.

26-A 10-year-old boy is admitted to the hospital with retrosternal discomfort. A CT scan reveals a midline tumor of the thymus gland. Which of the following veins would most likely be compressed by the tumor

- a.Right internal jugular.
- b.Left internal jugular.
- c.Right brachiocephalic.
- d.Left brachiocephalic.
- e.Right subclavian.

27-A 45-year-old male is treated at the hospital after he fell from his bicycle. Radiographic examination reveals fractures both of the tibia and the fibula. On physical examination the patient has a foot drop, but normal eversion. Which of the following nerve is most likely injured:

- a.Tibial.
- b.Common peroneal.
- c.Superficial peroneal.
- d.Saphenous.
- e.Deep peroneal.

28-A 49-year-old construction worker is admitted to the emergency department with a painful lump on the proximal medial aspect of his thigh. Radiographic and physical examinations revealed that the patient has a herniation of abdominal viscera beneath the inguinal ligament into the thigh. Through which of the following openings will a hernia of this type initially pass to extend from the abdomen into the thigh

- a.Femoral ring.
- b.Inguinal canal .
- c.Adductor hiatus.
- d.Saphenous opening .
- e.Obturator canal.

29-A 37-year-old male is admitted to the hospital after an injury to his foot while playing football with friends . A series of radiographs demonstrates a fracture involving the ankle (tibiotalar) joint. Which movements are the major ones to be affected by this injury

- a.Plantar flexion and dorsiflexion.
- b.Inversion and eversion.
- c.Plantar flexion, dorsiflexion, inversion, and eversion.
- d.Plantar flexion and inversion.
- e.Dorsiflexion and eversion.

30-After dividing the overlying superficial tissues and gluteus maximus in a 68-year-old patient, the orthopedic surgeon carefully identified the underlying structures. The key landmark in the gluteal region, relied upon in explorations of this area, is provided by which of the following structures

- a. Gluteus medius.
- b. Obturator internus tendon.
- c. Sciatic nerve.
- d. Piriformis muscle.
- e. Spine of the ischium.

Section (B): Cross Matching (15 Marks)

I-Match the origin of the following arteries:

(A)	(B)
1-Internal thoracic artery	a.Descending aorta
2-Lower 3 ant. Intercostal arteries	b.Ascending aorta
3-Pericardiophrenic artery	c.Muscuophrenic artery
4-Coronary arteries	d.Subclavian artery
5-Left bronchial artery	e.Internal mammary artery

II-Match column (A) with (B):

(A)	(B)
1-Iliacus	a.Has two heads
2-Sartorius	b.Originates from linea aspera
3-Vastus lateralis	c.Flexes the knee and hip
4-Adductor longus	d.Flexes the hip
5-Rectus femoris	e.Supplied by obturator nerve

III-Regarding the muscles attached to the upper part of the humerus, choose from column (B) what suits the statements in column (A):

Column(A)	Column(B)
1-Subscapularis	a.Upper facet of greater tuberosity
2-Supraspinatus	b.Middle facet of greater tuberosity
3-Teres major	c.Lower facet of greater tuberosity
4-Teres minor	d.Lesser tuberosity
5- Infrapinatus	e.Medial lip of bicipital groove

Part II

Section (C): Essay Questions (50 Marks)

Give an account of each of the following

- 1-Anatomical description of the pronated and supinated forearm, muscles responsible and the joints involved and the type of these joints.
- 2-Lymphatic drainage of the mammary gland (Breast)
- 3-Factors responsible for stability of a joint. Compare the stability of hip and shoulder joints.
- 4-Femoral artery, beginning, end, branches and its surface anatomy.
- 5-Anatomy of the femoral sheath. Comment on its clinical importance.
- 6-Arches of foot; bony components, functions and factors maintaining.
- 7-The sinuses of serous pericardium.
- 8-Surface anatomy of Lt. pleura and lung.
- 9-Azygos and hemiazygos venous systems.
- 10-Components of the placenta. Mention its normal and abnormal sites within the uterus.

Section (D) Fill in the blanks (15 Marks)

- 1-The axillary artery begins at the outer border of the and ends at the lower border of the
- 2-The....., are two bony components of the proximal row of the carpal bones.
- 3-The cervicoaxillary canal is bounded anteriorly by..... and medially by
- 4-The flexor carpi ulnaris is inserted into two carpal bones:.....,
- 5-The anterior surface of the interosseous membrane gives attachment to and
- 6-The nerve supplies the quadriceps muscle.
- 7-The sciatic nerve leaves the pelvis by passing through Below the muscle.
- 8-Themuscle lies between the anterior and posterior divisions of the obturator nerve.

- 9-Inversion and eversion of the foot occurs at thejoints.
- 10-Sartorius arises from spine while, the straight head of rectus femoris arises from..... spine.
- 11-The internal thoracic artery ends by dividing into and
- 12-The ribs from 1-7 are called.....while from 8,9 & 10 are called.....
- 13-The trachea begins at the level ofand ends at the level of
- 14- Each somite differentiates into a dorsolateral part calledand a ventromedial part called.....
- 15-After folding, the part of the secondary yolk sac enclosed within the embryo is called.....and the part remaining outside the embryo is called.....

Section (E) Problem Solving Questions (15 Marks)

I-A 30-years-old woman fell on her outstretched hand. She suffered from severe pain in the region of the wrist particularly at the floor of the anatomical snuff box.

- 1-What is the expected diagnosis?
- 2-What are the boundaries of the anatomical snuff box ?
- 3-What are the contents of the anatomical snuff box ?
- 4-What makes the floor of the anatomical snuff box ?
- 5-What makes the roof of the anatomical snuff box ?

II-An old man trying to cross the road stumbled and fell and was hit by a fast crossing car. He was transferred to hospital where x-ray revealed fracture of the neck of left fibula. On examining the patient's lower limb he was unable to perform dorsiflexion and eversion of the left foot.

- 1-What is the most probable injured nerve ?
- 2-Why the patient cannot perform dorsiflexion and eversion of the left foot ?
- 3-Name the cutaneous branches of the injured nerve.
- 4-Name the resulting deformity .
- 5-Give the origin of the injured nerve ?

III-A 50-years-old obese male complaining of constricting chest pain radiating to his left shoulder, arm and root of neck.

- 1-What is the possible diagnosis?
- 2-What are the affected arteries?
- 3-Give their origins.
- 4-Mention their distribution.
- 5-Name 2 branches of each of these arteries.

Anatomy Examination (First Year)

N.B.

The exam is composed of 9 pages.

Please answer Part I (sections A&B) in the answer sheet.

Please answer Part II (sections C, D&E) in the answer book.

Answer each question in a separate page.

Answers are preferred to be in the same order of the question.

PART I

Section (A): M. C. Os. (30 marks)

Choose one answer for each of the following questions (one mark each)

1-Regarding the breast, choose the correct statement :

- A-It lies directly on the pectoralis minor muscle
- B-Its medial part is drained by the subscapular lymph nodes
- C-Its tail is a prolongation from the upper lateral quadrant
- D-It is formed of ten lobes
- E-Its base extends downward to the 4th costal cartilage

2-Which of the following muscles shares in the formation of the medial wall of the axilla?

- A-Subscapularis
- B-Teres major
- C-Teres minor
- D-Pectoralis major
- E-Upper part of serratus anterior

3-Which of the following arteries arises from the second part of the axillary artery?

- A-Superior thoracic
- B-Subscapular
- C-Lateral thoracic
- D-Anterior circumflex humeral
- E-Posterior circumflex humeral

4-Which one of the following deformities results from injury to the radial nerve?

- A-Ape's hand
- B-Claw hand
- C-Policeman tip deformity
- D-Flat shoulder
- E-Wrist drop

5-Which of the following muscles are supplied via branches of the lumbar plexus?

- A-Muscles of the front and medial aspect of the thigh
- B-Muscles of the back of the thigh
- C-Muscles of the anterior and lateral aspects of the leg
- D-Muscles of the posterior aspect of the leg
- E-Muscles of the planter aspect of the foot

6- Regarding the origin of the medial circumflex femoral artery, choose the correct statement:

- A-Femoral
- B-Profunda femoris
- C-External iliac
- D-Internal iliac
- E-Superior gluteal

7-Regarding the muscle forming the anterolateral wall of the adductor canal,choose the correct statement:

- A-Sartorius
- B-Vastus lateralis
- C-Vastus medialis
- D-Gracilis
- E-Adductor longus

8- Which of the following muscles intervens between the anterior and posterior divisions of the obturator nerve?

- A-Obturator externus
- B-Gracilis
- C-Pectineus
- D-Adductor brevis
- E-Sartorius

9-Which of the following muscles flexes both the hip and knee joints?

- A-Semitendinosus
- B-Sartorius
- C-Psoas major
- D-Rectus femoris
- E-Piriformis

10- Regarding the tibialis posterior muscle, choose the correct answer:

- A-It everts the foot
- B-It helps in suspending the lateral longitudinal arch of the foot
- C-It arises from the tibia, fibula and interosseous membrane
- D-Its tendon passes superficial to that of the flexor digitorum longus
- E- Its slips of insertion lie in the third layer of the sole of foot

11- Regarding the peroneus longus muscle, choose the correct statement:

- A-It lies in the lateral compartment
- B-Its tendon is inserted into the tuberosity of the base of the 5th metatarsal bone
- C-It produces inversion of the foot by acting at the ankle joint
- D-It is supplied by the common peroneal nerve
- E-It is supplied by the anterior tibial artery

12- Regarding the structures passing deep to the superior extensor retinaculum at the ankle, choose the correct statement:

- A- Tibialis anterior tendon
- B- Tibialis posterior tendon
- C- Tibial nerve
- D- Flexor digitorum longus tendon
- E- Flexor hallucis longus tendon

13-Regarding the fibrous pericardium, it is innervated by:

- A-The cervical plexus
- B-The sympathetic chain
- C-The recurrent laryngeal nerve
- D-The vagus nerve
- E-The phrenic nerve

14- The atrio-ventricular groove of the heart lodges one of the following vessels:

- A-The anterior interventricular artery
- B-The posterior inter ventricular artery
- C-The right marginal artery
- D-The oblique vein of the left atrium
- E-The right coronary artery

15- Regarding the descending thoracic aorta, choose the correct statement:

- A-It begins at the level of T12
- B-It descends in the posterior mediastinum
- C-It is related to the right lung
- D-It gives the right bronchial artery directly
- E-It gives the first posterior intercostals artery

16- Regarding the superficial cardiac plexus, choose the correct statement :

- A-It is situated in front of the ligamentum arteriosum
- B-It is formed of five branches
- C-It is formed of sympathetic fibers only
- D-It forms esophageal plexuses
- E-It is a content of the posterior mediastinum

17- Regarding the pleura, choose the correct statement:

- A-The visceral pleura is sensitive to pain
- B-The parietal pleura is innervated by the intercostal nerves only
- C-The pleural cavity contains network of lymph capillaries
- D-The pulmonary ligament allows for distention of the pulmonary vein
- E-The inferior border of the parietal pleura reaches the 8th rib in the midaxillary line

18-One of the following structures is a content of the middle mediastinum:

- A-Descending aorta
- B-Ascending aorta
- C-Thoracic duct
- D-Azygos vein
- E-Esophagus

19- Regarding the phrenic nerves, choose the correct statement:

- A-They contain only somatic motor nerve fibers
- B-They pass posterior to the roots of the lungs
- C-They share in the formation of the esophageal plexuses
- D-The right phrenic is more vertical than the left one
- E-The left phrenic is related to venous side of the heart

20-Which one of the following structures is a mesodermal derivative?

- A- Intestinal mucosa
- B- Brain
- C-Striated muscle
- D-Thymus gland
- E- Epidermis of the skin

21- The first pair of the somites appear in the occipital region on:

- A-The 20th day
- B-The 22nd day
- C-The 23th day
- D-The 25th day
- E-The 26th day

22- A 36-year-old- man is admitted to the hospital with a deep knife wound on the medial side of his distal forearm. He is unable to hold a piece of paper between his fingers and has sensory loss on the medial side of his hand and his little finger. Which nerve is most likely injured?

- A-Radial
- B-Ulnar
- C-Median
- D-Axillary
- E-Posterior interosseous

23- A 48-year-old male patient suffers from chronic angina. Coronary arteriography reveals nearly total blockage of the posterior descending interventricular artery. In exposing this artery to perform the bypass procedure, which accompanying vessel is most susceptible to injury?

- A- Middle cardiac vein
- B-Great cardiac vein
- C-Small cardiac vein
- D-Anterior cardiac vein
- E-Coronary sinus

24-A 17-year-old girl was admitted to the hospital with severe dyspnea. Physical examination revealed that she was suffering from an asthma attack with associated bronchospasm. Which of the following nerves is responsible for the innervations of the bronchial smooth muscle cells?

- A-Greater thoracic splanchnic
- B-Lesser thoracic splanchnic
- C-Phrenic
- D-Vagus
- E-Intercostal

25- Postoperative examination of a 68-year-old male who underwent mitral valve replacement demonstrates significant cardiac hypertrophy. Which of the following structures would be most likely to be compressed?

- A-Pulmonary trunk
- B-Superior vena cava
- C-Inferior vena cava
- D-Trachea
- E-Esophagus

26-A 50-year-old man was struck by a car. Radiographic examination revealed flail chest. The patient complained of severe chest pain during inspiration and expiration. Which of the following nerves is most likely responsible for the pain during respiration?

- A-Intercostal
- B-Phrenic
- C-Vagus
- D-Cardiopulmonary
- E-Thoracic splanchnic

27- A football player suffering from a right knee joint injury was examined in a seated position. Holding the tibia with both hands, the clinician could press it backward under the distal part of the femur. Which structure was most likely damaged in the knee?

- A-Medial meniscus
- B-Medial collateral ligament
- C-Lateral collateral ligament
- D-Anterior cruciate ligament
- E-Posterior cruciate ligament

28- A 30-year-old man is pushing heavy weights while doing bodybuilding. Unfortunately, he felt severe pain in his upper thigh when he was maxing out the weight. Physical examination diagnosed the case as femoral hernia. What reference structure would be found immediately lateral to the herniated structures?

- A-Femoral vein
- B-Femoral artery
- C-Pectineus muscle
- D-Femoral nerve
- E-Adductor longus muscle

29-A 34-year-old woman received a direct blow to the patella. Radiographic examination revealed lateral dislocation of the patella. Which of the following needs to be strengthened to prevent future dislocation of the patella?

- A-Vastus lateralis
- B-Vastus intermedius
- C-Vastus medialis
- D-Pectineus
- E-Patellar ligament

30-A 45-year-old male fell from his bicycle. Radiographic examination revealed fracture of both tibia and fibula. On clinical examination, the patient had a foot drop, but normal eversion. Which of the following nerves would most likely be injured?

- A-Tibial
- B-Common peroneal
- C-Superficial peroneal
- D-Deep peroneal
- E-Saphenous

Section (B) :Cross matching : (15 marks) .

I- Match the muscle in column (A) with its nerve supply in column(B)

(A)	(B)
1-Deltoid	a-Posterior interosseous nerve
2-Pectoralis minor	b- Musculocutaneous nerve
3-Brachialis	c- Axillary nerve
4-Pronator teres	d- Ulnar nerve
5-Extensor carpi ulnaris	e-Medial pectoral nerve
	f-Median nerve

II- Match the structure in column (A) with its corresponding level in column (B):

(A)	(B)
6-End of aortic arch	a-T12 vertebra
7-Apex of the heart	b-2 nd costal cartilage
8-Apex of the lung	c-3 rd left sterno-costal junction
9-End of descending thoracic aorta	d-3 rd right costal cartilage
10- Beginning of pulmonary trunk	e- 5 th left intercostal space
	f- About one inch above the clavicle

III- Match the muscle in column (A) with its insertion in column (B):

(A)	(B)
11- Piriformis	a-Lesser trochanter
12- Biceps femoris	b-Quadrate tubercle
13- Adductor longus	c-Head of fibula
14- Psoas major	d-Top of greater trochanter
15- Tibialis anterior	e-Middle third of linea aspra
	f-Medial side of medial cuneiform

PART II

Section C :Short Essay Questions : (50 Marks:5 marks each)

- 1- Name the four muscles forming "the rotator muscle cuff". Give their attachments and mention their importance.
- 2- Describe the arterial anastomosis around the elbow. Give its clinical importance.
- 3- Give the attachment of the gluteus medius and minimus muscles. Mention their nerve supply and the resulting gait in their unilateral and bilateral paralysis .
- 4-Describe the boundaries of the popliteal fossa. Enumerate its contents and give their relation to each other.
- 5-Describe the movements of the ankle joint and name the muscles allowing them. Give the type of this joint. Is it the same as that of the knee joint. Why?
- 6-Describe the course of the great saphenous vein. Enumerate its tributaries and mention its clinical importance.
- 7-Define and describe the bronchopulmonary segments of the lung. Give their clinical importance.
- 8- Compare between the right and left ventricles.
- 9-Describe the course of the thoracic duct. Enumerate its tributaries.
- 10-Enumerate the abnormalities of the umbilical cord.

Section D : Fill in the blanks (15 marks)

- 1-Two branches of the upper trunk of the brachial plexus are-----and-----.
- 2-The profunda brachii artery is a branch of the----- artery and it is accompanied by the-----nerve in the spiral groove .
- 3-The palmar cutaneous branches of the-----and-----nerves pass superficial to the flexor retinaculum at the wrist.
- 4-The -----and-----muscles are inserted into the iliotibial tract.
- 5-The medial wall of the femoral triangle is formed by-----while its base is formed by-----.
- 6- The -----muscle is a powerful extensor of the hip joint and the----- muscle is a powerful extensor of the knee joint.
- 7 -The pubic part of the adductor magnus is supplied by the----- nerve while its ischeal part is supplied by the ----- nerve.
- 8-The anterior tibial artery begins at the lower border of the----- muscle and ends in front of the ankle by becoming the----- artery.
- 9- The typical thoracic vertebra is characterised by a-----on the side of its body and a-----spine.
- 10-Two branches of the typical intercostal nerve are-----and-----.
- 11-At the level of the-----vertebra, the azygos vein arches forward just above the----- of the right lung to end in the superior vena cava.
- 12- The left coronary artery arises from the-----of the ascending aorta and runs forward between-----and the left ventricle.
- 13- The anterior esophageal plexus is mainly formed from the----- vagus nerve while the posterior one is formed from the----- vagus nerve.
- 14-Implantation of the zygote starts at the----- day of gestation and is completed at the-----day.
- 15-Two functions of the amniotic fluid are-----and-----.

Section E : Problem Solving Questions (15 marks:5marks each) :

Problem (1):

A 35- year-old man complaining of tingling sensation over the lateral three and half fingers of his right hand, visited a doctor. During examination, the doctor found that the sensation over the palm was not affected but there was a weakness of the thenar muscles. The doctor diagnosed the case as a nerve compression.

- A-What is the name of this nerve compression syndrome? (1mark)
- B -Name the compressed nerve. (1mark)
- C-Give the root value of this nerve. (1mark)
- D-Why there was no sensory affection over the palm? (1mark)
- E -Enumerate two muscles supplied by this nerve in the forearm.(1mark)

Problem (2):

A patient was admitted to the hospital with a penetrating wound at the back of the thigh. Examination reveals a completely cut sciatic nerve.

- A-Give the root value of this nerve. (1mark)
- B-How does the sciatic nerve enter the gluteal region? (1mark)
- C-Name two muscles lying deep to it in the gluteal region. (1mark)
- D-Name two muscles supplied by the sciatic nerve. (1mark)
- E-Name two other branches of the sacral plexus. (1mark)

Problem (3):.

A Man with a penetrating stab wound in the 4th left intercostal space was admitted to the hospital. Examination revealed that there was accumulation of blood in the pericardial cavity.

- A-Name the condition. (1mark)
- B-Give the parts of the pericardium. (1mark)
- C-Name the structures between the pericardium and the sternum.(1mark)
- D-Name two arteries supplying the pericardium. (1mark)
- E-In this case do you expect injury of the left lung? Why? (1mark)

Anatomy Examination (First Year)

N.B.

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Answer each question in a separate page.

Answers are preferred to be in the same order of the question.

PART I

Section (A) : M. C. Qs. (30 marks)

Choose Only One Answer

1- Which one of the following muscles originates from the supraglenoid tubercle?

- A-Long head of biceps
- B-Short head of biceps
- C-Long head of triceps
- D-Medial head of triceps
- E-Corachobrachialis

2- The muscle responsible for the midprone position of the forearm is:

- A-The biceps brachii
- B-The brachialis
- C-The brachioradialis
- D-The flexor carpi radialis
- E-The pronator teres

3- The nerve passing behind the medial epicondyle of the humerus is:

- A-The radial
- B-The median
- C-The musculocutaneous
- D-The axillary
- E-The ulnar

4- The artery in the fourth compartment of the extensor retinaculum is:

- A-Ulnar
- B-Radial
- C-Anterior interosseous
- D-Posterior interosseous
- E-First dorsal metacarpal

5- Which of the following structures passes through the lesser sciatic foramen?

- A-Sciatic nerve
- B-Superior gluteal nerve
- C-Inferior gluteal nerve
- D-Tendon of piriformis muscle
- E-Pudendal nerve

6-Which of the following nerves originates from the lumbar plexus?

- A-Saphenous
- B-Posterior cutaneous nerve of the thigh
- C-Lateral cutaneous nerve of the thigh
- D-Medial cutaneous nerve of the thigh
- E-Intermediate cutaneous nerve of the thigh

7- Hyperextension of the hip joint is limited by:

- A-The iliofemoral ligament
- B-The ischiofemoral ligament
- C-The pubofemoral ligament
- D-The capsular ligament
- E-The round ligament of the head of femur

8- The ischial part of the adductor magnus muscle is supplied by:

- A-The obturator nerve
- B-The femoral nerve
- C-The sciatic nerve
- D-The Superior gluteal nerve
- E-The inferior gluteal nerve

9- The small saphenous vein is a tributary of one of the following veins:

- A-Femoral
- B-Popliteal
- C-Perforating
- D-Great saphenous
- E-Deep veins of the leg

10- The following muscle plantar flexes the ankle joint:

- A-Soleus
- B-Tibialis anterior
- C-Popliteus
- D-Peroneus tertius
- E-Extensor hallucis longus

11- The dorsalis pedis artery is the continuation of which of the following arteries?

- A-Anterior tibial
- B-Posterior tibial
- C-Popliteal
- D-Peroneal
- E-Femoral

12-The deltoid ligament is:

- A-A weak ligament
- B-Quadrilateral in shape
- C-Attached inferiorly to the spring ligament
- D-Attached superiorly to the lateral malleolus
- E-Lies on the lateral aspect of the ankle joint

13-The artery related to the front of the neck of the first rib is:

- A-The costocervical trunk
- B-The brachiocephalic
- C-The subclavian
- D-The internal mammary
- E-The superior intercostal

14-The intercosto-brachial nerve is the lateral cutaneous branch of which of the following intercostal nerves?

- A-The first
- B-The second
- C-The third
- D-The fourth
- E-The fifth

15- Which of the following is present in both the superior and posterior mediastina?

- A-Trachea
- B-Phrenic nerve
- C-Thoracic duct
- D-Descending aorta
- E-Thymus gland

16- The cervical pleura projects in the neck above the medial third of the clavicle for:

- A-Half an inch
- B-One inch
- C-One and half inches
- D-Two inches
- E-Two and half inches

17- The right common carotid artery arises from:

- A-The ascending aorta
- B-The arch of aorta
- C-The brachiocephalic artery
- D-The descending aorta
- E-The internal mammary artery

18- The inferior vena cava brings blood from the lower regions of the body and empties into:

- A-The left atrium
- B-The right atrium
- C-The coronary sinus
- D-The left ventricle
- E-The right ventricle

19- The esophagus crosses in front of the descending aorta at the level of:

- A-T4
- B-T5
- C-T6
- D-T7
- E-T8

20- At which day the embryo shows 10 pairs of somites?

- A-20
- B-21
- C-22
- D-23
- E- 24

21- Which of the following is ectodermal in origin?

- A-Brain
- B-Heart
- C-Lung
- D-Liver
- E-Kidney

22- A 54-year-old woman is admitted to the hospital after falling from a tree with an outstretched hand. Radiographic examination reveals a wrist dislocation. Which of the following carpal bones will most likely be involved?

- A-Scaphoid-lunate
- B-Trapezoid-trapezium
- C-Hamate-lunate
- D-Pisiform-triquetrum
- E-Hamate-capitate

23- A 32-year-old patient received a badly placed intramuscular injection to the posterior part of his gluteal region. The needle injured a motor nerve in the area. Later, he had great difficulty rising to a standing position from a seated position. Which muscle was most likely affected by the injury?

- A-Gluteus minimus
- B-Gluteus maximus
- C-Hamstrings
- D-Iliopsoas
- E-Obturator internus

24- A 43-year-old man, with a history of chronic bacterial arthritis, visits the out patient clinic with a painful, swollen knee joint. A knee aspiration is ordered for bacterial culture of the synovial fluid. A standard approach is used and a needle passes from the lateral aspect of the thigh into the region immediately proximal to and deep to the patella. Through which of the following muscles would the needle pass?

- A-Adductor magnus
- B-Short head of biceps femoris
- C-Rectus femoris
- D-Sartorius
- E-Vastus lateralis

25- A 49-year-old male worker fell from a ladder, with his weight impacting on the heel of his feet. Radiographic examination reveals comminuted calcaneal fractures. After the injury the contraction of which one of the following muscles most likely increase the pain in the injured foot?

- A-Flexor digitorum profundus
- B-Gastrocnemius
- C-Tibialis posterior
- D-Tibialis anterior
- E-Peroneus longus

26- An 18-year-old professional tennis player fell when she leaped for an overhead shot and landed with her foot inverted. Radiographic examination revealed an avulsion fracture of the tuberosity of the fifth metatarsal. Part of the tuberosity is pulled off, producing pain and edema. Which of the following muscles is pulling on the fractured fragment?

- A-Peroneus longus
- B-Tibialis posterior
- C-Peroneus brevis
- D-Extensor digitorum brevis
- E-Adductor hallucis

27- A 25-year-old man is admitted to the hospital with cough and severe dyspnea. Radiographic examination reveals that the patient suffers from emphysema. Upon physical examination the patient shows only "bucket handle movements" during deep inspiration. Which of the following movements of the thoracic wall is characteristic for this type of breathing?

- A-Increase of the transverse diameter of the thorax
- B-Increase of the anteroposterior diameter of the thorax
- C-Increase of the vertical diameter of the thorax
- D-Decrease of the anteroposterior diameter of the thorax
- E-Decrease of the transverse diameter of the thorax

28- A 58-year-old male is admitted to the emergency department with severe dyspnea. Bronchoscopy reveals that the carina is distorted and widened. Enlargement of which group of lymph nodes is most likely responsible for altering the carina?

- A-Pulmonary
- B-Bronchopulmonary
- C-Inferior tracheobronchial
- D-Superior tracheobronchial
- E-Paratracheal

29- A 48-year-old male patient is scheduled to have a coronary arterial bypass because of chronic angina. Coronary arteriography reveals nearly total blockage of the anterior interventricular artery. In exposing this artery to perform the bypass procedure, which accompanying vessel is most susceptible to injury?

- A-Great cardiac vein
- B-Small cardiac vein
- C-Middle cardiac vein
- D-Anterior cardiac vein
- E-Coronary sinus

30- A 45-year-old female is admitted to the hospital with swelling (edema) of the lower limbs. Ultrasound examination reveals an incompetent tricuspid valve. Into which area will regurgitation of blood occur in this patient?

- A-Pulmonary trunk
- B-Left atrium
- C-Ascending aorta
- D-Right atrium
- E-Left ventricle

Section (B) :Cross matching : (15 marks).

I- Select from column (B) the deformity resulting from injury to the nerve in column (A)

(A)	(B)
1- Radial nerve	a-Ape's hand
2- Median nerve	b-Flat shoulder
3- Ulnar nerve	c-Winging of the scapula
4- Axillary nerve	d-Wrist drop
5- Long thoracic nerve	e-Claw hand
	f-Erb's douchenne paralysis

II- Match the muscle in column (A) with its bony insertion in column (B):

(A)	(B)
6- Piriformis	a- Calcaneus
7- Biceps femoris	b-Talus
8- Semitendinosus	c- Greater trochanter
9- Plantaris	d-Tibial tuberosity
10- Quadriceps	e-Tibia
	f-Head of fibula

III- Match the following nerves in column (A) with their branches in column (B):

(A)	(B)
11- Vagus	a- Subcostal nerves
12- Phrenic	b- Recurrent laryngeal
13- Sympathetic chain	c- Motor branches to the diaphragm
14- Typical intercostal	d- Lesser splanchnic nerve
15- Osophageal plexuses	e- Gastric nerves
	f- White and grey rami communicans

Part II

Section C :Essay Questions : (50 Marks)

Give a short account on each the followings:

- 1- Describe the lymphatic drainage of the mammary gland. (5marks)
- 2- Give the beginning, course, end and surface anatomy of the brachial artery. Name its branches. (5marks)
- 3- Describe the femoral canal. Give its importance. (5marks)
- 4- Give the beginning, course and end of the popliteal artery. Enumerate its branches. (5marks)
- 5- Give the origin, course and end of the deep peroneal nerve. Enumerate the muscles that it supplies. Name the deformity occurring due to paralysis of this nerve. (5marks)
- 6- Describe the medial longitudinal arch of the foot and mention the factors maintaining it. What is the result of its weakness? (5marks)
- 7- Give the beginning, course and end of the internal mammary artery. Name its branches. Mention its clinical importance. (5marks)
- 8- Compare between the right and left lungs. Give the surface anatomy of their anterior border (5 marks)
- 9-Describe the interior of the right atrium. (5marks)
- 10- Give the results of folding of the embryonic disc. (5marks)

Section D : Fill in the blanks (15 marks)

- 1-Initiation of abduction of the arm is performed by the ----- muscle which is supplied by the ----- nerve.
- 2-Two contents of the cubital fossa are ----- and -----.
- 3-The cephalic vein begins from the ----- end of the dorsal venous arch while the basilic vein begins from the ----- end
- 4-The longest muscle of the guy rope group is the ----- muscle, it is supplied by the ----- nerve.
- 5-The ----- muscle lies in the posterior compartment of the thigh and is supplied by the ----- nerve.

- 6- The femoral artery begins opposite the ----- point and ends at the -----.
- 7- Planter flexion of the foot occurs at the ----- joint while eversion occurs at the ----- joint.
- 8-The flexor retinaculum of the ankle lies on the ----- side of the ankle joint while the extensor retinacula lie ----- of the joint.
- 9-The costomediastinal recess of the pleura lies along its ----- border and the costodiaphragmatic recess lies along its ----- border.
- 10 -The cardiac impression in front of the hilum of the left lung is caused by ----- while that in front of the hilum of the right lung is caused by -----.
- 11- The thoracic duct begins as the upper tapering end of the ----- and enters the thorax through the aortic opening of the diaphragm at the level of the ----- thoracic vertebra.
- 12- The two layers of the serous pericardium are the ----- and the ----- layers.
- 13-The azygos vein is the link between the ----- and the -----.
- 14- Two abnormalities of attachment of the umbilical cord are ----- and -----.
- 15- The late placental barrier is formed of ----- and -----.

Section E : Problem Solving Questions (15 marks) :

Problem (1):

Following a car accident, a young man was admitted to the hospital. Radiographic examination revealed fracture of the first rib.

- A- What is the artery liable to be injured in this case? Name its continuation in the upper limb. (1mark)
- B - Name the branches of the acromio-thoracic artery. (1mark)
- C - Which trunk of the brachial plexus is liable to be injured due to fracture of the first rib? (1mark)
- D - Describe the formation of the trunks of the brachial plexus. (1mark)
- E - Name two branches of the roots of the brachial plexus. (1mark)

Problem (2):

During the course of a football game, a football player developed locking of the knee joint due to violent abduction and external rotation of the knee.

- A-What is the most likely structure to be injured in this condition? Why? (1mark)
- B- Name two intracapsular ligaments of the knee joint. (1mark)
- C- Name the muscle producing unlocking of the knee joint and mention its nerve supply. (1mark)
- D- Name two muscles flexing the knee. (1mark)
- E- Name the powerful extensor muscle of the knee and mention its nerve supply. (1mark)

Problem (3):.

A 7-year-old boy had been playing with his little race cars. Soon after he put a wheel from one of the cars in his mouth, he began choking and coughing. Immediately his mother admitted him to the hospital where a radiographic examination revealed the presence of a foreign body in one of the main bronchi.

- A- Which main bronchus did this foreign body enter? Why? (1mark)
- B- Give the number of lobar bronchi in each lung? (1mark)
- C- Name the vein and the artery curving over the right and left main bronchi respectively. (1mark)
- D- Define the bronchopulmonary segment. (1mark)
- E- What is the importance clinically that the lungs are divided into many bronchopulmonary segments? (1mark)
-

BIOCHEMISTRY

All The Following Questions Must Be Attempted (Three questions in 2 pages):

1- What are the types and functions of RNA polymerases in prokaryotes and in eukaryotes? (4 marks) Describe the mechanism of synthesis of MRNA in eukaryotes (4 marks). Describe the post - transcriptionall modification for mRNA and the importance of each modification. (7 marks).

2- Give an account of:

- a) Control of cell cycle: including check points. (5 marks)
- b) Apoptosis (definition, different mechanisms, and importance). (5 marks)
- c) polymerase Chain Reacion (PCR): STEPS, requirements and applications. (5 marks)
- d) Both adult hemoglobin and myoglobin bind to oxygen, however they show differences, describe:
 - > Difference (s) in structure. (1 mark)
 - > Differences in function (mention 3 functions for hemoglobin and one function for myoglobin. (2 marks)
 - > Explain the effect of 2,3-bisphosphoglycerate of oxygen from hemoglobin at the tissues. (2 marks).

3- On biochemical basis. explain:

- a) One cannot predict the sequence of nucleotides in a gene knowing the amino acid sequence in the protein coded by this gene (give three reasons). (1.5 marks)
- b- Vitamin C deficiency leads to defective collagen synthesis. (1 mark)
- c) Pepsin and papain have different acions on antibody molecule. (2marks).
- d) Synthesis of the anitparallel strands of DNA simultaneously though DNA polymerase can wofk in 5-3 direction only. (1 mark)
- e) The importance of a named:
 - > free dinucleotide.
- f) The meaning of RFLP and an example of its use. (2 marks)
- g) Eposure to low oxygen concentration precipitates a hemolytic crisis in a patient with sickle cell anemia. (1 mark)
- h) o&p factiors have different roles in prokaryotic RNA synthesis. (2 marks)
- i) the IMPORTANCE OF CHLESTEROL IN THE cell membrane (1.5 marks)
- j) The role of DNA dependent RNA plymerase and RNA dependent DNA polymerase in replication. (2 marks)

Answer the following questions (50 marks):

1- Describe post transcriptional processing of mRNA and its importance (6 marks).

2- Give an account of the following (21 marks):

- a- the relationship between the properties of phospholipids and their orientation in cell membranes. what are bonds stabilizing them in the membran? (3 marks)
- b- Role of protein reotein rogulators in the cell cycle (3 marks)
- c- steps of Southern blotting technique (3 marks)
- d- Importance of mitochondrial DNA (3 marks)
- e- Meaning and clinical importance of named isozymes (3 marks)
- f- Competitive and allosteric inhobitors (3 marks)
- g- RFLP: definition, causes and clinical importance (3 marks)

3- On Biochemical basis explain the following (3 maoks):

- a- G- proteins act as signal transducers (4 marks)
- b- Conversion of proto - oncogene to oncogene (4 marks)
- c- p53 is the guardian of the genome (4 marks)
- d- The two antiparallel strands of DNA are synthesized simultaneously though DNA polymerase can work in the 5' to 3' direction only. State the differences in the synth esis of the new strands (3 marks)
- e- The action of a DNA depend ent RNA polymerase and an RNA depend ent DNA polymerase in replication (2 marks)
- f- Name and importance of a free nucleoside (1 mark) and a free nucleotide containing pantothenic acid (1 mark)
- g- Cause and manifestations of xeroderma pigmentosum (2 maoks)
- h- Organisms living in cold entironment have higher proportion of unsaturated fatty acids in their cell membranes (1 mark)
- i- One cannot predict the sequence of nucleotides in a gene knowing the amio acino acid sequence in the protein coded by this gene (1 mark)

The following are FIFTY MCQ questions. Answer all questions. For each there are four possible answers A, B, C, and D.

Choose the one you consider correct and record your choice on the separate Answer Sheet.

Each correct answer will score 1/2 mark (total 25 marks).

1- Cell membrane asymmetry is true due to all EXCEPT

- a- Irregular distribution of proteins.
- b- External location of carbohydrates.
- c- Membrane fluidity.
- d- Cholesterol presence in larger amounts on the outer surface.

2- Membrane fluidity is affected by the following EXCEPT:

- a- Temperature.
- b- Percentage of unsaturated fatty acids.
- c- Cholesterol.
- d- Distribution of proteins.

3- Membrane carbohydrates:

- a- Play a role in membrane fluidity.
- b- Project towards the inside of the cell.
- c- Are identical in all cells.
- d- Play a role in cell recognition.

4- All of the following statements are true with regard to cell membrane EXCEPT:

- a- They are selectively permeable.
- b- Have interior hydrophilic and exterior hydrophobic groups.
- c- Lipid bilayer contain phospholipids and cholesterol.
- d- Carbohydrate residues are located on their surfaces.

5- All of the following lipids are present in cell membranes EXCEPT:

- a. Lecithin.
- b- Cholesterol.
- c- sphingomyelin.
- d- triacylglycerol.

6- The k_m for an enzyme depends upon all of the following EXCEPT:

- a- Temperature.
- b- PH.
- c- Enzyme concentration.
- d- different isoenzymes have different k_m .

7- In the presence of a reversible noncompetitive enzyme inhibitor

- a- V_{max} and k_m remain the same.
- b- Both V_{max} and k_m decrease.
- c- V_{max} decreases while k_m increases.
- d- V_{max} decreases while k_m remains the same.

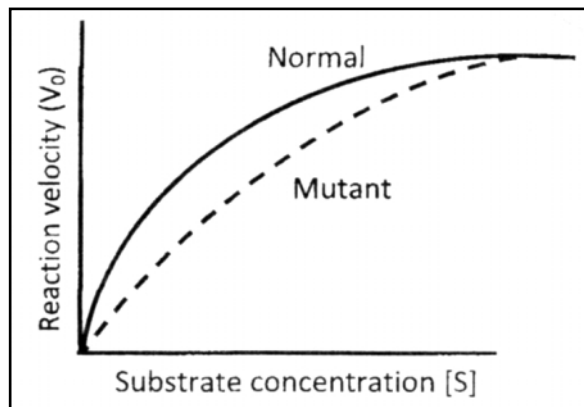
8- The coenzyme:

- a- Increases the affinity of apoenzyme to substrate.
- b- Lowers activation energy.
- c- Increases the number of active sites on the enzyme.
- d- May accept one of the products of the reaction.

9- The enzyme:

- a- reduces the energy of activation.
- b- Increases total energy of substrate.
- c- Increases equilibrium constant.
- d- Increases total energy of the product.

10- The mutant enzyme from a patient with a genetic disease is isolated, and its kinetic properties are studied. The following diagram shows results of a study of initial reaction velocity (V_0) as a function of a substrate concentration (S)



The mutant enzyme differs from the normal enzyme in that

- a- The mutant enzyme has a higher k_m .
- b- The mutant enzyme has a lower k_m .
- c- The mutant enzyme has a higher maximum velocity (V_{max}).
- d- The mutant enzyme has a lower V_{max} .

11- When substrate concentration is equal to k_m value:

- a- Half of the enzyme molecules are bound to the substrate and the other half are free.
- b- Maximum velocity is achieved.
- c- Maximum enzyme molecules are taking part in the reaction.
- d- The reaction is now at equilibrium.

12- Which of the following statements about michaelis-menten kinetics is correct?

- a- K_m , the michaelis constant, is defined as the concentration of substrate required for the reaction to reach maximum velocity.
- b- K_m , the michaelis constant, is defined as the dissociation constant of the enzyme-substrate complex.
- c- K_m , the michaelis constant, is expressed in terms of the reaction velocity.
- d- K_m , the michaelis constant, is a measure of the affinity the enzyme has for its substrate.

13- In a double stranded molecule of DNA, the ratio of purines: pyrimidines is:

- a- Variable.
- b- Determined by the base sequence in RNA.
- c- Genetically determined.
- d- Always 1:1.

14- Which of the following statements is true of all tRNA?

- a- The 3' end is phosphorylated.
- b- The 3' end base sequence is CCA.
- c- They are double stranded.
- d- The anticodon loop is identical.

15- Which class of nucleic acids is most likely to be chemically modified to contain a large number of unusual bases

- a- Nuclear DNA.
- b- Mitochondrial DNA.
- c- Transfer RNA.
- d- Messenger RNA.

16- Which of the following statements correctly describes eukaryotic nuclear chromosomal DNA?

- a- Unlike bacterial DNA, no histones are associated with it.
- b- It is linear and unbranched molecule.
- c- It is not replicated semiconservatively.
- d- It is circular.

17- A sample of human DNA is subjected to increasing temperature until it exhibits optical density changes due to disruption of its helix. A smaller fraction is atypical and required higher temperature for melting. This fraction must contain higher content of:

- a- Adenine plus cytosine.
- b- Cytosine plus guanine.
- c- Adenine plus thymine.
- d- Cytosine plus thymine.

18- Which of the following statements regarding a double-helical molecule of DNA is true?

- a- Bases are perpendicular to the axis.
- b- Each strand is identical to the other.
- c- Each strand has parallel 5' to 3' direction.
- d- Each strand replicates itself.

19- The process of translation requires the presence of:

- a- mRNA, tRNA and ribosomes.
- b- mRNA, ribosomes and RNA polymerase.
- c- DNA, mRNA and RNA polymerase.
- d- Free nucleotide bases, amino acids and ribosomes.

20- Which of the following descriptions of prokaryotic DNA replication is NOT common to the synthesis of both leading and lagging strands?

- a- RNA primed is synthesized.
- b- DNA polymerase III synthesizes DNA.
- c- DNA ligase repeatedly joins the ends of DNA along the growing strand.
- d- Nucleoside monophosphates are added in a 5' to 3' direction along the growing DNA chain.

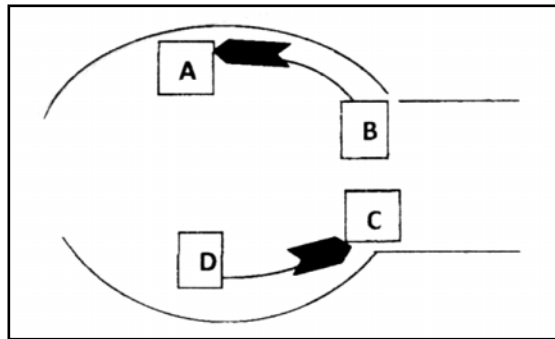
21- Given that the chromosomes of mammalian cells may be hundreds of times as large as those of a prokaryotic cell, how can replication of mammalian chromosomes be carried out in just a few hours?

- a- Eukaryotic DNA polymerases are extraordinary fast compared with prokaryotic polymerases.
- b- Hundreds of replication forks work simultaneously on each piece of chromosomal DNA.
- c- A great many different RNA polymerases carry out replication simultaneously on chromosomal DNA.
- d- The presence of histones speed up the rate of chromosomal DNA replication.

22- Which of the following enzymes can polymerize deoxyribonucleotides into DNA?

- a- primase.
- b- DNA ligase.
- c- RNA polymerase III
- d- Reverse transcriptase.

23- The diagram below represents a portion of a replication origin on a prokaryotic chromosome



Which letter indicates the 5' end of Okazaki strand?

24- Replication of DNA

- a- Takes Place in a "conservative" manner.
- b- Takes place in a "disruptive" manner.
- c- Takes place in a "semiconservative" manner.
- d- Takes place only in the 3' to 5' direction.

25- DNA ligase is:

- a- An enzyme that joins fragments in normal DNA replication.
- b- An enzyme involved in protein synthesis.
- c- An enzyme of bacterial origin which cuts at defined base sequence.
- d- An enzyme that facilitates transcription of specific genes.

26- Which component of transcribed RNA in eukaryotes is present in the initial transcript but is removed before translation occurs:

- a- Intron.
- b- 3'poly A tail.
- c- Ribosome binding site.
- d- 5' cap.

27- Which of the following statements about the 3' poly A tail of mRNA is FALSE?

- a- It helps align eukaryotic mRNA on the ribosome during translation.
- b- It is added to the primary transcript in the nucleus.
- c- It is not essential for protein synthesis.
- d- It helps contribute to the stability and life span of the mRNA.

28- The base sequence in a coding strand is CAGCGC. The mRNA produced upon transcription of this gene will contain the sequence:

- a- GCGCTG.
- b- CUGCGC.
- c- GCGCUG
- d- CAGCGC.

29- A patient has ingested mushrooms containing a toxin that has been found to specifically inhibit mRNA production. The toxin is most likely to directly inhibit:

- a- RNA polymerase I.
- b- RNA polymerase II.
- c- RNA polymerase III.
- d- reverse transcriptase.

30- All of the following processes occur in the eukaryotic cell nucleus EXCEPT:

- a- Transcription.
- b- Translation.
- c- Removal of introns.
- d- DNA replication.

31- A promoter site on DNA

- a- Transcribes repressor.
- b- Is important for initiation of transcription.
- c- Codes for RNA polymerase.
- d- Regulates termination.

32- Which one of the following binds to specific nucleotide sequence that are upstream of the start site of transcription

- a- RNA polymerase.
- b- Primase.
- c- Helicase.
- d- Histone protein.

33- In contrast to DNA polymerase, RNA polymerase

- a- Fills the gap between okazaki fragments.
- b- Works only in 5' to 3' direction.

34- In bacterial RNA synthesis, the function of the factor p is to

- a- Bind catabolic repressor to the promoter region.
- b- Increase the rate of RNA synthesis.
- c- Eliminate the binding of RNA polymerase to the promoter.
- d- Participate in the proper termination of transcription.

35- What is the correct order of the following steps in protein synthesis:

1. A peptide bond is formed.
2. The small ribosomal subunit is loaded with initiation factors, mRNA, and initiation amino-acyl-tRNA.
3. The intact ribosomes slides forward 3 bases to read a new codon.
- 4- The primed small ribosomal subunit binds with the large ribosomal subunit.
- 5- Elongation factors deliver aminoacyl-tRNA to bind to the A site.

- a- 1, 2, 5, 4, 3.
- b- 2, 3, 4, 5, 1.
- c- 2, 4, 5, 1, 3.
- d- 3, 2, 4, 5, 1.

36- Which of the following is a frame shift mutation?

- a- Transition.
- b- Transversion.
- c- Deletion.
- d- Substitution.

37- Mutation in a cod leads to the substitution of one amino acid with another is:

- a- Nonsense mutation.
- b- Missense mutation.
- c- Frame shift mutation.
- d- promoter mutation.

38- Operons:

- a- Are characteristic for eukaryotic genome.
- b- Contain more than one gene.
- c- Contain more than one promoter.
- d- Contain always similar genes.

39- The stick ends generated by restriction enzymes allow:

- a- Selection for plasmids lacking antibiotic resistance.
- b- Easy identification of plasmids which carry an insert.
- c- Replication of tRNA within the bacterial cell.
- d- Pieces of DNA from different sources to hybridize to each other and to be joined together.

40- The polymerase chain reaction (PCR) is a technique that:

- a- Was used to demonstrate DNA as the genetic material.
- b- Uses short DNA primers and a thermostable DNA polymerase to replicate specific DNA sequence in vitro.
- c- Measures the ribosome transfer rate during translation.
- d- Detects the level of polymerases involved in replication.

41- In PCR, which of the following reagents would have to be present in excess?

- a- Heat-stable DNA polymerase.
- b- Primers.
- c- Antibody.
- d- Reverse transcriptase.

42- The cDNA library is most likely to contain which one of the following?

- a- Exons.
- b- Promoters.
- c- Introns.
- d- Enhancers.

43- The loss or inactivation of an anti-oncogene causes

- a- B-thalassemia.
- b- Sickle cell anemia.
- c- Burkitt lymphoma.
- d- Retinoblastoma.

44- Alpha-fetoprotein (AFP) is important in the diagnosis of cancer

- a- Bones.
- b- Kidney.
- c- Liver.
- d- Prostate.

Match each of the following description with the appropriate term (45 - 48)

- a- Enhancer.
- b- P site.
- c- O factor.
- d- Promoter.

45- A protein subunit of prokaryote polymerase involved in initiation of transcription.

46- A binding site on DNA for RNA polymerase.

47- A regulatory sequence in eukaryotic DNA that does not have to be in a fixed location and influences the rate of transcription.

48- The part of the ribosome to which met tRNA binds.

Match each of the following nitrogen containing compounds with the following sites (49- 50)

- a- AUG.
- b- 7-methylguanosine.
- c- TATA.
- d- CCA.

49- part of the "cap" structure found at the 5' end of eukaryotic mRNA.

50- Occurs at the 3' end of tRNA.

Medical Biochemistry & Molecular Biology

All the [allowing questions must be attempted (65 marks)

I-Enumerate: (10 marks)

- 1-Four causes of metabolic acidosis.
- 2-Four mechanisms for conversion of proto-oncogenes into oncogenes.
- 3-Two examples of neutral sulfur containing amino acids and two examples of basic amino acids.
- 4-F our post-translational modifications of proteins.
- 5-Four functions of cholesterol.

II-Define each of the following: (10 marks)

- 1- Mutarotation.
- 2- Plasmid.
- 3- RNA splicing.
- 4- Gene mutation.
- 5- Protein denaturation.

III-On biochemical basis, explain: (20 marks)

- 1-P53 is called the guardian of the genome. (6 marks)
- 2-Vitamin C deficiency leads to defective collagen synthesis. (3marks)
- 3-One can not predict the sequence of nucleotides in gene knowing the amino acid sequence in the protein coded by this gene. (Bmarks)
- 4-Not all types of gene mutation lead to a disease. (6marks)
- 5-Selenium has an antioxidant effect. (2marks)

IV-Diagrammatically illustrate: (10 marks)

- 1- Structure of tRNA.
- 2- Organization of globin genes.

V-Give an account of each of the following: (15 marks)

1. Polymerase chain reaction (PCR); Definition, steps and importance.
2. Isoenzymes; Characters, examples and clinical significance.
3. Functions of glycosaminoglycans (GAGS) (at least 5 functions are required).

Oral exam will be held at 8 am in the department according to the schedule declared by the faculty.

Medical Biochemistry

**Note: The examination consists of 20 MCQ; gs in 4 pages (10 marks):
Choose the most appropriate answer (ONLY one answer for each question
is required):**

1-Membrane carbohydrates:

- a) Play a role in membrane fluidity.
- b) Project towards the inside of the cell.
- c) Are identical in all cells.
- d) Play a role in cell recognition.

2- The enzyme:

- a) Reduces the energy of activation.
- b) Increases total energy of substrate.
- c) Increases equilibrium constant.
- d) Increases total energy of the product.

3- The process of translation requires the presence of :

- a) mRNA, tRNA and ribosomes.
- b) mRNA, ribosomes and RNA polymerase.
- c) DNA, mRNA and RNA polymerase.
- d) Free nucleotide bases, amino acids and ribosomes.

4- DNA ligase is:

- a) An enzyme that joins fragments in normal DNA replication.
- b) An enzyme involved in protein synthesis.
- c) An enzyme of bacterial origin which cuts at defined base sequence
- d) An enzyme that facilitates transcription of specific genes

**5- Which component of transcribed RNA in eukaryotes is present in the
initial transcript but is removed before translation occurs:**

- a) 3' poly A tail.
- b) Ribosome binding site.
- c) 5' cap.
- d) Intron.

6. The sticky ends generated by restriction enzymes allow:

- a) Selection for plasmids lacking antibiotic resistance.
- b) Easy identification of plasmids which carry an insert.

- c) Replication of tRNA within the bacterial cell
- d) Pieces of DNA from different sources to hybridize to join together

7. Alpha-fetoprotein (AFP) is important in the diagnosis of cancer

- a) Bones.
- b) Kidney.
- c) Liver.
- d) prostate.

8. Which of the following sugars is an anomer of α -D-glucose

- a) α -D-fructose.
- b) α -D-glucose.
- c) α -D-galactose.
- d) α -L-glucose

9. Glycerol is the backbone of all the following phospholipids EXCEPT

- a) phosphatidylethanolamine.
- b) cardiolipin.
- c) phosphatidylcholine.
- d) sphingomyelin.

10. Which of the following is an imino acid

- a) glycine.
- b) proline.
- c) arginine.
- d) histidine.

11. Globin part of hemoglobin A molecule is made of

- a) one polypeptide chain.
- b) two α and two β polypeptide chains.
- c) two α and two γ polypeptide chains.
- d) two α and two δ polypeptide chains.

12. Which of the following statements concerning immunoglobulins is most accurate

- a) IgE is the principal antibody in the serum
- b) The heavy chains are similar in each class of immunoglobulins.
- c) The constant regions of the heavy chains are the same in each class of immunoglobulins.
- d) IgE is the major immunoglobulin found in the external secretions.

13. DNA replication occurs in which phase of the eukaryotic cell cycle?

- a) M phase.
- b) S phase.
- c) G_0 phase.
- d) G_1 phase.

14. A protein that regulates gene expression by binding to the operator region of a bacterial operon is called

- a) an inducer.
- b) a repressor.
- c) a promoter.
- d) an enhancer.

15. In eukaryotes, the TATA sequence functions as

- a) an indication of the starting point for replication.
- b) a part of the binding site for a transcription factor and RNA polymerase.
- c) a termination signal for transcription.
- d) an indication of the starting point for translation

16. All these are basic amino acids, EXCEPT:

- a) Arginine. b) Valine. c) Lysine. d) Histidine.

17. RFLP is important for diagnosis of:

- a) Cancer lung. b) Sickle cell anemia.
c) Aplastic anemia. d) AIDS.

18. In Northern blotting, we use:

- a) A protein probe. b) A cDNA probe.
c) An antibody probe. d) A genomic DNA probe.

19. Ketosis leads to:

- a) Respiratory alkalosis. b) Respiratory acidosis.
c) Metabolic alkalosis d) Metabolic acidosis.

20. Regarding pRb, all are correct EXCEPT:

- a) Plays an important role in tumor suppression.
b) It binds transcription factors when phosphorylated.
c) It binds transcription factors when dephosphorylated.
d) Its phosphorylation is initiated by CDKócyclin complex.

All questions must be attempted

(Total marks 65)

I- What is meant by:

(10 marks)

1. Synonym codons.
2. Pribnow or TATA box.
3. Zymogens.
4. Plasmid.
5. Isoelectric point.

II- On Biochemical basis explain:

(15 marks)

1. p53 is called the Molecular Policeman. *(4 marks)*
2. Membrane fluidity is dependent on several factors. *(4 marks)*
3. Collagen has a very firm structure. *(4marks)*
4. Changes in pH can affect the rate of enzyme-catalyzed reactions. *(3 marks)*

III- Compare and contrast:

(10 marks)

1. Adult hemoglobin and fetal hemoglobin. *(2 marks)*
2. Immunoglobulin G and M. (Four differences are required) *(2 marks)*
3. Prokaryotic and eukaryotic enzymes of replication. *(4 marks)*
4. Amylose and amylopectin. *(2 marks)*

IV- Enumerate:

(10 marks)

1. Four functions of phospholipids.
2. Four causes of gene mutations.
3. Four adenine containing nucleotides.
4. Four characteristics of the genetic code.
5. Four effects of denaturation on proteins.

V- Give a short account of:

(20 marks)

1. Lactose Operon in the presence of lactose and absence of glucose.
2. Mismatch repair.
3. Three types of post-transcriptional modifications of mRNA.(The modifications and their importance)
4. DNA secondary structure.

I. Define ONLY FIVE of the following:

(10 Marks)

1. Vector.
2. Buffers.
3. Zymogens.
4. RNA splicing
5. Operon.
6. Synonym codons.

II. On biochemical basis explain ONLY SIX of the following statements:

(18marks)

1. Sickle cell anemia is a genetic disorder caused by point mutation.
2. The importance of telomerase enzyme in replication.
3. Sulfonamide antibiotics are used in treatment of bacterial infections.
4. The mitochondrial pathway of apoptosis (Intrinsic pathway).
5. The role of σ subunit (sigma factor) in initiation of transcription.
6. Intracellular processing of collagen.
7. Cancer patients show resistance to the chemotherapeutic drug methotrexate.

III- Differentiate between ONLY FIVE of the following:

(10 marks)

1. Adult and fetal hemoglobin (Mention two differences).
2. Amylose and amylopectin (Mention two differences).
3. Emulsoids and suspensoids. (Mention two differences).
4. Competitive and allosteric enzyme inhibitors. (Mention two differences)
5. The effect of a missense mutation and a nonsense mutation.
6. Fibrous proteins and globular proteins. (Mention two differences)

IV- Enumerate ONLY SIX of the following:

(12 marks)

1. **TWO** non-heme iron –containing proteins.
2. **TWO** types of post-translational covalent modifications.
3. **TWO** functions of cholesterol.
4. **TWO** sulfur-containing amino acids and **TWO** basic amino acids.
5. **TWO** enzymes of DNA replication in prokaryotes (mention the function of each)
6. **TWO** phospholipids containing glycerol and **TWO** phospholipids containing sphingosine.
7. **TWO** functions of phospholipids.

V- Give a short account of ONLY THREE of the following:

(15 marks)

1. Post-transcriptional modifications of messenger RNA (mRNA). (Mention the importance of each)
2. Isoenzymes (Characteristics and mention one example in detail).
3. Polymerase Chain Reaction (PCR) (Definition, steps and 3 applications).
4. Primary structure of DNA.

End-Year Examination

Choose only one answer for each question of the following questions :

(10 questions in 2 pages)

(10 Marks)

1- L-Fucose is a:

- a) Deoxysugar b) Fructan. c) Glucan. d) Sugar alcohol.

2- An essential and hydroxy amino acid is:

- a) Tyrosine. b) Serine. c) Threonine. d) Hydroxylysine.

3- All the following are unsaturated fatty acids Except:

- a) Arachidonic acid b) Oleic acid c) Palmitic acid d) Palmitoleic acid

4- Hydrotropic substances include all the following Except :

- a) Phospholipids. b) Bile salts. c) Soap. d) Long chain fatty acids.

5- The chemical combination of ribose and one of the five nitrogen bases results in formation of a:

- a) DNA molecule. b) nucleotide. c) nucleoside. d) gene.

6- The bonds that link the base pairs in the DNA double helix are

- a) Ionic bonds. b) Hydrogen bonds.
c) Ester bonds. d) Hydrophobic bonds.

7- When a new strand of RNA is transcribed from the DNA strand shown, its base sequence will be

Coding strand of DNA: TTACGGAT

Template strand of DNA: AATGCCTA

- a) AAUGCCUA. b) AATGCCTA. c) TTACGGAT. d) UUACGGAU

8- The anticodon is

- a) Identical to the codon on DNA.
- b) Complementary to the codon on mRNA
- c) Complementary to the codon on DNA.
- d) Identical to the codon on mRNA.

9- In prokaryotes, the initiation codon (AUG) encodes

- a) Methionine
- b) N-formylmethionine
- c) A stop codon
- d) Alanine

10- Which of the following statements concerning the double helix structure present in DNA molecules is correct?

- a) The two nucleotide strands are mirror images of each other.
 - b) Hydrogen bonds between sugar units hold the two nucleotide strands together.
 - c) Base pairing between strands always involves one pyrimidine base and one purine base.
 - d) Base pairing combinations are always A-G and C-T.
-

Cairo University

Faculty of Medicine

Department of Biochemistry & Molecular Biology

First Year

Date 28/06/2015

Time Allowed: 2 hours and 50 mins

Total Marks Allocated: 65 Marks

End-Year Examination

All questions are to be attempted(5 questions in 2 pages)

I- Define: (8 marks)

- 1- Plasmids.
- 2- Zymogens.
- 3- Normal solution.
- 4- Trimming

II- On biochemical basis explain: (18marks)

- 1- Collagen has a strong structure.
- 2- p53 is called the molecular policeman.
- 3- cAMP acts as a hormone second messenger.
- 4- The importance of the globin part of hemoglobin.
- 5- Heparin is a well known anticoagulant.
- 6- Hyperventilation and hypoventilation affect blood pH.

III- Enumerate: (14 marks)

1. **Two** types of hemoglobinopathies and mention the defect in each.
2. **Two** non-heme iron containing proteins & mention their functions.
3. A RNA dependent DNA polymerase and a DNA dependent RNA polymerase.
4. **Two** corticoids: one is the most potent mineralocorticoid and the other is the most potent glucocorticoid.
5. **Two** tumor markers.
6. **Four** bonds that maintain the tertiary structure of proteins.
7. **Two** functions of cholesterol.

IV-Compare between: (8 marks)

- 1- Helicase and topoisomerase.
- 2- Competitive and allosteric enzyme inhibitors. (Mention two differences)
- 3- The effect of a missense mutation and a silent mutation.
- 4- Amylose and amylopectin. (Mention two differences)

V- Give an account on: (17marks)

1. Post-transcriptional modifications of messenger RNA (mRNA). (Mention the importance of each). (7 marks)
 - 2- Lactose Operon (Components and mechanism of action in the presence of lactose and absence of glucose). (5 marks)
 - 3- Polymerase Chain Reaction (PCR) (Definition, steps and 3 applications). (5 marks)
-

HISTOLOGY

HISTOLOGY

Section II: 7 questions for 45 marks

Essay Question: (01 marks)

1- illustrating your answer with a labeled diagram, describe the histological structure of a neuron as regards:

- a- classification (2 marks)
- d- Cell body (size, shape, nucleus & cytoplasm) 4 marks
- c- processes (2 marks)
- e- Diagrams (2 marks)

2- Draw a labeled diagram for a section of: (5 marks each)

- a- Thick skin
- b- Aorta.

Short Answer Questions: (5 marks each)

- 3- Define & describe the histological structure of a sarcomere.
- 4- Define aneuploidy. List the types & causes of aneuploidy.
- 5- Mention & describe the histological changes that occur in the epiphyseal plate.
- 6- Describe the histological characters (L. M & E.M.) and functions of blood platelets.
- 7- Define the macrophage system & mention the histological characters of its cells, origin & functions

End of Section II

Answer all questions (9 questions).

The number of marks is given in brackets at the end of each question { } or part question ().

1. Describe the different types of lysosomes. (5)
2. Explain how determination of type of intermediate filaments can help to diagnose cell of origin in tumours. (5)
3. Describe 5 different types of structural aberrations in chromosomes. (5)
4. Name and describe the structure of the epithelium lining the urinary bladder. (5)
5. Mast cell is one of connective tissue cells.
 - a. Describe Im & EM features of this cell. (2.5)
 - b. State functions performed by this cell. (2.5)(5)
6. Bone cells are responsible for different functions.
 - a. Name the cell responsible for bone resorption. (1/2)
 - b. Outline how this resorption takes place. (1)
 - c. Describe LM & EM picture of the cell. (2.5)
 - d. Illustrate Im picture with a coloured labeled diagram. (1)(5)
7. A patient has acute pyogenic infection (appendicitis).
 - a. what cell is expected to show increase in its differential leucocytic count? (1)
 - b. State the functions performed by this leucocyte. (4)(5)
8. In a table form mention 5 histological differences between: (10)
 - a. Skeletal, cardiac and smooth muscle fibres. (5)
 - b. Spinal and sympathetic ganglion. (5)
9.
 - a. Draw a coloured labeled diagram for section in aorta. (5)
 - b. Identify the section (1/2) and the labels (4.5) in fig.1 (5)

Histology First Year June 2011 (Section 1) 40 questions 40 minutes for (20 marks)

Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. Sharpey's fibers:

- a. Fix endosteum to bone.
- b. Are thick collagen fibers.
- c. Are thick elastic fibers.
- d. Are thick reticular fibers.
- e. connect bone lamellae together.

2. Epiphyseal plates:

- a. Allow for the growth of bone throughout life.
- b. Are formed of white fibrocartilage.
- c. Site of intramembranous ossification.
- d. Are formed of hyaline cartilage.
- e. Are formed of elastic cartilage.

3. Compact bone is present in the following site:

- a. Short bone.
- b. Flat bone.
- c. Irregular bone.
- d. Covering plate of flat bone.
- e. Epiphyseal plate.

4. Regarding intramembranous ossification, one of the following is correct:

- a. It requires the presence of cartilage model.
- b. It occurs in the epiphyseal plate.
- c. It ends by formation of spongy bone.
- d. It ends by formation of compact bone.
- e. It requires the presence of spongy bone.

5. which of the following fibers are present in the matrix of hyaline cartilage?

- a. Collagen type I.
- b. Collagen type II.
- c. Reticular fibers.
- d. Elastic fibers.
- e. Collagen type V.

6. Which type of cartilage is present in the sternoclavicular joint?

- a. Hyaline cartilage.
- b. Elastic cartilage.
- c. Articular cartilage.
- d. White fibrocartilage.
- e. White fibrous connective tissue.

7. In the adult human perichondrium fibres consist of which one of the following?

- a. Collagen type I.
- b. Collagen type II.
- c. Collagen type III.
- d. Collagen type IV.
- e. Collagen type V.

8. White fibrocartilage:

- a. Not surrounded by perichondrium.
- b. Contains type II collagen fibers.
- c. Appears translucent in fresh state.
- d. It is flexible.
- e. Has abundant matrix.

9. Concerning chondroblasts, all are true except:

- a. They can differentiate from mesenchyme.
- b. They are present on the surface of the cartilage.
- c. They are flat or spindle shaped.

- d. They are responsible for interstitial growth of cartilage.
- e. They form cartilage collagen.

10. Interstitial bone lamellae:

- a. Are parallel to the endosteum.
- b. Are parallel to the periosteum.
- c. Connect two Haversian canals.
- d. Surround Haversian canals.
- e. Have irregular arrangement.

11. Pericytes:

- a. Secrete ground substance of the connective tissue.
- b. The most common type of cells in the connective tissue.
- c. Can differentiate into fibroblasts.
- d. Have well-developed Golgi apparatus.
- e. Have pale acidophilic cytoplasm.

12. Negative Golgi image is very prominent in:

- a. Mast cell.
- b. Plasma cell
- c. Macrophage.
- d. Reticular cell.
- e. Fibrocyte.

13. Vitreous humor of the eye is formed of:

- a. Reticular connective tissue.
- b. Mucoïd connective tissue.
- c. Brown adipose connective tissue.
- d. Yellow elastic connective tissue.
- e. Irregular white fibrous connective tissue.

14. One of the following is a character of connective tissue:

- a. Widely separated cells.
- b. All cells rest on basement membrane.
- c. Little amount of matrix.
- d. Ectodermal in origin.
- e. Cells connected by cell junctions.

15. Vital stain is used to detect the following cell:

- a. Mast cells.
- b. Plasma cell.
- c. Fibroblasts.
- d. Reticular cell.
- e. Macrophage cell.

16. Connective tissue cell that is concerned with allergy is:

- a. Mast cells.
- b. plasma cells.
- c. Reticular cells.
- d. Fibroblasts.
- e. Adipocytes.

17. Concerning the yellow elastic connective tissue, all are true except:

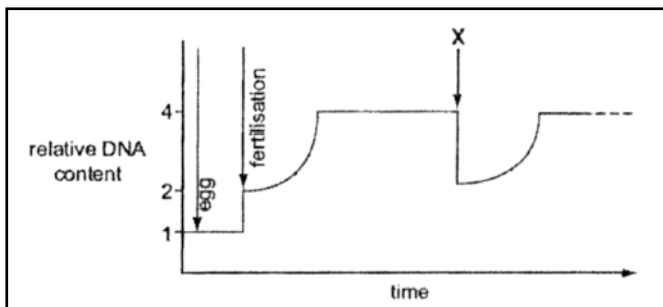
- a. Dense type of connective tissue.
- b. Regular parallel elastic fibers.
- c. Present in the Eustachian tube.
- d. Gives brown black color with Orcein stain.
- e. Present in the wall of the aorta.

- 18. Irregular type of white fibrous connective tissue is present in:**
- The cornea under the epithelium.
 - Tendons of the muscles.
 - Sclera of the eye.
 - Stroma of the organs.
 - Umbilical cord.
- 19. The loose areolar connective tissue is present in the following sites except:**
- Submucosa of the organs.
 - Serous membranes.
 - Under the epithelium of the cornea.
 - Around the blood vessels.
 - Dermis of the skin.
- 20. Elastic fibers are characterized by being:**
- Single thin.
 - Non-branching.
 - Basophilic.
 - Affected by chemicals.
 - Yellow with orcein stain.
- 21. Tunica media of blood vessels shows the following except:**
- Smooth muscle fibers.
 - Elastic fibers.
 - Collagen fibers.
 - Internal elastic lamina.
 - Ground substance.
- 22. Regarding endothelial lining of blood sinusoids, the following is incorrect:**
- Simple squamous epithelium.
 - Multiple fenestrated with no diaphragm.
 - The basement membrane splits to enclose pericytes.
 - Large intercellular gaps.
 - The basal lamina is discontinuous.
- 23. The following blood vessel contains longitudinal bundles of smooth muscle fibers in the tunica adventitia:**
- Inferior vena cava.
 - Coronary arteries.
 - Umbilical arteries.
 - Medium-sized artery.
 - Basilar artery.
- 24. As regards glomus, all are true except:**
- It is a type of arteriovenous anastomosis.
 - It has prominent elastic laminae.
 - Convolutated.
 - Richly innervated smooth muscle.
 - It is surrounded by a capsule.
- 25. Blood sinusoids are not characterized by the following:**
- Have pores in their wall.
 - The cells are separated by large intercellular spaces.
 - Have continuous basement membrane.
 - Macrophages are found among or outside their wall.
 - They are wide irregular blood channels.

26. Arterio-venous anastomoses are:

- a. Direct connection between medium sized arteries and veins.
- b. Direct connection between large elastic arteries and large veins.
- c. Direct connection between arterioles and venules.
- d. The blood capillaries.
- e. Direct connection between arterioles and capillaries.

27. The graph represents the changes in the quantity of DNA present in one nucleus at different stages in the life cycle. Which stage takes place at x?



- a. Interphase.
- b. Prophase.
- c. Anaphase.
- d. Telophase.
- e. Metaphase.

28. Colchicine is a chemical that stops chromatids from separating in mitosis. Which stage will the cell reach and then stop dividing?

- a. Interphase.
- b. Prophase.
- c. Metaphase.
- d. Anaphase.
- e. Telophase.

29. Karyorrhexis means:

- a. Nuclei become small and eccentric.
- b. Fragmentation of chromatin material into pieces.
- c. Dissolution of the nucleus.
- d. Breakdown of the cytoplasm into large vesicles.
- e. phagocytosis of the cell remnants by macrophages.

30. Klienfilter syndrome have the following except:

- a. Additional x chromosome.
- b. Mentally reatrded.
- c. Short child.
- d. Small testis.
- e. Large breast.

31. Hyaline cartilage provides structural support for all the following except:

- a. Larynx.
- b. Trachea.
- c. Bronchi.
- d. Bronchioles.
- e. Nasal cavity.

32. Bowman's glands are present in the lamina propria of:

- a. Larynx.
- b. Trachea.
- c. Bronchi.
- d. Olfactory mucosa.
- e. Nasopharynx.

33. All the following are characteristics of clara cell except:

- a. They line the bronchi.
- b. They secrete surfactant-like material.
- c. They can metabolize air-borne toxins.
- d. They may act as stem cells.
- e. They protect against development of emphysema.

34. Which one of the following is NOT part of the blood gas barrier?

- a. Cytoplasm of type I pneumocyte.
- b. Cytoplasm of type II pneumocyte.
- c. Basal lamina of endothelial cells.
- d. endothelium of continuous capillaries.
- e. The film of pulmonary surfactant on the alveolar surface.

35. The true vocal cords are covered by:

- a. Simple squamous epithelium.
- b. Stratified squamous epithelium.
- c. Simple columnar epithelium.
- d. Respiratory epithelium.
- e. Stratified columnar epithelium.

Matching

- a. Respiratory epithelium.
 - b. Simple cubical ciliated epithelium with clara cells.
 - c. Simple columnar ciliated with clara cells.
 - d. simple columnar ciliated with goblet cells.
 - e. Olfactory epithelium.
 - f. Non keratinized stratified squamous epithelium.
 - g. Keratinized stratified squamous epithelium.
- 1. Superior conchae.
 - 2. Vestibule of the nose.
 - 3. True vocal cords.
 - 4. Terminal bronchiole.
 - 5. Intrapulmonary bronchus.

Histology Section II

Instructions for candidates:

- 9 Short answer questions in 2 printed pages.
- Write your candidate number and name in the spaces provided at the slip on the separate answer booklet.
- Write your answer in the separate answer booklet.
- The number of marks is given in brackets [] at the end of each question or part question.

Answer all the questions.

1. Differentiate between rER and sER in terms of:

- a. LM. [2].
- b. EM. [2].
- c. Functions. [4].
- d. Cell types in which each is typically abundant; include examples. [2]

[10 marks]

2. Blood sinusoids are one type of capillaries.

- a. Name four histological characters of sinusoids. [2]
- b. State one site with reference to function. [1]

[3 marks]

3. Epithelial cells are linked together by different types of junctions.

- a. Name the types of junctions found between epithelial cells. [2]
- b. Which junction(s) named in the answer to question 3a is (are) associated with:

- i. A belt like structure. [1]
- ii. Condensation of actin filaments at cytoplasmic side. [1]
- iii. Intermediate filaments. [1]
- iv. Narrow gap (2nm). [1]

(6 marks)

4. Classify neurons in terms of their number of dendrites and axons with reference to examples. [4 marks]

5. Tabulate eight histological differences between skeletal, cardiac and smooth muscle fibres. [4 marks]

6. Mention the site and functions of the following cells:

- a. Mast cell. [3].
- b. Osteoblasts. [4].
- c. Clara cell. [2].
- d. Histiocytes [3].

[12 marks]

7. Indicate the level of the respiratory system where the followings take place:

- a. First disappearance of goblet cell.
- b. First disappearance of cilia.
- c. First disappearance of glands.
- d. Last appearance of cartilage
- e. Last appearance of smooth muscle.
- f. Transition of pseudostratified columnar ciliated epithelium to simple columnar ciliated epithelium.
- g. Transition of simple columnar ciliated epithelium to simple cubical ciliated epithelium.
- h. Transition of simple cubical epithelium to simple squamous epithelium.

[4 marks]

8. Neutrophils are the most numerous granulocytes.

- a. Differentiate between the 2 granule types in neutrophils as regards size, percentage and content. [3]
- b. List 4 functions for the cell.[4]
- c. Sketch a labeled diagram with pencil for LM of the cell. [1]

[8 marks]

9. Compare between:

- a. Ring chromosome and inversion.[2] .
- b. Translocation and duplication.[2]

[4 marks]

Histology Final Examination

READ THESE INSTRUCTIONS FIRST

The examination is formed of 2 sections;

Section I: 20 marks

- Multiple choice questions (30 questions) and extended matching (10 questions).
- Write the ID of the exam A or B in the space provided in the separate answer sheet.
- Read the instructions on the Answer Sheet very carefully.
- Choose the one you consider correct and record your choice in soft pencil on the separate Answer Sheet.
- Each correct answer will score half mark. No mark will be deducted for a wrong answer,

Section I 40 questions 40 minutes for 20 marks

Section A: Multiple Choice

Identify the choice that best completes the statement or answers the question. Each question for 1/2 mark

1. Osteocytes are connected together by fine cytoplasmic processes passing through:

- a. Lacuna.
- b. Haversian canal.
- c. Canaliculi.
- d. Volkmann's canal.
- e. Bone lamellae.

2. Regarding bone, the following statement is incorrect:

- a. Osteocytes are present in lacunae.
- b. Osteoblasts deposit organic bone matrix.
- c. Compact and spongy bone types are naked eye classifications.
- d. Bone lamellae refer to appearance of bone under microscope.
- e. Osteoclasts are bone resorbing cells.

3. interstitial bone lamellae:

- a. Are parallel to the endosteum.
- b. Are parallel to the periosteum.
- c. Connect two Haversian canals.
- d. Surround Haversian canals.
- e. Have irregular arrangement.

4. All are true about osteoclasts, except:

- a. have a single nucleus
- b. stain strongly acidophilic
- c. are often situated in Howship's lacunae

- d. are situated at sites of bone resorption
- e. develop from monocytes

5. Concerning osteocytes, all are true except:

- a. They are oval cells with minute processes.
- b. They form the organic matrix of the bone.
- c. They have deeply basophilic cytoplasm with eccentric nuclei.
- d. They are present inside bony lacunae.
- e. They are important for bone maintenance.

6. All are true about Volkmann's canals except:

- a. in direct communication with Haversian canals.
- b. vascular (containing blood vessels).
- c. connected to the bone marrow.
- d. surrounded by concentric lamella.
- e. mainly transverse or oblique.

7. In a typical epiphyseal (growth) plate, which zone of cartilage is closest to the marrow cavity?

- a. Zone of reserve cartilage
- b. Zone of proliferating cartilage
- c. Zone of hypertrophic cartilage
- d. Zone of calcifying cartilage
- e. Zone of ossification

8. r The cartilage is classified into three types according to:

- a. Presence or absence of C.T. fibers.
- b. Type of the predominant C.T. fibers.
- c. Presence or absence of perichondrium.
- d. Presence or absence of blood vessels.
- e. Presence or absence of chondroitin sulphate.

9. In the adult human perichondrium, fibres consist of which of the following?

- a. collagen type I
- b. collagen type II
- c. collagen type III
- d. collagen type IV
- e. collagen type V

10. Concerning the yellow elastic connective tissue, all are true except:

- a. Dense type of connective tissue.
- b. Regular parallel elastic fibers.
- c. Present in the Eustachian tube.
- d. Gives brown black color with Orcein stain.
- e. Present in the wall of the aorta.

11. Plasma cells:

- a. Originate from T-lymphocytes.
- b. Clonally derived nucleus.
- c. Small cells.
- d. Few mitochondria.
- e. Phagocytic cells.

12. Pigment cells: .

- a. Synthesize melanin pigments.
- b. Originate from undifferentiated mesenchymal cells.
- c. In the epidermis of the skin.
- d. Small branched cells.
- e. Negative Golgi image

13. Elastic fibers are characterized by being:

- a. Single thick
- b. Non-branching.
- c. Elasticoelastic.
- d. Affected by chemicals.
- e. Yellow with orcein stain.

14. Mitosis is characterized by the following except:

- a. No exchange of genes
- b. Presence of crossing over
- c. Daughter cells contain $2n$ of chromosomes
- d. Occurs in somatic cells
- e. Daughter cells are identical to mother cell

15. Turner's syndrome is characterized by except

- a. Tall female
- b. Mental retardation
- c. Primary amenorrhea
- d. Underdeveloped ovaries
- e. Infertility

16. Numerical aberrations include the following except

- a. Down syndrome
- b. aneuploidy
- c. deletion
- d. polyploidy
- e. Turner's syndrome

17. Polyploidy refers to

- a. extra copies of a gene adjacent to each other on a chromosome
- b. an individual with complete extra sets of chromosomes
- c. a chromosome which has replicated but not divided
- d. multiple ribosomes present on a single mRNA
- e. an inversion which does not include the centromere

18. Cri-du-chat syndrome is an example of a genetic disorder caused by a (n)

- a. translocation
- b. metacentric
- c. deletion
- d. inversion
- e. isochromosome

19. Mongol child has the following

- a. Lateral upward slope of eyes
- b. Mentally retarded
- c. small genitalia
- d. Trisomy 21
- e. Cardiac abnormalities

20. Lymphocytes are stimulated to divide by

- a. colcemid
- b. KCl

- c. Thymidine
- d. 2-deoxycytidine
- e. Phytohemagglutinin

21. E. coli's glands are present in the lamina propria of

- a. larynx
- b. trachea
- c. bronchi
- d. Olfactory mucosa
- e. nasopharynx

22. All the following are characteristics of Clara cells except

- a. they line the bronchi
- b. they secrete surfactant-like material
- c. they can metabolize air-borne toxins
- d. they may act as stem cells
- e. they protect against development of emphysema

23. Which one of the following is NOT part of the blood gas barrier?

- a. cytoplasm of type I pneumocyte
- b. cytoplasm of type II pneumocyte
- c. basal lamina of endothelial cells
- d. endothelium of continuous capillaries
- e. the film of pulmonary surfactant on the alveolar surface

24. The trachea has which one of the following components?

- a. skeletal muscles in its wall.
- b. irregular cartilage plates in its wall.
- c. an elastic membrane between mucosa and submucosa.
- d. stratified columnar ciliated epithelium.
- e. simple columnar ciliated epithelium.

25. All about elastic arteries are true except:

- a. are found mainly near the heart
- b. have many concentric, fenestrated elastic laminae in the tunica media
- c. tunica media with smooth muscle fibers
- d. allow additional force to push the blood into smaller arteries.
- e. have a series of valves throughout their length.

26. Arterioles have:

- a. diameters of 8 - 10 microns.
- b. a wide subendothelial layer
- c. about one to two layers of smooth muscle in their walls
- d. external elastic lamina.
- e. vasa vasorum

27. Endothelial capillaries have all the following except:

- a. No smooth muscle in their walls
- b. Macrophages may be associated with them.
- c. endothelial cells with a basal lamina
- d. associated perivascular cells or pericytes
- e. occluding junctions between endothelial cells and pericytes

28. Tunica media of blood vessels constitutes the following except:

- a. Smooth muscle fibers.
- b. Elastic fibers.
- c. Collagen fibers.
- d. internal elastic lamina.
- e. Ground substance.

29. Tunica adventitia of arteries shows the following except:

- a. Smooth muscle fibers..
- b. Elastic fibers.
- c. Collagen fibers.
- d. vasa vasorum.
- e. Loose connective tissue.

s30. Regarding vasa vasorum. the following is incorrect:

- a. Small arteries in tunica adventitia.
- b. Blood vessels of the blood vessels.
- c. Present mainly in large vessels especially veins.
- d. They nourish the outer part of the wall of large vessels
- e. They contain venous blood.

Section B: Extended Matching. Each question for 1/2 mark.

- a. underlying all epithelia
- b. supportive framework
- c. tendons and ligaments
- d. withstands stresses applied in different directions
- e. surrounding organs such as kidneys and blood vessels
- f. heat production
- g. external ear and epiglottis

1. irregular fibrous connective tissue

2. regular fibrous connective tissue

3. loose areolar connective tissue

4. reticular connective tissue

5. white adipose connective tissue

- a. constitute 97% of alveolar epithelium
- b. show hemosiderin granules in cytoplasm
- c. are antigen presenting cells
- d. are mucous secreting unicellular glands
- e. Cytoplasm appears bleached with eosin particles
- f. are the stem cell of lung alveoli
- g. act as stem cell for bronchiolar cells

6. Dust cells

7. Pneumocytes II

8. Goblet cells

9. Pneumocytes I

10. Heart Failure cells

June Exam., 2013
Time allowed: 2h: 15min
Date: 20/6/2013

Cairo University
Faculty of Medicine
Total Marks Allocated 55

Histology
Section II

- 10 Short answer questions in 2 printed pages.
- The number of marks is given in brackets [] at the end of each question or part question.

Answer all the questions.

1. **Differentiate** between lysosomes and peroxisomes in terms of:

- a. Origin. [1]
- b. Contents. [2]
- c. Functions. [2]
- d. Effect of deficiency on human health. [1]

[6 marks]

2. **Name** the chromosomal abnormality in each of the following cases:

- a. Loss of fragments between 2 breaks in the same arm of chromosome and fusion at the break site. [1]
- b. Two breaks in the chromosome on one side of centromere followed by rejoining in an inverted form. [1]
- c. Loss of segment from one end by a single break [1]
- d. Addition of a fragment of one chromosome to its homologous chromosome. [1/2]
- e. Addition of one extra chromosome to have a karyotype of $2n+1$. [1/2]
- f. Fusion of the long arm of one chromosome and the long arm of another non-homologous chromosome with loss of short arms of both chromosomes. [1]

[5 marks]

3. **List** the differences between:

- a. Zonula adherens and macula adherens. [4]
- b. Zonula occludens and gap junction. [1]

[5 marks]

4. **Explain** how the structure of neutrophil is related to its functions.

[5 marks]

5. Explain the appearance of A band, I band, Z line, H zone and M line in EM of myofibril.

[5 marks]

6. Name 2 common sites for each of the following:

- a. Irregular white fibrous connective tissue.
- b. Brown adipose connective tissue.
- c. Mucoïd connective tissue.
- d. Mast cells.
- e. UMCs in the adult.

[5 marks]

7. Distinguish between astrocytes, oligodendroglia and microglia in terms of:

- a. Origin
- b. Ability to form myelin
- c. Capacity for division
- d. Relationship to mononuclear phagocytic system.
- e. Nuclear staining intensity

[5 marks]

8. Describe osteoclasts in terms of:

- a. Number of nuclei. [1/2]
- b. Origin. [1/2]
- c. Staining property. [1/2]
- d. Organelles present. [1/2]
- e. Location and function of brush border. [1]
- f. Functions. [2]

[5 marks]

9. Compare the following:

- a. Structure of continuous capillaries and sinusoidal capillaries. [2.5]
- b. Chondroblasts and chondrocytes in terms of origin and LM picture. [2.5]

[5 marks]

10. State the origin, site and functions of the following cells:

- a. Langerhans cells in skin. [2]
- b. Merkel's cell. [2]
- c. Epithelial reticular cells. [5]

[9 marks]

Histology (HIS-102)

Section II

- 9 Short answer questions in 2 printed pages.
- The number of marks is given in brackets () at the end of each question & parts of a question.
- Answer all questions:
 1. a. List the non-membranous organelles and describe the structure (L.M. & E.M.) of the organelle involved in protein synthesis. (5)
b. List the types of intermediate filaments with reference to their sites.(2) (7 marks)
 2. Compare between osteoblast & osteoclast as regards: origin, site and structure (L.M. & E.M.). (5 marks)
 3. Correlate the structure of each type of junction to its function, with particular reference to their sites:
 - a. Macula adherens. (2½)
 - b. Gap junction. (2½) (5 marks)
 4. A patient had a glass cut in the hand injuring the median nerve. Describe the histological changes occurring in the nerve cell, proximal and distal parts of the nerve fiber. (6 marks)

5. Mention the site and functions of each of the following:

a. Fibroblasts (3)

b. Mast cells (3)

c. Chondroblasts (3)

(9 marks)

6. Enumerate the blood cells involved in allergic reaction. Describe one of them in terms of: Differential count, Life span, Diameter, L.M., E.M. and Functions. (5 marks)

7. Define the blood thymic barrier. Mention its histological structural components and main functions. (5 marks)

8. Compare between each of the following:

a. Skeletal and cardiac muscle fibers as regards: different organelles and inclusions in their sarcoplasm. (5)

b. Somatic and sinusoidal blood capillaries as regards: diameter and structure. (3) (8 marks)

9. List the clinical importance of chromosomal examination.

(5 marks)

Cairo University
Faculty of Medicine

Final Exam., 2015

Total Marks Allocated: 55

Time allowed: 2 h, 15 min.

Date: 6/6/2015

Histology (HIS-102)

Section II

- 7 Short answer questions in 2 printed pages.
- Number of marks is given in brackets () at the end of each question & parts of a question.
- Answer all questions:

1) a. Name the structures formed by stable microtubules. Describe the E.M. picture of the organelle that forms tail of the sperm. (3)

b. Name the types of chromatin. Describe their E.M. picture and their corresponding L.M. appearance of the nucleus. (4)

(7 marks)

2) a. Define the osteon. Describe its histological components. (4)

b. Compare the structure of regular white fibrous C.T. and white fibrocartilage. Mention TWO sites for each. (3)

(7 marks)

3) a. Specify the type of respiratory epithelium. Describe its histological picture, with particular reference to its sites. (4)

b. Enumerate the numerical aberrations in sex chromosomes. Mention the karyotype report of the sex chromosome monosomy, with reference to the cause of this abnormality and features of affected individuals. (5)

(9 marks)

- 4) a. Classify neurons according to their polarity. Mention the sites of each type (5)
- b. Describe the E.M. picture of a smooth muscle fiber. (5)
- (10 marks)
- 5) a. Describe the L.M. picture and mention the functions of fibroblasts. (3)
- b. Enumerate THREE cells that can be demonstrated by vital stain with reference to their location. Describe their E.M. picture. (3)
- (6 marks)
- 6) a. Define the blood thymic barrier. List the layers forming the barrier, with reference to its functions. (5)
- b. Correlate between the general structure of the wall of blood vessels and their functions. (3)
- (8 marks)
- 7) Name the blood cell involved in acute pyogenic infections. Describe the cell in terms of: Differential count, L.M. picture and Functions. (8 marks)

End of Exam
Best Wishes

Section A: Multiple Choices. 30 questions, ½ mark for each question

Identify the choice that best completes the statement or answers the question.

1. In Gap 2 phase:

- a. Cell becomes specialized working cell
- b. Cell increases in size
- c. Duplication of centrioles occurs
- d. DNA duplication occurs
- e. Replicated DNA is analyzed for error

- a. An active programmed cell death
- b. A pathological condition results from anoxia
- c. Cells decrease in size
- d. Occurs normally at the end of cell life
- e. Cytoplasm breaks into large vesicles

2. Fusion of long arms of two acrocentric chromosomes forming t chromosome with loss of short arms. This aberration is called:

- a. Reciprocal translocation
- b. Duplication
- c. Centric fusion
- d. Deletion
- e. Inversion

5. One of the events that takes place during anaphase is:

- a. Centrioles move to opposite poles
- b. Microtubules are organized to form a spindle.
- c. Chromosomes migrate to equatorial plane of cell.
- d. D-chromosomes split longitudinally at centromere.
- e. Constriction at equatorial plane of parent cell

3. Crossing over occurs in.....stage of prophase of first meiotic division:

- a. Leptotene
- b. Zygotene
- c. Pachytene
- d. Diplotene
- e. Diakinesis

6. Thymus gland is characterized by:

- a. Presence of many crypts
- b. Thymic barrier is in the medulla
- c. Has afferent lymphatic vessels
- d. Epithelial reticular cells secrete hormones
- e. Presence of primary and secondary lymphatic follicles

4. One of the following is a character of necrosis:

7. Choose the correct statement about Malpighian corpuscle:

- a. Formed of loose C.T. with RBCs
- b. Appears red in fresh sections
- c. Endothelial cells are fenestrated
- d. Central arterioles are eccentric in position
- e. Forms the junction between the cortex & medulla

8. Concerning lingual tonsil, one statement is correct:

- a. Covered with non-keratinized stratified squamous epithelium
- b. Ducts of its mucous glands open on surface
- c. Absence of crypts
- d. Commonly inflamed
- e. Hypertrophy results in adenoid

9. Blood film could be a useful tool for sex differentiation by identifying:

- a. Fewer RBCs count in females
- b. Barr body
- c. Eosinophils with characteristic appearance
- d. Metachromatic granules
- e. Rouleaux appearance

10. During erythropoiesis, hemoglobin begins to accumulate in ---- stage:

- a. Proerythroblasts
- b. Basophilic erythroblasts
- c. Polychromatophilic erythroblasts
- d. Normoblasts

e. Reticulocytes

11. A mother of a 9-year-old girl noticed that she had reddish purple skin rash, prolonged bleeding from minor injuries and spontaneous bleeding from nose. Blood picture showed platelet count to be 20,000/mm³. The underlying cause is:

- a. Hyperactive bone marrow
- b. Increased production of platelets
- c. Autoimmune disease
- d. Allergic reaction
- e. Excessive hemolysis of RBCs

12. Megakaryocytes:

- a. Are large cells about 25-40 micron in diameter
- b. Have acidophilic cytoplasm
- c. Lie in Howship's lacuna on bony surfaces
- d. Forms demarcation channels dividing cytoplasm into parts
- e. Are multinucleated

13. Hereditary spherocytosis of RBCs is caused by:

- a. Abnormal type of hemoglobin (HbS)
- b. Primary defect in actin gene expression
- c. Deficiency of carbonic anhydrase enzyme
- d. Primary defect in spectrin gene expression
- e. Failed production of intrinsic factor

14. Regarding the visceral capillaries:

- a. Have fenestrated endothelial cells
- b. Tunica media is formed of 1-2 layers of smooth muscles
- c. Have irregular diameter
- d. Pores of endothelial cells are always covered with diaphragm
- e. Present all over the body

15. Choose the correct statement concerning aorta:

- a. Tunica media is 40% of wall
- b. Lined by simple cubical epithelium
- c. Tunica media is formed mainly of fenestrated elastic membranes
- d. Has clear IEL and EEL
- e. Tunica media is formed mainly of smooth muscles

16. Vasa vasora are:

- a. Nerve supply of blood vessels
- b. Small lymph vessels
- c. Source of nutrition for tunica intima
- d. Present in adventitia of large veins
- e. Valves of small blood vessels

17. Inferior vena cava has:

- a. Well developed I
- b. Thick tunica media.
- c. Transverse skeletal muscle in tunica intima
- d. Valves projecting into the lumen

- c. Longitudinal smooth muscle in tunica adventitia

18. Cardiac muscle is characterized by having well developed:

- a. T-tubules
- b. Caveolae
- c. Sarcoplasmic reticulum
- d. Triad tubular system
- e. Rough endoplasmic reticulum

19. Concerning myoneural junction, the following statement is true:

- a. A type of sensory nerve ending within skeletal muscle
- b. A synapse between a motor nerve fiber and smooth muscle fiber
- c. Post synaptic membrane shows junctional folds
- d. Excess acetyl choline is hydrolyzed by choline acetyltransferase
- e. In myasthenia gravis, acetyl cholinerelease is inhibited

20. Regarding white fibers of skeletal muscle, which statement is correct?

- a. ATP is generated by aerobic glycolysis
- b. Contraction is forcible & maintained for long time
- c. Pale in color due to abundant mitochondria
- d. Rich in myoglobin
- e. Predominate in muscles of eye & digit

21. A boy with biceps muscle injury in an accident. Muscle would regenerate through :

- a. Differentiation of satellite cells
- b. Differentiation of myocytes
- c. Fusion of damaged myofibers
- d. Hyperplasia of existing myofibers
- e. Differentiation of fibroblasts

22. Choose the correct statement concerning intercalated discs:

- a. Junctions between two adjacent cardiac muscle fibers
- b. Occluding junctions are found in the transverse component
- c. Adhering junctions are found in the lateral component
- d. Gap junctions are found in the lateral component
- e. Desmosomes are found in the lateral component

23. Purkinje fibers transmit the nerve impulses 4 times faster than ordinary cardiac muscle fibers, because:

- a. They are larger in diameter than ordinary cardiac muscle fibers
- b. Nuclei are central in position
- c. Sarcoplasm has less glycogen
- d. Sarcoplasm has excess myofibrils
- e. They have many intercalated discs

24. Myelinated nerve fibers without Schwann cells are present in:

- a. Peripheral nerve fibers
- b. White matter of CNS
- c. Sympathetic ganglia
- d. Grey matter of CNS
- e. Synaptic cleft

25. Concerning muscle spindle, the following statement is true:

- a. Annulospiral endings wrap around the non striated area of the intrafusal muscle fibers.
- b. Flowerspray endings wrap around the central portion of the intrafusal muscle fibers
- c. Alpha motor neurons innervate the striated portion of the intrafusal muscle fibers
- d. It is a non capsulated fusiform structure that lies parallel to muscle fibers
- e. Extrafusal muscle fibers are smaller and have no myofibrils

26. Formation of myelin sheath and electric insulation is the function of:

- a. Astrocytes
- b. Oligodendroglia
- c. Microglia
- d. Ependymal cells
- e. Satellite cells

27. The specific stain for demonstration of myelin is:

- a. Orcein
- b. Osmic acid
- c. Silver
- d. Toluidine blue
- e. PAS

28. Ectodermal star shaped cells share in formation of blood brain barrier:

- a. Microglia
- b. Schwann cells
- c. Astrocytes
- d. Ependymal cells
- e. Oligodendrocytes

29. The organelles demonstrated by silver stain in a nerve cell are:

- a. Microfilaments and sER
- b. Nissl's granules and sER
- c. Microtubules and lysosomes
- d. Neurofilaments and Golgi
- e. Golgi and rER

30. One of the following is a proprioceptor found in the dermis, periosteum and joint capsule:

- a. Ruffini end organ
- b. Pacinian corpuscle
- c. Meissner's corpuscle
- d. Krause's end bulb
- e. Golgi tendon organ

Section B: Extended Matching, 10 questions in two tables, each question for ½ mark

Table 1

Column (A)	Column (B)
1. Cytotoxic T cells	a. Control humoral immunity by suppressing T-Helper cells
2. Helper T cells	b. Responsible for secondary immune response
3. Regulatory T cells	c. Antigen presenting cells
4. Memory T cells	d. Contribute to graft rejection
5. B-Lymphocytes	e. Responsible for innate immune response
	f. Destroyed by HIV that causes AIDS
	g. Phagocytic cells

Table 2

Column A	Column B
6. Subcapsular sinus	a. Network of reticular cells & fibers infiltrated with blood cells & lymphoid cells
7. High endothelial venules	b. Site of T lymphocyte maturation & differentiation
8. Cords of Billroth	c. Receives lymph from afferent lymphatics
9. Medullary cords	d. Separate lymphatic follicles from trabeculae
10. Splenic sinusoids	e. Branched masses of B lymphocytes & plasma cells extending from the paracortex
	f. Entry point for T lymphocytes into lymph node
	g. Lined with fenestrated elongated endothelial cells

ENGLISH

Section 1

shade the correct answer in the answer sheet - choose one only.

- 1- Alzheimer's aged people
a. Afflicts b.effects c.effective d.effiectvely
- 2- Doctors and nurses patients.
a.insure b.assure c.assure d.ensure
- 3- The inner living teeth tissue is the
a.enamel b.dentin c.root d.pulp
- 4- Chloroform is used as an
a. anesthetic b.antieptic c.analgesic d.antibiotic
- 5- Sleep walking is
a.insomnia b.soporific c.Somnambulism d.somnolence
- 6- A Wound or injury to the body or mind is
a.ulcer b.tumorur c.trauma c.trauma d.scar
- 7- BYdissecting human bodies, knowledge of anatomy could be gained
a.medicine b.anatomical c.medicament d.medical
- 8- Da Vicnci's technique of dissection is still used.
a.medicine b.medicacion c.medicament d.medical.
- 9- Sleep walking and bedwetting occur during wave sleep.a. long b.quick
c.short d.slow
- 10- Scientisis found that monks used anesthetics.
a. evident b.evidently c.evidence d.evidents
- 11- The ambulance carried the patient to hospital
a. died b.dying c.dyeing d.death
- 12- Lrn and carbon are two Elements of stea.
a.components b.complimentary c.component d.continent
- 13- The experim was agreat success. It was conducted under conditions.
a.dismal b.optimal c.formal d.informal
- 14- The doctor's advice or you'll be sorry.
a.Need b.Heed c.Exceed d. Bleed
- 15- The opposite of the word adequate is
a.unadequate b.inadequate c.non adequate d.disadequate
- 16- the student to succeed, he has to work hard.
a. In order of b.inorder for c.in order to d.in order from
- 17- The patient ha to comply the doctor's orders
a. to b.for c.wit d.from
- 18- A person who is listless has very little
a.money b.pressurs breath d.energy
- 19- to pant is toa.walk b.reathe rapidly c.lift d.smoke
- 20- To put one's fingers on something is to
a.press it b.ring it c.accuse d.idntify it
- 21- Inflammation of one or more Joints is called
a. arthritis b.bronchitis c.dermatitits d.appendicitis
- 22- Take these pills. they will your pains
a.relief b.relive c.relive d.revive.
- 23- weca the matter to your satisfaction
a.revolve b.resolve c.issolve d.revive

- 24- A disease of unknown cause is
- a.iatrogenic b.idiopathic c.congenital d.degenerative
- 25- the pain associated tension headaches is often felt in the forehead.
- a.for b.with c.to d.for
- 26- Transient means
- a.permanent b.momentary c.persistent d.acute
- 27- irritability means
- a.annoyae b.disability c.inability d.inability
- 28- Sharp, severe and brief is
- a.chronic b.benign c.epidemic d.acute
- 29- The place for keeping dead bodies is the
- a.cellar b.ward c.ambulance d.motuary
- 30- Ambulance carried dressings to the.....
- a.injure b.injury c.injured d.injuries
- 31- To feel iight - headed means to feel
- a. dizzy b.lazy c.busy d.fizzy
- 32- He failed miserably in the of his duty.
- a.contormance b.allowance c.performance d.insurance
- 33 politicians must be thrown out of office
- a. Corrupt b. Abrupt c.Interrupt d.Disrupt
- 34- The word aquainted is the equivalent of the word.....
- 35- A..... is a substance which contains bacteria
- 36- The opposite of the word competent' is
- a. incompetent b. uncompetent c. discompetent d. illcompetent
- 37- Anew version fo an old film is a of it
- a.remark b.remain c.remake d.success
- 38- The word' sanctity means
- a.marriage b.downfall c.death d.succes
- 39- The word sanctity means
- a.sanctions b.holiness c.wholeness d.stabitiy
- 40- A pronouncement' is a formal expression of
- a. anger b.disgus c.happiness d.opnion
- 41- He tried to a foolproof plan for getting rid of termites.
- 42- A..... is a person who is older thn another
- a.mior b.ancient c.senior d.major
- 43- you ve had too dessert
- a.many b.much c.mor d.fewer
- 44- The boxer was for seveal hour after the knockout
- a.conscious b.preconscions c.conscientious d.unconscious.
- 45- Television stets widely in price
- a.vary b.very c.every d.veaiable
- 46- I'm sorry. I don't your name.
- a. call b. promote c. suggest d. recall
- 47- Iron and carbon are two of steel.
- a.opponents b.component c.components d.proponents
- 48- wear and tear means
- a.acceleraiton b.coloraiton c.identification d.deterioration
- 49- The opposite of external is
- a.eternal b.internal c.outer d.inside
- 50- The opposite of normal is
- a.annormal b.innormal c.abnormal d.nonnormal

SECTION 2

- 1- if medication is stopped, bacteria can be to antibiotic.
a. resist b. resistant c. preventive d. effective
- 2- After we consume drugs they From the intestine into the blood.
a. absorb b. absorbed c. rarely absorbed d. absorption
- 3- When symptoms improve, the doctor will take the patient the medication
a. out of b. away c. of d. off
- 4- Chronic insomnia the doctor's care
a. inquires b. requires c. acquires d. acquires
- 5- The purpose for not prescribing medication is
- a. indication b. explication c. contraindication d. metabolism
- 6- Pneumothorax is a collapse of the lungs.
a. part b. partial c. party d. partly
- 7- Alcohol disturb the last phases of sleep.
a. can b. must c. has d. does
- 8- Insomnia is a in many car accidents.
a. factory b. fraction c. factor d. friction
- 9- Acupuncture needles are
- a. sterile b. sterility c. unsterile d. sterilization
a. sterile b. sterility c. unsterile d. sterilization
- 10- to dull the pain means to it
a. produce b. refuse c. reduce d. induce
- 11- The opposite of deteriorate is
- a. approve b. disapprove c. reduce d. prove
- 12- The plural of blood b. bleed c. bloods d. blood
a. blood b. bleed c. bloods d. blood
- 13- The plural of bath is
- a. bathae b. baths c. bathes d. bath
- 14- The plural of potato is
- a. potatoes b. potatoe c. potatoes d. potato
- 15- The plural of proof is
- a. proves b. proofs c. proof d. proofes
- 16- the plural of louse is
- a. louse b. lousem c. lise d. lice
- 17- the singular of bacteria is.....
- a. bacter b. bactei c. bacterium d. bacteria
- 18- The singular of thoraces is
- a. thorace b. thorax c. thorac d. thoracium
- 19- The singular of scissors is
- a. thorace b. thorax c. thorac d. scissorium
- 20- The singular of teeth is
- a. tee b. tooth c. teetium d. teeth
- 21- the plural of attorney general is
- a. attorneys general b. attorneys generals c. attorney general d. attorney generals
- 24- stomach means
- a. gloss b. gastro c. glcto d. gigiva
- 25- Radiation means

- | | | | |
|-------------------------------|-----------|-------------|------------|
| a.ration | b.rhino | c.retor | d.radio |
| 26- pain means | | | |
| a.algia | b.aemia | c.aden | d.angio |
| 27- Tumor means..... | | | |
| a. ostomy | b. oma | c. oid | d. ology |
| 28- Liver means | | | |
| a. hist | b. hom | c. hia | d. hydr |
| 29- Heat mean..... | | | |
| a. therm | b. thel | c. therombo | d. thorace |
| 30- Stitch mean..... | | | |
| a. rrhea | b. rihex | c. rhhaphy | d. rhoea |
| 31- Paralysis mean..... | | | |
| a. Phrenia | b. plasty | c. plegia | d. pathy |
| 32- Speech disorder mean..... | | | |
| a. Phrenia | b. Phasia | c. physis | d. pexy |
| 33- Deficiency mean..... | | | |
| a. phrenia | b. pexy | c.penia | d. itis |
| 34- Enlarged mean..... | | | |
| a. desis | b. megaly | c. ostomy | d. olysis |
| 35- Saliva mean..... | | | |
| a. sial | b. stoma | c.soma | d. sebum |

Choose the word that is related to each of the prefixes and suffixes given below

- | | | | |
|---------------------|---------------|--------------|----------------|
| 36- Brachio..... | | | |
| a.lung | b. arm | c. neck | d. hip |
| 37- Arthro..... | | | |
| a.head | b. hand | c. arm | d. joint |
| 38- Mast..... | | | |
| a. bone | b. fist | c. outside | d. around |
| 39- Lntra..... | | | |
| a. inside | b. between | c. outside | d. around |
| 40- Labia..... | | | |
| a. foot | b. nose | c. lip | d.knee |
| 41- Pneumo..... | | | |
| a. vein | b. organ | c. vessel | d. nipple |
| 43- Vesic..... | | | |
| a. badder | b. pus | c. false | d. seed |
| 44- trans..... | | | |
| a. backwars | b. inside | c. across | d. below |
| 45- ology is..... | | | |
| a. measuring | b.study | c. cutting | d. filling |
| 46- pathy is..... | | | |
| a. dropping down | b. disease | c. poison | d. source |
| 47- ectasis is..... | | | |
| a. surgical removal | b. opening | c. narrowing | d. enlargement |
| 48- phobia is..... | | | |
| a. paralysis | b. deficiency | c. fear | d. growth |
| 49- genic is..... | | | |
| a. souce | b. pain | c. puncrure | d. like |
| 50- cide is..... | | | |
| a. acid | b. side | c. before | d. killer |

1) COMPREHENSIGN

Read the following passage, and then answer ALL the Questions. Copy ONLY the letter of your right choice in your answer sheet: [06 marks]

Arteries of the heart blocked by plaque can reduce the flow of blood to the heart possibly resulting in heart attack or death. Plaque is actually fat and cholesterol that accumulates on the inside of the arteries. The arteries of the heart are small and can be blocked by such accumulations. There is a medical procedure that creates more space in the blocked artery by inserting and inflating a tiny balloon into the blood vessel. It is called coronary balloon angioplasty. When the balloon is inflated, it compresses the plaque against the wall of the artery, creating more space and improving the flow of blood.

Many doctors choose this technique, because it is less invasive than bypass surgery. Yes, both involve entering the body cavity, but in bypass surgery, the chest must be opened, the ribs must be cut, and the section of diseased artery must be removed and replaced. To replace it, the patient's body is opened, once again, to acquire a healthy section of artery. Usually, this blood vessel is removed from an artery located in the calf of the leg. This means the patient now has two painful incisions that must heal at the same time. There is far more risk in such bypass surgery than in angioplasty, which involves threading a thin tube, called a catheter, into the circulatory system and working it to the damaged artery.

Angioplasty may take between 30 minutes to 3 hours to complete. It begins with a distinctive dye that is injected into the bloodstream. A thin catheter is then inserted into the femoral artery of the leg, near the groin. The doctor monitors the path of the dye using x-rays. He moves the tube through the heart and into the plaque-filled artery. He inflates the balloon, creating more space, deflates the balloon, and removes the tube. It is important to note that the plaque has not been removed; it has just been compressed against the sides of the artery. Sometimes, a stent may be implanted, a tiny tube of stainless steel that is expandable when necessary. Its function is to keep the artery open. _

There is good news and there is bad news. The good news is that the statistics compiled are superb. Ninety percent of all angioplasty procedures are successful. The risk of dying during an operation of this type is less than 2%. The risk of heart attack is also small: 3-5%. Yet heart surgeons do not take any risk lightly; therefore, a team of surgeons stands ready to perform bypass surgery if needed. The length of hospitalization is only three days. The bad news is twofold. First, this procedure treats the condition but does not eradicate the cause. In 20% of the cases, there is a recurrence of plaque. Second, angioplasty is not recommended for all patients. The surgeons must consider the patient's age, physical history, how severe the blockage is, and, finally, the degree of damage to the artery before they make their determination.

1. When coronary arteries are blocked by plaque, one of the results could be

- a. stroke. b. heart attack. c. hospitalization.

d. femoral artery deterioration.

2. According to the passage, angioplasty is defined as

- a. a tiny balloon.
- b. a plaque-laden artery.
- c. blood vessel repair.
- d. bypass surgery.

3. It can be inferred from the passage that invasive most closely means

- a. entering the body cavity.
- b. causing infection.
- c. resulting in hospitalization.
- d. requiring a specialist's opinion.

4. The angioplasty procedure begins with

- a. a thin catheter being inserted into the femoral artery.
- b. a balloon being inflated in the heart.
- c. a special dye being injected into the bloodstream.
- d. a healthy artery being removed from the calf

5. It can be inferred from the passage that

- a. a healthy artery is removed and awaits possible bypass surgery.
- b. patients have trouble accepting the idea that a tiny balloon will cure the problem.
- c. 3-5% of the patients refuse to undergo this procedure.
- d. surgeons do not take even a 2% chance of death lightly.

6. Which one of the following statements is true?

- a. The plaque that has caused the problem is not removed during angioplasty.
- b. The risk of dying during an angioplasty procedure is 3-5%
- c. The coronary balloon angioplasty is a separate procedure from inflating a balloon into a blocked artery.
- d. All of the above statements are true.

II) VOCABULARY & CONTEXT:

Choose the BEST answer from the alternatives given below: [14 marks]

7. Volunteers to the homeless after the flood.

- a) administered
- b) demonstrated
- c) ministered
- cl) ministry

8. A is a substance which contains chemicals that kill bacteria. i

- a) disinfect
- b) disinfectant
- c) disinfected
- d) disinterested

9. Edison is with the invention of phonograph.

- a) familiar
- b) charged
- c) discredited
- d) credited

10. Bad weather didn't us from starting our vacation.

- a) dissolve
- b) deter
- c) determine
- cl) encourage

11. Medical instruments widely in price.

- a) vary b) very c) every d) various

12. Iron and carbon are two of steel.

- a) components b) element c) opponents d) proponent

13. is body wound or shock produced by physical injury, as from violence or accident.

- a) Trauma b) Dizziness c) Blastoma c) Glioma

14. means the loss of one's sense of direction.

- a) Orientation b) Acceleration c) Disorientation d) Desiccative

15. of memory is usually a temporary loss of memory.

- a) Lapse b) Leaps c) Caps d) flaps

16. The world faces disasters as a result of global warming.

- a) eminent b) immanent c) approach d) imminent

17. New policies should be to better doctors' salaries in Egypt.

- a) adapted b) adopted c) played d) invented

18. It has been proven that chemicals used in agriculture have bad on our health.

- a) affects b) affections c) effects d) effective

19. Everything will be fine with the of time.

- a) course b) curse c) coarse cl) cross p

20. You have to the author in an endnote.

- a) site b) sight c) cite d) sit

III) ENGi.1s16i Fon MEDICAL Punieosasz

**A] Fill in the blanks with suitable words from the alternatives given below:
[20 marks]**

21. is a family of procedures involving stimulation of anatomical locations on or in the skin.

- a) Antiseptics b) Acupuncture c) Simulation d) Amputation

22. Apertialicollapse of the lung is called

- a) heart attack b) anesthetics c) pneumothorax d) obstetrics

23. The opposite of "deterioration" is

- a) improvement b) approval c) declination d) frustration

24. A substance used for medical treatment is called

- a) mediation b) meditation c) medication d) mediocre

- 25. is the chemical processes that occur within a living organism resulting in energy production.**
 a) Alcoholism b) Metabolism c) Despotism d) Behaviourism
- 26. "To pant" is to**
 a) walk b) sweat c) breathe rapidly d) smoke
- 27. A person who is listless has very little**
 a) energy b) time c) breath d) pressure
- 28. An abnormality of ftuiction is called**
 a) dysfunction b) conjunction c) disjunction d) disfunction
- 29. is the inflammation of one or more joints**
 a) Arthritis b) Dermatitis c) Bronchitis d) Appendicitis
- 30. Anything that is meant to last only for a limited time is referred to as**
 a) permanent b) contemporary c) everlasting d) temporary
- 31. Extreme tiredness after a long flight involving marked differences of local time is called**
 a) jet ski b) jet leg c) jet lag d) super jet
- 32. The medical term used to refer to cancer is**
 a) epithelioma b) urethritis c) vagotonia d) oliguria
- 33. The popular term used to refer to "enuresis" is**
 a) day dreaming b) sleep walking c) bed-wetting d) bad temper
- 34. "Ante cibum" means**
 a) before noon b) before sleeping c) before meals d) before sunset
- 35. " Ter in die or t.i.d." means**
 a) heat b) temperature c) everyday d) three times a day
- 36. "Oculus dexter" means if**
 a) right eye b) left eye c) right arm d) right ear
- 37. The plural form of "attorneyógeneral" is**
 a) attorneys-generals b) attorneys-general
 c) attomey-generals d) attomies-general
- 38. A disease might be cured if its are correctly identified.**
 a) protocols b) phantoms c) periods d) symptoms
- 39. Insomnia is the inability to have sleep.**
 a) restful b) restless c) rest d) irresistible
- 40. She has to keep the chemicals at a temperature of 30 degrees.**
 a) consonant b) contestant c) constant d) persist

B] Choose the right medical suffix or prefix from the alternatives given:

[10 marks]

- | | | | |
|----------------------------|-------------|-------------|-------------|
| 41. surgical repair | a) -plasty | b) -plegia | c) -plasia |
| 42. excessive flow | a) órrhapy | b) -rrhea | c) -rrhexis |
| 43. tumor | a) -olysis | b) -Osis | c) -oma |
| 44. stoppage | a) -stasis | b) -spasm | c) -sthenia |
| 45. enlarged | a) -malacia | b) -megaly | c) -mania |
| 46. before | a) angio- | b) anti- | c) ante- |
| 47 . arm | a) brachio- | b) broncho- | c) brady- |
| 48. gums | a) genuó | b) gingiva- | c) gastro- |
| 49. nose | a) ren- | b) retro- | c) rhin- |
| 50. vagina | a) colpo- | b) cranio- | c) carpo- |

22. The dental specialty and practice of adding artificial teeth and oral components is called
- a) orthodontics b) prosthodontics c) periodontics
23. The is capable of removing cholesterol from the blood circulation as well as manufacturing it.
- a) kidney b) liver c) pancreas
24. The is popularly known as the good kind of cholesterol and it is increased in blood through walking.
- a) LDL b) HDL c) FDL
25. Safety should be taken before hosting the annual conference.
- a) measures b) cautions c) limits
26. The loss of water from the body ends in dehydration.
- a) successive b) progressive c) excessive
27. He kept trying eyeglasses until the print came into focus.
- a) acute b) strong c) sharp
28. Avoid buying dark sunglasses that do not offer 100% protection to prevent eye damage.
- a) UV b) UVU c) VU
29. I have never used glasses with lenses that lighten up indoors and darken outdoors.
- a) transitional b) colored c) photo
30. The periodic interruption of normal breathing during sleep is a syndrome medically known as sleep
- a) disorder b) apnea c) insomnia
31. Increasing public is the key to successful prevention of illness.
- a) notification b) awareness c) announcement
32. A examination was essential to detect the cause of his death.
- a) postmortal b) postmortem c) postmorting
33. Migraine attacks are usually preceded by symptoms lasting hours to days.
- a) premonitory b) preambuler c) presuppositional
34. Vertigo and double vision are considered as symptoms of migraine.
- a) simple b) hemiplegic c) vertebrobasilar
35. After passing such a difficult exam, students should take that the coming one is a piece of cake.
- a) breath b) account c) heart
36. The Canadian educational system was to suit Arab students at Egyptian universities
- a) adapted b) adopted c) adepated
37. The professor illustrated that the two diagrams were not exactly similar through comparing them each other.
- a) with b) to c) for
38. No one can study for eight hours without a break.
- a) continually b) continuously c) continuantly
39. Either the students or the teacher causing trouble in class today.
- a) are b) is c) be
40. of energy flow patterns through the human body cause disease.
- a) Distortions b) Disruptions c) Disintegrations

B) Choose the right medical suffix or prefix from the alternatives given:

[10 marks]

- | | | | |
|--------------------------|---------------|-------------|-------------|
| 41. surgical opening | a) -ostomy | b) -ectomy | c) -otomy |
| 42. decrease~ | a) -rrhapy | b) -phasia | c) -penia |
| 43. expansion/dilatation | a) -olysis | b) -osis | c) -ectasis |
| 44. hardening | a) -sclerosis | b) -spasm | c) -sthenia |
| 45. rupture | a) -rrhexis | b) -rrhea | c) -rrhaphy |
| 46. hand | a) coxa- | b) chiro- | c) brachio- |
| 47. red | a) leuko- | b) erythro- | c) melano- |
| 48. testes | a) procto- | b) orch- | c) hyster- |
| 49. speedy/rapid | a) tachy- | b) brady- | c) hyper- |
| 50. wrist | a) colpo- | b) cranio- | c) carpo- |

I) Medical English Comprehension:

Read the passage carefully, and then choose the RIGHT answer:

[06 marks]

The term "virus" is derived from the Latin word for poison or slime. It was originally applied to the noxious stench emanating from swamps that was thought to cause a variety of diseases in the centuries before microbes were discovered and specifically linked to illness. But it was not until almost the end of the nineteenth century that a true virus was *proven* to be the cause of a disease.

The *nature* of viruses made them impossible to detect for many years even after bacteria had been discovered and studied. Not only are viruses too small to be seen with a light microscope, they also cannot be detected through their biological activity, except as it occurs in conjunction with other organisms. In fact, viruses show no traces of biological activity by themselves. Unlike bacteria, they are not living agents in the strictest sense. Viruses are very simple pieces of organic material composed only of nucleic acid, either DNA or RNA, enclosed in a coat of protein made up of simple structural units. Some viruses also contain carbohydrates and lipids. They are parasites, requiring human, animal, or plant cells to live. The virus replicates by attaching to a cell and injecting its nucleic acid. Once inside the cell, the DNA or RNA that contains the virus genetic information takes over the cell's biological machinery and the cell begins to manufacture viral proteins rather than its own.

- Which of the following is the best title for the passage?
(a) New Developments in Viral Research (b) Exploring the Causes of Disease
(c) DNA: Nature's Building Block (d) Understanding Viruses
- Before microbes were discovered, it was believed that some diseases were caused by
(a) germ-carrying insects (b) certain strains of bacteria
(c) foul odors released from swamps (d) slimy creatures living near swamps
- The word "proven" in line 4 is closest in meaning to which of the following:
(a) Shown (b) Feared (c) Imagined (d) Considered
- The word "nature" in line 6 is closest in meaning to which of the following?
(a) Self-sufficiency (b) Shapes (c) Characteristics (d) Speed
- The author implies that bacteria were investigated earlier than viruses because
(a) bacteria are easier to detect (b) bacteria are harder to eradicate
(c) viruses are extremely poisonous (d) viruses are found only in hot climates
- All of the following may be components of a virus EXCEPT
(a) RNA (b) plant cells (c) carbohydrates (d) a coat of protein

II) English for Medical Purposes:

Choose the RIGHT answer from the alternatives given below:

[44 marks]

- of memory can result from significant head, neck or facial trauma.
a) Lapse b) Collapse c) Flaps
- Enamel and dentin serve to protect the inner living tooth
a) pulp b) bulb c) cap
- The dental specialty and practice of adding artificial teeth and oral components is called
a) orthodontics b) prosthodontics c) periodontics

10. The is capable of removing cholesterol from the blood circulation as well as manufacturing it.
a) kidney b) liver c) pancreas
11. The is popularly known as the good kind of cholesterol and it is increased in blood through walking.
a) LDL b) HDL c) FDL
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28. is a family of procedures involving stimulation of anatomical locations on or in the skin.
a) Antiseptics b) Acupuncture c) Simulation
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a) heart attack b) anesthetics c) pneumothorax
30. The opposite of "deterioration" is.....
a) improvement b) approval c) declination
31. A substance used for medical treatment is called.....
a) mediation b) meditation c) medication
32. is the chemical processes that occur within a living organism resulting in energy production.
a) Alcoholism b) Metabolism c) Despotism
33. "To pant" is to.....
a) walk b) sweat c) breathe rapidly
34. A person who is listless has very little
a) energy b) time c) breath
35. An abnormality of function is called.....
a) dysfunction b) conjunction c) disfunction

36.is the inflammation of one or more joints
 a) Arthritis b) Dermatitis c) Bronchitis
37. Any thing that is meant to last only for a limited time is referred to as....
 a) permanent b) contemporary c) temporary
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 a) day dreaming b) sleep walking c) bed-wetting
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 a) before noon b) before sleeping c) before meals
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 a) consonant b) contestant c) constant
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 a) affects b) affections c) effects
49. Everything will be fine with theof time.
 a) course b) curse c) coarse
50. You have tothe author in an endnote.
 a) site b) sight c) cite

English for Medical Purposes

Choose the RIGHT answer from the alternatives given below:

[50 marks]

01. The pertaining to straightening of teeth and associated facial abnormalities is (a. periodontics – b. orthodontics – c. prosthodontics).
02. The removal of the fatty deposits from the artery is called (a. angiology – b. aortopathy – c. endoarterectomy).
03. Pulmonary dyspnea may affect the (a. heart – b. lungs – c. legs) in people when they are active.
04. An abnormal condition of fungi in the mouth is called (a. stomatodynia – b. stomatomycoosis – c. stomatalgia).
05. The operation a patient undergoes to maintain his/her airway is known as (a. tracheostomy – b. tracheotomy – c. pneumonosis).
06. (a. Enteroscopy – b. Endoscopy – c. Endoscope) is the visual examination of the intestines.
07. Myalgia is a case of severe (a. contraction – b. pain – c. paralysis) in the muscles.
08. (a. Odontology – b. Odontalgia – c. Odontopathy) is any disease affecting the teeth.
09. (a. Toxaemia – b. Hypoxaemia – c. Hypervolaemia) is an abnormal deficiency of blood oxygen.
10. If a patient has difficulty in swallowing, then he has (a. dysphagia – b. dysphasia – c. dysuria).
11. A condition that comes back repeatedly and lasts for a long time is called (a. benign – b. chronic – c. restful).
12. An internist is a physician who uses (a. tools – b. operations – c. drugs) to treat patients.
13. The phase of medicine is known as (a. therapeutics – b. therapy – c. indications).
14. A geriatrician is a specialist in diseases of (a. young – b. adult – c. elderly) patients.
15. Consultant physicians decide when a patient is ready to be (a. charged – b. recharged – c. discharged) from hospital.
16. Doctors (a. on – b. in – c. for) call carry a radio pager or bleeper to be contacted easily any time.
17. Someone who specializes in delivering babies is a (a. charge nurse – b. midwife – c. staff nurse).
18. A week later, John has visited the surgeon to remove the (a. threads – b. sutures – c. ropes) of the surgery.
19. (a. Opticians – b. Chiropodists – c. Physiotherapists) treat conditions affecting the feet.
20. The patient has lost his right leg in the accident and started to use the (a. industrial – b. artificial – c. plastic) limb.
21. A professional surgeon has to be good (a. at – b. with – c. about) his hands.
22. A group of symptoms which usually occur together is known as (a. marks – b. syndrome – c. reflections).
23. Family members sometimes share the same medical conditions due to (a. genetic – b. genital – c. genial) factors.
24. The medical record of a patient includes his physical examination and medical (a. history – b. story – c. past).
25. A case of (a. degenerate – b. degeneration – c. degenerative) arthritis causes severe pain in the joints of the body.
26. A large room in hospital where patients are kept is known as a (a. ward – b. word – c. world).

27. I am a (a. graduate – b. graduated – c. graduator) of the Faculty of Medicine.
28. The loss of cognitive functions such as thinking, remembering, making decisions is medically known as (a. dementia – b. dimensions – c. demention).
29. Angiosclerosis is a case of (a. hardening – b. softening – c. fixation) of body blood vessels.
30. An abnormal large increase in the number of white blood cells is medically known as (a. endocytosis – b. erythrocytosis – c. leukocytosis).
31. His high blood pressure (a. contraindicative – b. contraindicates – c. contraindication) surgery now.
32. Paralysis of the bronchi in a human being is known as (a. bronchoplegia – b. bronchogenic – c. broncomycosis).
33. It is not recommended to use over-the- (a. counter – b. table – c. display) medications without consulting the physician.
34. Controlling hypertension can decrease the risk of (a. strike – b. stroke – c. stricken), heart attack, and kidney failure.
35. Genu varum is a problem related to the (a. knees – b. ankles – c. elbows) of individuals.
36. Metromalacia is a pathological softening of the tissues of the (a. larynx – b. anus – c. uterus).
37. Nowadays, young people easily accept the (a. corruption – b. incursion – c. entrance) of new words into their language.
38. Bedwetting and somnambulism occur most commonly during arousal from (a. rapid – b. moderate – c. slow) wave sleep.
39. (a. Lapse – b. Collapse – c. Flaps) of memory can result from significant head, neck or facial trauma.
40. I have never used glasses with (a. transitional – b. colored – c. photo) lenses that lighten up indoors and darken outdoors.

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|--------------------------|-------------|-------------|-------------|
| 41. testes | a) procto- | b) orch- | c) hyster- |
| 42. speedy/rapid | a) tachy- | b) brady- | c) hyper- |
| 43. arm | a) brachio- | b) broncho- | c) brady- |
| 44. gums | a) genu- | b) gingiva- | c) gastro- |
| 45. vagina | a) colpo- | b) cranio- | c) carpo- |
| 46. crushing | a) -tripsy | b) -trophy | c) -tomy |
| 47. surgical opening | a) -ostomy | b) -ectomy | c) -olysis |
| 48. expansion/dilatation | a) -olysis | b) -osis | c) -ectasis |
| 49. tumor | a) -olysis | b) -osis | c) -oma |
| 50. rupture | a) -rrhexis | b) -rrhea | c) -rrhaphy |

مع خالص أمنياتنا بدوام التوفيق

عميد كلية طب القصدير العيني

مطابع دار «الجمهورية» للصحافة