



**AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCE
DEPARTMENT OF REHABILITATION MEDICINE
BACHELOR OF SCIENCE IN PHYSIOTHERAPY
END OF SEPT-DECEMBER 2024 TRIMESTER EXAMINATIONS**

**UNIT CODE: PHT 117 UNIT NAME: HUMAN PHYSIOLOGY. GENERAL
ORGANIZATION**

**DATE: Friday/ 6th/ December
TIME: TWO HOURS
START: 2PM STOP : 4PM**

INSTRUCTIONS (physical exams)

Do not write on this question paper

(Marks and questions distribution as per program curriculum.)

1. This exam is marked out of 70 marks
2. This Examination comprises 3 Sections
3. This exam shall take 2 Hours

Section A. Multiple choice questions. Answer all the questions (30 Marks)

1. A typical neuron has a resting membrane potential of:
 - a. -70v
 - b. 70MV
 - c. -55V
 - d. None of the above
2. In pacemaker potential:
 - a. Long lasting calcium channels promote plateauing of the potential
 - b. At -40v, the calcium channel (L (for long-lasting) channels are open
 - c. At around 50v, t-type (transient) calcium channels open
 - d. Depolarization is primarily caused by an influx of calcium from the l-type channels
3. Which part of a neuron receives information from other neurons?
 - a) cell body
 - b) axon
 - c) dendrites
 - d) myelin sheath
4. Depolarization is achieved when which ions flow through the membrane into the cell:
 - a. Potassium
 - b. Chloride
 - c. Magnesium
 - d. Sodium
5. Which statement about muscles is true
 - a. Tropomyosin promotes muscle contraction
 - b. troponin blocks muscle contraction by blocking actin binding sites
 - c. The action potential travels along the muscle fiber membrane in the same way that action potentials travel along nerve fiber membranes.
 - d. None of the above
6. The process by which cells engulf minute particles, bacteria, or other cells is called:
 - a. Phagocytosis
 - b. Pinocytosis
 - c. Exocytosis
 - d. Simple diffusion

7. The organelle responsible for ATP production in eukaryotic cells is the
 - a. Ribosomes
 - b. Rough endoplasmic reticulum
 - c. Mitochondria
 - d. Lysosome
8. The movement of substances across a cell membrane without the use of energy is
 - a. Endocytosis
 - b. Active transport
 - c. Passive transport
 - d. All of the above
9. Which statement is true about mechanoreceptors
 - a. Pancinian corpuscles are sensitive skin stretch
 - b. Pancinian corpuscles are located in the upper dermis
 - c. Pancinian corpuscles are only found in glabrous skin
 - d. None of the above
10. Which of the following contribute to iron deficiency
 - a. Pregnancy
 - b. Excessive bleeding
 - c. Gastric bypass for weight loss
 - d. All of the above
11. Which type of hemoglobin is responsible for giving red blood cells a c- shape
 - a. Hemoglobin A
 - b. Hemoglobin S
 - c. Hemoglobin c
 - d. Thalassemia
12. What is the diagnosis of a baby with the above cell characteristics
 - a. Erythroblastosis fetalis
 - b. Hereditary spherocytosis
 - c. Sickle cell anemia
 - d. Hemolytic anemia

13. Clumping of red blood cells may occur when the blood of one person is mixed with another's. This is due to?
- Antigen-antigen reaction
 - Antibody-antibody reaction
 - Antigen-antibody reaction
 - Production of too many red blood cells
14. An athlete exercising in high altitude region is going to have increased number of red blood cells. Why?
- There is less oxygen
 - There is more oxygen
 - The air is cooler
 - The athlete is not used to training in this region.
15. Which hormone is responsible for the changes the athlete mentioned in question number 14 is experiencing.
- Hormone thyroxine
 - Erythropoietin
 - Colony forming unit
 - Proerythroblasts
16. The main hemopoietic tissue of human embryo is:
- Liver
 - Bone marrow
 - Spleen
 - Kidney
17. Immature red blood cells of human species have:
- No nucleus
 - Many nuclei
 - Single nucleus
 - 2 nuclei

18. In which organ is albumin synthesized
- Lymphoid tissue
 - Liver
 - Smooth endoplasmic reticulum
 - Porphyrin
19. Which are the major cations in the intracellular compartment
- Potassium
 - Sodium
 - Calcium
 - Magnesium
20. Which of the following statements regarding membrane transport is not true
- Symports are proteins that move molecules in the same direction across the membrane
 - Antiports move molecules in opposite directions across the bilayer
 - Uniports move single molecules at a given time
 - Active transport involved movement of molecules down a concentration gradient using energy in the form of ATP
21. Which occurs last in the clotting process.
- Conversion of fibrinogen to fibrin
 - Conversion of prothrombin to thrombin
 - Secretion of thromboxane A₂
 - Vasoconstriction
22. Which of the following is not a condition that causes excessive bleeding
- Hemophilia
 - Thrombocytopenia
 - Vitamin k deficiency
 - Jaundice
23. Which of the following factors affect the speed of simple diffusion.
- Concentration gradient.
 - Thickness of the membrane.
 - Weight of molecule
 - All of the above

24. Which autorhythmic cell is referred to as the origin of normal heart beat
- Red blood cell
 - White blood cell
 - Platelets
 - SA node
25. Apart from ventricular depolarization, what else does the QRS deflection show
- Atrial repolarization
 - SA node firing
 - AV node firing
 - A and C
26. Which factors affect cardiac output
- Force of contraction of the heart
 - Heart rate
 - Blood volume
 - Capillary refill
27. Which of the following statements is true
- Systolic blood pressure is the minimum pressure recorded in the central arterial system
 - Diastolic blood pressure) is the peak pressure recorded in the central arterial system and occurs during ventricular ejection
 - SBP between 120 and 129 mm is considered elevated
 - SBP between 120 and 129 mm is considered elevated
28. Smooth muscles are found in the:
- Lining of hollow organs
 - Digestive tracts
 - Eyes
 - All of the above
29. Which does NOT occur during the development of blood cells?
- Nucleus disappears.
 - Nucleus reduces in size.
 - Basophilic material is retained
 - Diapedesis

30. The following does not occur after 120 days of red blood cells' life span
- Phagocytosis is mediated by kupffer cells and macrophages
 - Iron can be reused in the formation of new red blood cells
 - Porphyrin is converted into bilirubin
 - The converted unconjugated bilirubin is transported to the liver by globulins

Section B. Short structured questions. Answer all the questions (20 marks)

31. State three roles of lysosomes. (3 marks)
32. State four types of autorhythmic cells. (4 marks)
33. What is the difference between plasma membrane and nuclear membrane. (2 marks)
34. Differentiate between nociceptors and mechanoreceptors. (2 marks)
35. What is the difference between translation and transcription. (2 marks)
36. State and define two types of anemias. (4 marks)
37. What is refractory period with regard to a cardiac muscle? (1 mark)
38. What is a sickle cell disease crisis. (2 marks)

Section C Long structured answers. Answer any of the two questions (20 marks)

39. A. A physiotherapist has instructed a patient to perform biceps exercises using a dumbbell. Outline the mechanism of muscle contraction in order to lift that dumbbell. (8 marks)
- B. State two types of synapses. (2 marks)
40. A. Outline the phases of a cardiac muscle action potential. (5 marks)
- B. Outline the phases of pacemaker potential. (5 marks)
41. State 5 cell organelles and their functions. (10 marks)