

**M.B.B.S. FIRST PROFESSIONAL EXAMINATION, FEBRUARY-2023**  
**PHYSIOLOGY**  
**PAPER - SECOND**

[Time allotted: Three hours]

SET - A

[Max Marks: 100]

**Q. 1. Multiple choice questions (Darken the single best response in OMR sheet. Time allotted 20 minutes) (1 x 20 = 20)**

1. Corticospinal tract lesion leads to all **except**:
  - a. Increased tone
  - b. Flexor plantar response
  - c. Babinski's sign
  - d. Cogwheel rigidity
2. Process of consolidation of memory from short-term to long-term occurs in:
  - a. Prefrontal cortex
  - b. Hippocampus
  - c. Neocortex
  - d. Amygdala
3. Which of the following is **not** a feature of hyperthyroidism?
  - a. Weight gain
  - b. Tachycardia
  - c. Systolic hypertension
  - d. Heat intolerance
4. Group B nerve fibres are:
  - a. Concerned with carrying pain
  - b. Concerned with carrying proprioception
  - c. Autonomic preganglionic fibres
  - d. Motor to muscle spindles
5. Delta waves in EEG are seen in:
  - a. Deep sleep
  - b. REM sleep
  - c. Awake with eyes open
  - d. Awake with eyes closed
6. Which of the following hormones peaks in the early part of pregnancy?
  - a. HCG
  - b. Prolactin
  - c. Estrogens
  - d. Relaxin
7. The highest density of Sodium channels is found at:
  - a. Surface of myelin
  - b. Dendrite
  - c. Nodes of Ranvier
  - d. Soma
8. The nerve fibre carrying which sensation has the highest diameter?
  - a. Pain
  - b. Temperature
  - c. Proprioception
  - d. Itch
9. Function of anterior hypothalamus is:
  - a. Thermoregulation
  - b. Vomit center
  - c. Gastrointestinal regulation
  - d. Satiety center
10. Which of the following is **not** a glial cell in the CNS?
  - a. Ependymal cell
  - b. Astrocyte
  - c. Oligodendrocyte
  - d. Neurolemmocyte
11. Which of the following causes hypocalcemia?
  - a. Calcitonin
  - b. Thyroid hormone
  - c. PTH
  - d. Vitamin D
12. Muscle spindle is:
  - a. Receptor for a variety of multisynaptic reflexes
  - b. Receptor for stretch reflex
  - c. Occurs only in antigravity extensor muscles
  - d. Excited by both stretch and contraction of the muscles in which it is located
13. Which of the following is true about isometric contraction?
  - a. Increase in muscle length
  - b. Decrease in muscle length
  - c. Increase in muscle tension
  - d. External work is done.
14. All the following chemicals acting on the hypothalamus increase food intake **except**:
  - a. Neuropeptide Y
  - b. Orexin
  - c. Ghrelin
  - d. Leptin
15. Hyperaldosteronism is associated with all **except**:
  - a. Hypermnatremia
  - b. Hypokalemia
  - c. Metabolic acidosis
  - d. Hypertension
16. The Reflex arc consists of:
  - a. Receptor
  - b. Efferent organ
  - c. Afferent and Efferent neuron
  - d. All of the above
17. Which of the following is an example of a positive feedback loop?
  - a. Regulation of blood sodium
  - b. Regulation of estrogen secretion at midcycle
  - c. Regulation of progesterone secretion in pregnancy
  - d. Regulation of TSH secretion
18. On exposure to darkness, photoreceptors release:
  - a. Glutamate
  - b. Acetyl Choline
  - c. Gustducin
  - d. Glycine
19. Wernicke's area is located in which lobe of the brain?
  - a. Parietal
  - b. Occipital
  - c. Temporal
  - d. Frontal
20. The enzyme associated with conversion of androgen to estrogen is:
  - a. Desmolase
  - b. Isomerase
  - c. Aromatase
  - d. Hydroxylase

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**Note:** Attempt all questions.  
Draw suitable diagrams (wherever necessary)

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- Q. 2. Give reasons:** (2 x 5 = 10)
- a. Increased food intake (polyphagia) occurs in diabetes mellitus.
  - b. Fovea has the highest clarity of vision in the retina.
  - c. Exophthalmos occurs in patients of Grave's disease.
  - d. Conduction of impulse is faster in myelinated neurons
  - e. Amenorrhoea occurs during the period of lactation
- Q. 3. Problem based question:** (2+4+2+2 = 10)
- A 70 years old patient presents to the OPD with difficulty in performing his daily activities. On examination, the doctor records a general slowness of movements, pill-rolling type of tremors occurring at rest which disappear on activity, rigidity in the muscles and gait with short, quick steps and reduced arm-swinging.
- a. What is your provisional diagnosis?
  - b. Outline the physiological basis of the disease with a diagram of the neural circuits associated with it.
  - c. Compare and contrast rigidity and spasticity.
  - d. What treatment would you like to give to this patient?
- Q. 4. Write briefly on:** (6 x 4 = 24)
- a. Functions of oxytocin
  - b. Endogenous analgesia or pain-inhibiting mechanisms of the body.
  - c. Functions of cerebellum
  - d. Qualities of good patient in doctor –patient relation.
- Q. 5. Structured questions:**
- (i) Enumerate the hormones of the adrenal cortex. Describe the actions of the glucocorticoids. What sign and symptoms seen in Cushing's syndrome? (10)
  - (ii) Describe the ovarian and uterine events during the various phases of menstrual cycle. Depict the hormonal regulation of the menstrual cycle with a diagram. What is the physiological basis or cause of the bleeding that occurs during menstruation? (10)
- Q. 6. Answer as indicated:** (4 x 4 = 16)
- a. Draw a Neuromuscular junction
  - b. Impedance matching
  - c. Excitation-contraction coupling in a skeletal muscle with the help of a suitable diagram.
  - d. Draw a visual pathway

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## PHYSIOLOGY

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Q. 1. Multiple choice questions (Darken the single best response in OMR sheet. Time allotted 20 minutes) (1 x 20 = 20)

1. Which of the following wave in atrial pressure curve is due to isovolumetric ventricular contraction:
  - a. 'a' wave
  - b. 'c' wave
  - c. 'v' wave
  - d. 'p' wave
2. Vagal stimulation of the heart causes:
  - a. Increased heart rate
  - b. Increased P – R interval in ECG
  - c. Increased force of heart contraction
  - d. Increased cardiac output
3. All of the following are the features of Bezold-Jarish reflex, **except**:
  - a. Produces after injection of veratridine in coronary artery
  - b. Apnea
  - c. Bradycardia
  - d. Increased blood pressure
4. Discharge from baroreceptor causes inhibition of:
  - a. CVLM
  - b. RVLM
  - c. Nucleus ambiguus
  - d. Nucleus tractus solitarius
5. Which of the following is **not** a distributive shock?
  - a. Anaphylactic shock
  - b. Septic shock
  - c. Neurogenic shock
  - d. Cardiogenic shock
6. Cardiac index in human (L/min/m<sup>2</sup>) is:
  - a. 2.1
  - b. 3.2
  - c. 4.6
  - d. 5.9
7. During inspiration, the intrapleural pressure becomes:
  - a. More negative
  - b. More positive
  - c. Remain same
  - d. Initially positive, then negative
8. Alveolar ventilation (L/min) at rest is:
  - a. 1.5
  - b. 3.3
  - c. 4.2
  - d. 5.5
9. Destruction of apneustic centre along with the vagus nerve in an experimental animal will produce:
  - a. Prolonged inspiration
  - b. Prolonged expiration
  - c. Slow and shallow breathing
  - d. Rapid and shallow breathing
10. All of the following results due to parasympathetic stimulation to GIT **except**:
  - a. Increase in secretions
  - b. Increase in motility
  - c. Increase in tone
  - d. Contraction of sphincters
11. Pepsinogen is activated by:
  - a. Enterokinase
  - b. Low pH
  - c. Trypsin
  - d. Chymotrypsin
12. Which of the following is **not** correct regarding gastric acid secretion?
  - a. Gastrin increases secretion
  - b. Secretin decreases secretion
  - c. H<sub>2</sub> Blockers decreases secretion
  - d. Somatostatin increases secretion
13. Which of the following secretions get absorbed in the colon?
  - a. Iron
  - b. Proteins
  - c. Bile salts
  - d. Water and electrolytes
14. Juxtaglomerular apparatus consists of all of the following structures, **except**:
  - a. JG cells
  - b. Lacis cells
  - c. Macula densa
  - d. Vasa recta
15. Resting renal blood flow in (L/min) is:
  - a. 0.53
  - b. 0.83
  - c. 1.3
  - d. 2.3
16. Value of TmG is:
  - a. 175 mg/min
  - b. 175 mg/100 ml of blood
  - c. 375 mg/min
  - d. 375 mg/100 ml of blood
17. Osmotic pressure exerted by plasma proteins primarily depends on:
  - a. Number of molecules
  - b. Molecular weight
  - c. Molecular shape
  - d. All of the above
18. Arneht count is counting of WBCs on the basis of:
  - a. Their size
  - b. Presence of granules
  - c. Presence of number of lobes of nucleus
  - d. Staining feature
19. Alpha granules of platelets contain the following substances, **except**:
  - a. Fibronectin
  - b. von Willebrand's factor
  - c. Thrombospondin
  - d. Histamine
20. All of the following physiological processes are mediated by positive feedback, **except**:
  - a. Platelet plug formation
  - b. Parturition
  - c. Genesis of an action potential
  - d. Blood thyroxine levels

**PHYSIOLOGY**  
**PAPER- FIRST**

**Note:** Attempt all questions.  
Draw suitable diagrams (wherever necessary)

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- Q. 2. Give reasons:** **(2 x 5 = 10)**
- a. With decrease in the pH of the duodenal content the rate of gastric emptying decreases.
  - b. Blood flow to organs remains relatively constant within the mean arterial pressure range of 60 to 180 mmHg.
  - c. Periodic breathing is seen following voluntary hyperventilation performed for 2 to 3 min.
  - d. Filtration of cationic substances is greater than that of anionic substances.
  - e. ABO incompatibility rarely produces hemolytic disease of newborn.
- Q. 3. Problem based question:** **(2 x 5 = 10)**
- A 55-year-old female presents to clinic with a complaint of light-headedness, dizziness, and syncope. On leading questions she denies chest pain, cough or other symptoms. She is a known case ischemic heart disease with hypertension since last 10 years on treatment and Type 2 DM taking oral hypoglycaemic drugs. ECG shows sinus bradycardia and prolonged PR interval. Based on above clinical history answer the following
- a. What may be the probable diagnosis in the above case?
  - b. What is sinus bradycardia?
  - c. Name one physiological condition of sinus bradycardia and explain its physiological basis.
  - d. Normal range of PR interval.
  - e. What portion of ECG is included in the PR interval?
- Q. 4. Write briefly on:** **(6 x 4 = 24)**
- a. Heterometric regulation of stroke volume.
  - b. Movements in small intestine. Write a note on adynamic ileus.
  - c. Countercurrent multiplier system.
  - d. Responsibility and privileges of a doctor.
- Q. 5. Structured questions:**
- (i) Classify hypoxia and list two causes of each type of hypoxia. Briefly describe the mechanism of each type of hypoxia. **(2+3+5 = 10)**
  - (ii) Draw a schematic diagram of blood coagulation. Name the Vitamin K dependent clotting factors. Write a note on anticoagulants. **(5+2+3 = 10)**
- Q. 6. Answer as indicated:** **(4 x 4 = 16)**
- a. Distribution of total body water in the body.
  - b. Baroreceptors classification and baroreceptor reflex
  - c. Glomerulotubular balance.
  - d. Surfactant source and functions