

PHYSIOLOGY
PAPER - FIRST

SET - B

[Max Marks: 50]

[Time allotted: Three hours]

Q. 1. Multiple choice questions (attempt all MCQs in the allotted first 20 minutes in the OMR sheet) ($\frac{1}{2} \times 20 = 10$)

1. The chemical form in which carbon dioxide is transported maximally from tissues to lung is :
 - a. Bicarbonate ion
 - b. Carbamino-hemoglobin
 - c. Carbamino-protein
 - d. Dissolved in plasma
2. The cells responsible for hydrogen ion secretion in distal tubules and collecting ducts:
 - a. Intercalated
 - b. Lacin
 - c. Macula densa
 - d. Principal
3. An important anti-allergic substance released by eosinophils include:
 - a. Bradykinin
 - b. Histamine
 - c. Major basic protein
 - d. Serotonin
4. The main factor according to Poiseuille's law that determines rate of blood flow in vessel:
 - a. Length of vessel
 - b. Pressure difference across ends of vessel
 - c. Radius of vessel
 - d. Viscosity of blood
5. The morphological type of red blood cells in iron deficiency anaemia is:
 - a. Microcytic hypochromic
 - b. Microcytic normochromic
 - c. Normocytic hypochromic
 - d. Normocytic normochromic
6. The primary bile acids formed in the liver are:
 - a. Cholic acid and chenodeoxycholic acid
 - b. Cholic acid and deoxycholic acid
 - c. Chenodeoxycholic acid and lithocholic acid
 - d. Deoxycholic acid and lithocholic acid
7. The plasma anion gap is used mainly in diagnosing different causes of:
 - a. Metabolic acidosis
 - b. Metabolic alkalosis
 - c. Respiratory acidosis
 - d. Respiratory alkalosis
8. The fourth heart sound is caused by:
 - a. Retrograde flow in the vena cava
 - b. Closure of the mitral and tricuspid valve
 - c. Ventricular filling
 - d. Vibrations in the ventricular wall during systole
9. The spike potentials in gastrointestinal smooth muscles is mainly due to _____.
 - a. Closure of voltage-gated calcium channels
 - b. Opening of calcium-sodium channels
 - c. Opening of voltage gated sodium channels
 - d. Closure of voltage-gated potassium channels
10. The features of acclimatization in soldiers posted at high altitude include ALL EXCEPT
 - a. Increased chest size
 - b. Increased number of red blood cells
 - c. Increased diffusing capacity of lungs
 - d. Increased vascularity of peripheral tissues
11. The rapid propagation of electrical activity from cell to cell is by means of _____.
 - a. Desmosomes
 - b. Gap junctions
 - c. Herai-desmosomes
 - d. Zonula occludens
12. MCH I proteins present antigens to _____.
 - a. Cytotoxic T cells
 - b. Helper T cells
 - c. Memory T cells
 - d. Suppressor T cells
13. The main driving force for hydrochloric acid secretion by the parietal cell is _____.
 - a. Hydrogen pump
 - b. Hydrogen-potassium pump
 - c. Hydrogen-sodium pump
 - d. Hydrogen-calcium pump
14. The underlying cause of pre-potential is
 - a. Calcium influx through L-channels
 - b. Calcium influx through T-channels
 - c. Sodium and calcium influx through h-channels
 - d. Calcium and potassium influx through h-channels
15. The cell adhesion molecules include all except:
 - a. Cadherins
 - b. IgE superfamily
 - c. Integrins
 - d. Selectins
16. The secretion of copious amount of alkaline pancreatic juice deficient in enzymes is by:
 - a. Acetylcholine
 - b. Cholecystokinin
 - c. Secretin
 - d. Somatostatin
17. The juxtaglomerular apparatus is constituted by
 - a. Lacin, Macula densa and Juxtaglomerular cells
 - b. Lacin, Principal and Juxtaglomerular cells
 - c. Macula densa, Principal and Juxtaglomerular cells
 - d. Macula densa, Intercalated and Juxtaglomerular cells
18. The surfactant in lung alveoli is secreted by
 - a. APUD cells
 - b. Pulmonary alveolar macrophages
 - c. Type I alveolar epithelial cells
 - d. Type II alveolar epithelial cells
19. Which of the following has the highest total cross-sectional area in the body?
 - a. Arteries
 - b. Arterioles
 - c. Capillaries
 - d. Veins
20. The complement protein that plays role in chemotaxis of white blood cells
 - a. C3a
 - b. C4a
 - c. C5a
 - d. C3b

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

- Q. 2. Give reasons:** (1 x 5 = 05)
- Rh blood group system is an exception to Landsteiner's second law
 - Functional residual capacity increases in old age
 - Sudden standing from lying posture can lead to fainting in an individual
 - Chronic renal failure patients suffer from severe anaemia
 - Pernicious anaemia develops in patients who have gastrectomy done
- Q. 3. Problem based question:** (1 x 5 = 05)
- An infant 3 day old, from remote hill area is presented in the emergency for breathlessness and sweating especially during breastfeeding and crying. On examination the infant appeared cyanotic with heart rate=166 beats/min; respiratory rate=32 breaths/min and systemic partial pressure of oxygen=58 mm of Hg on pulse oximetry. X-ray chest showed right ventricular prominence and echocardiography revealed right to left shunt. Based on above findings answer the following questions:
- What type of hypoxia the infant is having and why?
 - Define hypoxia?
 - Why the infant is breathless?
 - Does oxygen therapy have a role in immediate treatment? If yes why?
 - Why the infant appeared cyanosed?
- Q. 4. Write short notes on:** (2.5 x 4 = 10)
- Hyponatremia-definition, causes and consequences
 - Physiology of vomiting
 - Baroreceptor mechanism for short-term regulation of blood pressure
 - Micturition reflex
- Q. 5. Structured questions:**
- (i). Enumerate the requirements for excreting concentrated urine. Describe the role of counter-current mechanism in concentration of urine. (1+4 = 05)
- (ii). Define cardiac cycle and describe with labelled diagram the aortic, left atrial & left ventricular pressure as well as volume changes during cardiac cycle. (1+4 = 05)
- Q. 6. Write in brief about:** (2.5 x 4 = 10)
- Role of helper T-cells in immunity.
 - Formation and secretion of bilirubin.
 - Cross-section showing different layers of respiratory membrane
 - Cardiac-muscle action potential with ionic basis

**PHYSIOLOGY
PAPER - SECOND**

SET - A

[Max Marks: 50]

[Time allotted: Three hours]

Q. 1. Multiple Choice questions (attempt all MCQs in the allotted first 20 minutes in the OMR sheet)

(½ x 20 = 10)

1. The secretion of FSH in a male is inhibited by negative feedback effects of:
 - a. Inhibin secreted from Sertoli cells
 - b. Inhibin secreted from the Leydig cells
 - c. Testosterone secreted from the tubules
 - d. Testosterone secreted from Leydig cells
2. The ability of the lens to increase its curvature and maintain a focus at close distances is called:
 - a. Convergence
 - b. Accommodation
 - c. Astigmatism
 - d. Amblyopia
3. Response of mothers body to pregnancy includes:
 - a. Increase BMR
 - b. Reduced red blood cells
 - c. Reduced minute ventilation
 - d. Decreased salt and water accumulation
4. Basal part of basilar membrane responds to:
 - a. High pitch sounds
 - b. Low pitch sounds
 - c. Does not vibrate
 - d. Both high and low pitch
5. Rise in body temperature at ovulation is primarily due to:
 - a. FSH surge
 - b. LH surge
 - c. Progesterone
 - d. Oestrogen
6. Which of these hormones may have a primary role in many circadian rhythms?
 - a. Estradiol
 - b. Insulin
 - c. Adrenocorticotrophic hormone
 - d. Melatonin
7. Damage to nigrostriatal pathway results in:
 - a. Tabes dorsalis
 - b. Huntington disorder
 - c. Syringomyelia
 - d. Parkinson disease
8. Accommodation reflex includes which of the following?
 - a. Relaxation of ciliary muscle
 - b. Diplopia
 - c. Convergence of visual axis
 - d. Dilatation of pupil
9. Which of these is a midbrain component?
 - a. Stretch reflex
 - b. Tonic neck reflex
 - c. Neck righting reflex
 - d. Tonic labyrinthine reflex
10. Which hormone is responsible for development of secondary sexual characteristics in males?
 - a. FSH
 - b. Testosterone
 - c. Dihydroepiandrosterone
 - d. Dihydrotestosterone
11. Tympanic reflex helps in:
 - a. Protecting auditory receptors
 - b. Amplifying sound
 - c. Equilibrate the pressure
 - d. Transmit the sound
12. Taste sensation of sweetness is produced by:
 - a. Alkaloids
 - b. Organic substances
 - c. Ionizing substances
 - d. Acidic substance
13. Conditioned learning is example of:
 - a. Associative learning
 - b. Non associative learning
 - c. Short term learning
 - d. Long term learning
14. Features of cerebellar dysfunction are all **except**:
 - a. Nystagmus
 - b. Static tremors
 - c. Dysmetria
 - d. Ataxia
15. Theories of referred pain are all **except**:
 - a. Dermatomal theory
 - b. Convergence theory
 - c. Facilitation theory
 - d. Myogenic theory
16. The corpus luteum is maintained for the first 10 weeks of pregnancy by:
 - a. HCG
 - b. LH
 - c. Estrogen
 - d. Progesterone
17. Progression of brain wave from alert wakefulness to sleep in NREM sleep:
 - a. Alpha to theta wave
 - b. Beta wave to delta wave
 - c. Alpha wave to delta wave
 - d. Beta wave to theta wave
18. The energy for muscle contraction is most directly obtained from:
 - a. Phosphocreatine
 - b. Glycogen in muscle
 - c. FFA in blood
 - d. Glucose in blood
19. Cholinergic neurons are all **except**:
 - a. All preganglionic autonomic fibers
 - b. Post ganglionic parasympathetic
 - c. Post ganglionic sympathetic to sweat gland
 - d. Post ganglionic sympathetic to blood vessels of skin
20. Slow IPSP is produced by:
 - a. Acetyl choline
 - b. GnRH
 - c. Norepinephrine
 - d. Dopamine

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

- Q. 2. Give reasons why:** (1 x 5 = 05)
- a. Smooth muscles contract to 80% of their length as compared to only 30% by skeletal muscle.
 - b. In conditioned reflex, conditioned stimuli (CS) precede unconditional stimuli (US).
 - c. Alcohol intake causes increased urine formation.
 - d. People with infection of middle ear have hearing difficulty.
 - e. Bi-potential genitalia after eighth week of gestation transform to male in genetic male.
- Q. 3. Problem based question:** (1 x 5 = 05)
- A young male attended the ophthalmologist with complaint of decrease in vision in both the eyes for last 6 months. He also complained of increasing frequency of headaches and nausea. Recently he disclosed of having erectile dysfunction and secretion from his mammary glands. On examination his visual acuity was 6/12 for both eye but perimeter showed loss of vision on temporal half of both the eye. CT scan shows a mass in region of sella turcia.
- a. What is the most probable diagnosis?
 - b. Why is there a loss of vision in bi-temporal field?
 - c. Why is vision by fovea least likely to be affected in head injury?
 - d. Surgery performed on right half of the lesion will improve defect in quadrant of which eye?
 - e. With the help of diagram illustrate other types of visual field defects.
- Q. 4. Write short notes on:** (2.5 x 4 = 10)
- a. Feed forward inhibition circuit of cerebellum
 - b. Analgesic system of body
 - c. Milk ejection reflex
 - d. Hormonal regulation spermatogenesis
- Q. 5. Structured questions:**
- (i) What is tetany? Discuss the role of hormones in regulation of serum calcium levels. (2+3=05)
 - (ii) Define the term sensory receptor. Describe the properties of receptor. (1+4=05)
- Q. 6. Write in brief about:** (2.5 x 4 = 10)
- a. Ovulation
 - b. EEG waves
 - c. De-cerebrate rigidity
 - d. Cushing's syndrome