

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

1. Parasympathetic stimulation of the salivary glands causes:
 - a. Viscid secretion
 - b. Decreased secretion
 - c. Increased secretion rich in enzymes and mucin
 - d. Secretion is unaffected
2. True about pacemaker potential is:
 - a. Unstable RMP
 - b. Also known as spike potential
 - c. Characteristic of ventricular muscle fibre
 - d. Due to potassium influx
3. Clathrin is used in:
 - a. Receptor-mediated endocytosis
 - b. Exocytosis
 - c. Cell to cell adhesion
 - d. Facilitated diffusion
4. Windkessel effect is produced in:
 - a. Large elastic vessels
 - b. Capacitance vessels
 - c. Thoroughfare channels
 - d. Capillaries
5. Glucose transport across the intestinal epithelium is an example of:
 - a. Active transport
 - b. Facilitated diffusion
 - c. Diffusion
 - d. Secondary active transport
6. Increase in serum urea is seen in all **except**:
 - a. High protein diet
 - b. Burns
 - c. Renal failure
 - d. Hypervolemia
7. Water-hammer pulse can be observed in all of the following **except** in:
 - a. Aortic incompetence
 - b. Patent Ductus Arteriosus
 - c. Arteriovenous fistula
 - d. Hypothyroidism
8. Which of the following correctly describes restrictive lung disease?
 - a. Increased FRC and increased compliance
 - b. Increased FEV1 / FVC ratio and reduced compliance
 - c. Decreased FEV1 / FVC ratio and reduced compliance
 - d. Increased Total Lung Capacity and reduced Residual Volume
9. Which of the following statements about extracellular fluid (ECF) is **true**?
 - a. ECF is rich in Potassium
 - b. Amount of ECF is more than ICF
 - c. ECF is rich in organic anions
 - d. ECF is rich in Sodium
10. **True** about ventilation-perfusion ratio of lungs is that:
 - a. It is least at the apex of lungs
 - b. It is highest at the middle region of lungs
 - c. It is least at the base of lungs
 - d. It is uniform throughout the lungs
11. Reabsorption of glucose occurs from which part of the tubule?
 - a. Proximal tubule
 - b. Distal tubule
 - c. Loop of Henle
 - d. Collecting duct
12. At tissue level, increased CO₂ enhances unloading of oxygen from hemoglobin. This effect is known as:
 - a. Bohr effect
 - b. Haldane effect
 - c. Henry effect
 - d. Dalton effect
13. The enzyme salivary amylase is inactivated by:
 - a. Enteropeptidase
 - b. Low pH of the stomach
 - c. High pH of the intestine
 - d. Intestinal mucus
14. Under basal conditions, caloric requirements of the cardiac muscle is mainly met by:
 - a. Fatty acids
 - b. Proteins
 - c. Carbohydrates
 - d. Ketone bodies
15. Renin is produced by:
 - a. Macula Densa cells
 - b. Juxtaglomerular cells
 - c. Cells of proximal tubules
 - d. All of the above
16. The parietal cells secrete which of the following:
 - a. HCL
 - b. Gastrin
 - c. Intrinsic factor
 - d. a and b
17. Peritubular capillaries of the nephron originate from:
 - a. Afferent arteriole
 - b. Interlobar artery
 - c. Efferent arteriole
 - d. Interlobular artery
18. The cardiac output is the volume of blood pumped out by .../min:
 - a. Left Ventricle
 - b. Left Atria
 - c. Right Atria
 - d. None of the above
19. The principal site of reabsorption of sodium in a nephron is:
 - a. Proximal tubule
 - b. Distal tubule
 - c. Loop of Henle
 - d. Collecting duct
20. Buffy coat obtained after centrifugation of a blood sample in a tube represents:
 - a. Cholesterol part of the plasma
 - b. Antibodies of the plasma
 - c. WBC and platelets
 - d. Only platelets

PHYSIOLOGY
PAPER- FIRST

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

- Q. 2. Give reasons:** **(2 x 5 = 10)**
- a. Alveoli do not collapse during expiration and also do not rupture during inspiration
 - b. Pancreatic tissues are not digested themselves by the enzymes of exocrine pancreas.
 - c. Heart is not fatigued even though it never stops pumping until death.
 - d. Edema occurs in diseases of the glomerular filtration membrane of kidneys.
 - e. Sub-endocardial portion of the left ventricle is prone to ischemia.
- Q. 3. Problem based question:** **(1+2+3+2+2 = 10)**
- A 16 year old girl presents to the OPD with the complaints of gradual onset generalized weakness, fatigue and tiredness for the last 2 months. On clinical examination, the doctor records pallor, koilonychias, heart rate of 110 bpm and BP of 110/ 70 mm of Hg. Hemoglobin level was found to be 10 gm% and peripheral blood smear revealed a microcytic hypochromic blood picture.
- a. What is your provisional diagnosis?
 - b. Enumerate the laboratory tests you would advise to confirm your diagnosis.
 - c. What are the stages of erythropoiesis?
 - d. What treatment would you like to give to this patient?
 - e. What is reticulocyte response?
- Q. 4. Write briefly on:** **(6 x 4 = 24)**
- a. Secretion of Hydrochloric acid in the stomach and its regulation.
 - b. What are resistance and capacitance vessels?
 - c. Peristalsis
 - d. A 35 year old man presents to the OPD with complaints of loss of weight and diarrhoea for 2 months. The doctor takes a meticulous history, performs careful clinical examination and suspects HIV-AIDS. He confirms it by advising a blood test. Briefly describe the various roles of a doctor in such a scenario.
- Q. 5. Structured questions:**
- (i) Enumerate static and dynamic lung volumes and capacities. Enumerate the various changes occurring in the body during high altitude acclimatization and briefly describe how they develop with a suitable flowchart. **(4+2+4= 10)**
 - (ii) Enumerate the various phases of cardiac cycle along with their duration. Describe the events occurring in the phase of ventricular ejection. What is the cause of heart sounds? What would happen to the duration of systole and diastole if the heart rate increases? **(4+2+2+2= 10)**
- Q. 6. Answer as indicated:** **(4 x 4 = 16)**
- a. What are the rapidly acting blood pressure control measures?
 - b. Draw a schematic diagram of the Oxy-hemoglobin dissociation curve. Name the factors causing right-shift of the curve.
 - c. Depict the Renin-Angiotensin System with the help of a flow chart and enlist the physiologic effects of Angiotensin-II.
 - d. Briefly describe the physiologic role of Na⁺-K⁺ pump with the help of suitable diagram.

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, JANUARY-2022

PHYSIOLOGY
PAPER - SECOND

[Time allotted: Three hours]

SET - A

[Max Marks: 100]

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

1. All are the properties of synapse **except**:
 - a. All or None Law
 - b. Law of forward conduction
 - c. Fatigue
 - d. More susceptible to hypoxia than nerve fibres
2. Source of generator potential in Pacinian corpuscle:
 - a. Unmyelinated sensory nerve ending
 - b. Receptor capsule
 - c. First node of ranvier
 - d. Second node of ranvier
3. Sperm contains all **except**:
 - a. Fructose
 - b. Thromboplastin
 - c. Fibrinogen
 - d. Prothrombin
4. Menopause does **not** manifest with:
 - a. Hot flushes
 - b. Bone pain
 - c. Nervousness
 - d. Decrease in pituitary gonadotropin
5. Webers Fechner Law deals with:
 - a. Frequency discrimination
 - b. Receptive field organisation
 - c. Intensity discrimination
 - d. Two point discrimination
6. The centre point of the lens is known as:
 - a. Nodal point
 - b. Principal axis
 - c. Principal focus
 - d. Visual point
7. Refractive power of the lens of reduced eye is:
 - a. 60 D
 - b. 59 D
 - c. 61 D
 - d. 58 D
8. Aldosterone escape occurs through:
 - a. Primary active transport
 - b. Facilitated diffusion
 - c. Pressure diuresis
 - d. Pinocytosis
9. The glucose transporter responsible for transport of fructose in the sperm is:
 - a. GLUT 1
 - b. GLUT 2
 - c. GLUT 5
 - d. GLUT 6
10. Receptors for Growth hormone is located in:
 - a. Nucleus
 - b. Cytoplasm
 - c. Cell membrane
 - d. Ribosomes
11. Somatomedins are chiefly secreted in:
 - a. Liver
 - b. Bone marrow
 - c. Kidney
 - d. Brain
12. Endolymph is present in:
 - a. Scala vestibule
 - b. Scala media
 - c. Helicotrema
 - d. Scala tympani
13. The taste sensation produced by monosodium glutamate is:
 - a. Sweet
 - b. Salt
 - c. Bitter
 - d. Umami
14. Lesion of optic chiasma leads to:
 - a. Blindness in the same eye
 - b. Blindness in opposite eye
 - c. Bitemporal hemianopia
 - d. Homonymous hemianopia
15. Circadian rhythm is controlled by:
 - a. Suprachiasmatic nucleus
 - b. Raphe nucleus
 - c. Thalamus
 - d. Giant cell of betz
16. Apraxia refers to:
 - a. Inabililty to recognise faces
 - b. Inability to read
 - c. Inability to perform movement in absesnce of paralysis
 - d. Inability to speak
17. Loss of memory is termed:
 - a. Amnesia
 - b. Anosmia
 - c. Ageusia
 - d. Aphasia
18. Following are endogenous opioids **except**:
 - a. Pethedine
 - b. Enkephalin
 - c. Endorphin
 - d. Dynorphin
19. Utricles help in detection of ----- movements.
 - a. Rotation
 - b. Side to side
 - c. Anteroposterior
 - d. Oblique
20. Window of limbic system is:
 - a. Hypothalamus
 - b. Amygdala
 - c. Hippocampus
 - d. Thalamus

**PHYSIOLOGY
PAPER- SECOND**

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

- Q. 2. Give reasons:** **(2 x 5 = 10)**
- a. Deep reflex are exaggerated (increased) in upper motor neuron lesion.
 - b. Cretinism leads to mental retardation.
 - c. Undescended testes leads to infertility
 - d. Peptide hormones need second messenger system.
 - e. Image appears blurred when person moves from bright lighted area to dim light.
- Q. 3. Problem based question:** **(2 x 5 = 10)**
- A 45 years old woman had tumor in thyroid gland. Doctor advised surgery. After surgery she developed spasm in muscles of hands and increase in excitability of muscles even to mild mechanical stimuli. On investigation plasma calcium levels was 6mg/dl. Based on above case history answer the following questions-
- a. What is the normal plasma calcium levels?
 - b. Name the hormones which regulate plasma calcium levels
 - c. What is the reason for spasm in hand muscles and increase in excitability of muscles to mild mechanical stimuli?
 - d. Does kidney play role in maintaining plasma calcium levels. If yes HOW?
 - e. What is the role of calcium in blood clotting?
- Q. 4. Write briefly on:** **(6 x 4 = 24)**
- a. Mechanism of thyroid hormone synthesis with diagram.
 - b. Molecular mechanism of skeletal muscle contraction
 - c. Events at neuro-muscular junction
 - d. Characteristic of good patient in doctor –patient relationship
- Q. 5. Structured questions:**
- (i) Describe the neural connections within cerebellum with help of diagram Describe the functions of cerebellum .What sign and symptoms will be seen in cerebellar dysfunction? **(3+4+3= 10)**
- (ii) Describe the structure and innervation of muscle spindle. How is muscle tone regulated in body? What is inverse stretch reflex? **(4+6= 10)**
- Q. 6. Write short notes on:** **(4 x 4 = 16)**
- a. Mechanism of phototransduction
 - b. Functions of testosterone
 - c. Accommodation reflex
 - d. Functions of sertoli cells