

[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. Transpulmonary pressure is the difference between:
 - a. Intrapleural & Alveolar
 - b. Atmospheric & Intrapulmonary
 - c. Intrapulmonary & Intrapleural
 - d. Atmospheric & Intrapleural
2. Which is true about the function of proximal tubule?
 - a. Leaky epithelium not permeable to ions & water
 - b. Reabsorption is isosmotic
 - c. Na^+ reabsorbed only through transcellular route
 - d. Cl^- ion concentration is less in tubular lumen than outside
3. Neutrophil differs from monocyte in that:
 - a. It kills & digest bacteria
 - b. It is a precursor of Macrophage
 - c. It is a second line of defense
 - d. It may kill tumor cells
4. Mass movement of colon would abolish by:
 - a. Extrinsic denervation
 - b. Destruction of Auerbach plexus
 - c. Gastrocolic reflex
 - d. Distension of colon
5. Which of following tends to decrease K^+ secretion by cortical collecting duct?
 - a. Increased ECF [K^+]
 - b. Osmotic diuretic
 - c. Aldosterone blocker.
 - d. Acute Alkalosis
6. An example of co-transport is:
 - a. Sodium potassium pump
 - b. Calcium pump
 - c. Sodium hydrogen pump
 - d. Sodium glucose transport
7. True about bile salts:
 - a. Formed from Haem of hemoglobin
 - b. Formed & Conjugated in Liver
 - c. Gives golden yellow color to bile
 - d. Are bilirubin & biliverdin
8. Colloidal osmotic pressure is directly related to:
 - a. Size of molecule
 - b. Shape of molecule
 - c. Concentration of molecule
 - d. Concentration of Sodium
9. Not a function of Pontine respiratory group is:
 - a. Stimulating contraction of diaphragm
 - b. Smoothing out transition from inspiration to expiration
 - c. Cause apneustic breathing if damaged
 - d. Regulate activity of medullary neuron
10. The following changes tends to increase GFR:
 - a. Increase afferent arteriolar resistance.
 - b. Decrease efferent arteriolar resistance
 - c. Increase Bowman's capsule hydrostatic pressure
 - d. Increase capillary filtration coefficient
11. Ventricular pressure is higher than atrial pressure in all phases of cardiac cycle except:
 - a. Isometric contraction
 - b. Atrial systole
 - c. Maximum ejection
 - d. Reduced ejection phase
12. Spike phase of pacemaker potential is due to:
 - a. Opening of voltage gated Ca^{++} channels
 - b. Opening of voltage gated Na^+ channels
 - c. Closure of Voltage gated K^+ channels
 - d. Activation of NaK ATPase pump
13. Cellular immunity differs from Humoral in:
 - a. Affected by free elements in body fluids
 - b. Persist for longer time
 - c. Increased by Interleukins
 - d. Checks cells that have undergone malignant transformation
14. Which of these offers a nonspecific defense against viral infection?
 - a. Antibodies
 - b. Leukotrienes
 - c. Interferon
 - d. Histamine
15. What of the following changes is seen during moderate exercise?
 - a. Increase in stroke volume despite small EDV.
 - b. Arterial PCO_2 falls due to hyperventilation.
 - c. Little rise in arterio-venous difference in oxygen
 - d. Arterial PO_2 falls below normal.
16. Which of the following is not affected by the preload in the heart muscle?
 - a. End systolic volume
 - b. End diastolic volume
 - c. Stroke volume
 - d. Ejection fraction
17. Which hormone stimulates bicarbonate rich pancreatic secretion?
 - a. Somatostatin
 - b. CCK
 - c. Secretin
 - d. Gastrin
18. Hypersecretion of gastric acid leads to:
 - a. Peptic ulcer
 - b. Venous thrombosis
 - c. Skin ulcer
 - d. Arterial thrombosis
19. ECG corresponding to ventricular cardiac cycle:
 - a. Iso-volumetric contraction starts after QRS
 - b. Iso-volumetric relaxation starts with T wave
 - c. Iso-volumetric contraction starts with QRS
 - d. Iso-volumetric relaxation ends before T wave
20. Not a feature of rapid ascend to high altitude:
 - a. Increase in ventilation
 - b. High [H^+] of blood
 - c. Renal diuresis
 - d. Low bicarbonate in blood

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

Q. 2. Give reasons:

(2 x 5 = 10)

- a. Peristalsis always proceeds from proximal to distal end of the GIT
- b. Subendocardial portion of left ventricle is more prone to ischemia
- c. Depth of breathing is far more effective in elevating alveolar ventilation than ventilation rate
- d. Glucose appears in urine before it's tubular transport maximum is reached
- e. Migrating Motor Complex has a role of "house keeper" of the gut

Q. 3. Problem based question:

(2 x 5 = 10)

On attending to a call at emergency you observe a 62-year obese male with history of smoking and alcohol addiction for past 10 years unconscious with sweating and breathlessness. He had multiple gunshot injuries and have lost lot of blood. On examination he was pale with rapid shallow breathing and had low blood pressure 70/50 mmHg, thready pulse with cold & sweaty skin. Chest was clear on auscultation and JVP was not raised.

- a. What is the most probable type of shock the person is suffering?
- b. Tabulate relevant categorization for mechanisms of shock.
- c. Enumerate three compensatory mechanisms to restore plasma volume in such scenario.
- d. Draw diagram illustrating the Baroreceptor mechanism.
- e. Draw flow chart of sequence of events in the rapid compensatory mechanisms.

Q. 4. Write briefly on:

(6 x 4 = 24)

- a. Digestion and Absorption of fats from small intestine
- b. Regulation of cardiac output
- c. Role of Physician in health care system
- d. Neural regulation of respiration

Q. 5. Structured questions:

- (i) Describes the mechanisms responsible for concentration of urine by the kidney. Enumerate factors affecting concentration of urine? (5+5= 10)
- (ii) Describe the transport of CO₂ from tissue to the Lung. Why is exchange of CO₂ much easier than exchange of oxygen? Add a note Haldane effect. (4+2+4= 10)

Q. 6. Write as indicated:

(4 x 4 = 16)

- a. Homeostasis control systems
- b. Write a note on Erythropoiesis
- c. Facilitated vs Simple diffusion
- d. Mechanism of temporary plug formation

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, FEBRUARY-2021

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. Which of the following hormone secretion will be unaffected in a women having pituitary necrosis following severe haemorrhage during child birth?
 - a. Growth hormone
 - b. Prolactin
 - c. Follicle-stimulating hormone
 - d. Vasopressin
2. Sensory systems code for the following attributes of a stimulus:
 - a. Touch, taste, hearing and smell
 - b. Threshold, receptive field, adaptation and discrimination
 - c. Threshold, laterality, sensation and duration
 - d. Modality, location, intensity and duration
3. A lesion of Wernicke's area in categorical hemisphere causes patient to:
 - a. Speak in a slow halting voice
 - b. Lose ability to recognize faces
 - c. Talk rapidly but make little sense
 - d. Lose short-term memory
4. In the utricle, tip links in hair cells are involved in:
 - a. Depolarization of the stria vascularis
 - b. Movements of the basement membrane
 - c. Perception of sound
 - d. Regulation of distortion-activated ion channels
5. The maintenance of posture in a normal adult human being depends on:
 - a. Integrity of reflex arc
 - b. Joint movements in physiological range
 - c. Muscle power
 - d. Type of muscle fibers
6. Umami taste is due to:
 - a. Glutamic acid
 - b. Hydrogen ion
 - c. Potassium ion
 - d. Sodium ion
7. Tremors associated with cerebellar disease are:
 - a. Associated with fine movements only
 - b. Present at rest
 - c. Present with action
 - d. Restricted to hands and trunk
8. The principle that in the spinal cord the dorsal roots are sensory and ventral roots are motor is known as:
 - a. Marey's law
 - b. Muller law
 - c. Bell-Magendie law
 - d. Weber-Fechner law
9. The visual association area corresponds to Brodmann's area:
 - a. Area 8
 - b. Area 17
 - c. Area 18
 - d. Area 22
10. The satiety centre in hypothalamus is regulated by:
 - a. Gastric dilatation
 - b. Fatty acids
 - c. Blood insulin levels
 - d. Blood glucose levels
11. The brain area not directly concerned with emotional expression:
 - a. Brainstem
 - b. Hypothalamus
 - c. Limbic system
 - d. Thalamus
12. Vitamin A is a precursor for the synthesis of:
 - a. The pigment of iris
 - b. Somatostatin
 - c. Scotopsin
 - d. Retinene1
13. Rigidity in Parkinson's disease is characterized by all except:
 - a. Posture is that of extension attitude
 - b. Involves both protagonists and antagonists
 - c. Biceps, knee flexors and sternocleidomastoid muscles are commonly affected
 - d. Affects mainly large proximal group of limb muscles
14. Which of the following is not involved in regulating plasma Ca^{2+} levels?
 - a. Intestine
 - b. Kidneys
 - c. Liver
 - d. Lungs
15. The peak secretion of oestrogen occurs:
 - a. At the time of ovulation
 - b. Just before ovulation
 - c. Mid-follicular phase
 - d. Mid-luteal phase
16. Insulin increases the entry of glucose into:
 - a. Renal tubular cells
 - b. Skeletal muscle
 - c. Mucosa of small intestine
 - d. Neurons in cerebral cortex
17. Visual accommodation involves:
 - a. A decrease in curvature of lens
 - b. Contraction of ciliary muscle
 - c. Increased tension on lens ligaments
 - d. Relaxation of the sphincter muscle of iris
18. The mechanism of action of contraceptive pill is by:
 - a. Blocking the entry of sperms into fallopian tubes
 - b. Decreasing motility of sperms
 - c. Increasing the motility of fallopian tubes
 - d. Inhibiting ovulation
19. True about tympanic reflex are all except:
 - a. A protective reflex against loud sound
 - b. It develops in 40 msec and completed in 160 msec
 - c. Occurs due to contraction of middle ear muscles
 - d. More effective to a prolonged loud sound than to a sudden loud sound
20. In human males, testosterone is produced mainly by the:
 - a. Leydig cells
 - b. Seminiferous tubules
 - c. Sertoli cells
 - d. Vas deferens

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**PHYSIOLOGY
PAPER- SECOND**

Paper Code: MBBS103

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

- Q. 2. Give reasons:** (2 x 5 = 10)
- a. Hypocalcemia leads to tetany
 - b. REM sleep is also called paradoxical sleep
 - c. Relaxin hormone facilitates delivery in pregnant women
 - d. When irrigating ear canals the fluid used should be at body temperature.
 - e. Sterility is one of the health hazard in men working in furnaces
- Q. 3. Problem based question:** (2 x 5 = 10)
- A 27 year old young healthy male qualified the written exam for recruitment as railway engine driver but on medical check-up he was disqualified. His medical examination report showed:
General and systematic examination- Normal
Tests of hearing- Normal
Tests of vision-1) Visual acuity (without glasses) Rt. eye-6/6 (N-18), Lt. eye-6/6 (N-18)
2) Field of vision & binocular vision- Normal
3) Color vision- could read 11 out of 21 Ishihara's plates
4) Fundus exam- Normal
- Based on above case scenario answer the following questions:
- a. Name the receptor for color vision and its photo-pigment.
 - b. Define red-green color blindness.
 - c. Why color blindness is passed from mother to son?
 - d. Enlist any two theories of color vision.
 - e. Why visual acuity is highest in fovea centralis?
- Q. 4. Write briefly on:** (6 x 4 = 24)
- a. Physiologic effects of thyroid hormone
 - b. Sequence of events during excitation-contraction coupling in skeletal muscle.
 - c. Temperature-regulating mechanisms
 - d. Professional qualities and role of a physician
- Q. 5. Structured questions:**
- (i) Depict diagrammatically the structure of synapse. Enumerate the properties of synapse and explain any two properties with suitable diagrams. (2+4+4 = 10)
- (ii) List the hormones secreted by various zones of adrenal cortex. Describe the principal actions of aldosterone and give an account of Conn's syndrome. (3+4+3 = 10)
- Q. 6. Explain with labelled diagram:** (4 x 4 = 16)
- a. Feedback control of growth hormone secretion
 - b. Brown Sequard syndrome
 - c. Fetal circulation
 - d. Wallerian degeneration