P0110

RAN-2506000101022601

RAN-2506000101022601/2406000101020601

First Year M.B.B.S. Examination September - 2025

Physiology (Paper - I) Level - 2

Time: 3 Hours] **[Total Marks: 100**

સૂચના : / Instructions

(1) નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ First Year M.B.B.S.

Name of the Subject :

☛ Physiology (Paper - I) Level - 2

Subject Code No.: 2506000101022601/2406000101020601

Seat No.:

Student's Signature

SECTION "A" Multiple Choice Question (MCQ)

Instructions : Select one of the most appropriate choice out of four options in each Multiple Choice Question.

Q. 1. MCQ Based **1×20=20**

1. Iron deficiency anaemia is :
   a) Normocytic normochronic
   b) Normocytic hypochromic
   c) Microcytic hypochromic
   d) Macrocytic hypochromic
2. Erythroblastosis foetalis is :
   a) Destruction of RBCs of mother by foetal Rh antibodies
   b) Haemolysis in foetus due to maternal Rh antibodies
   c) Haemolysis in foetes due to maternal ABO antibodies
   d) Destruction of RBCs of mother by foetal ABO antibodies
3. Presentation of antigen on major histocompatibility complex (MHC)-I by a cell will result in which of the following?
   a) Generation of antibodies
   b) Activation of cytotoxic T cells
   c) Increase in phagocytosis
   d) Release of histamine by mast cells

4. Immunoglobulins that provides localized protection :

a) IgG b) IgA

c) IgM d) IgD

5. Peripheral resistance falls by :

a) Increase in mean arterial pressure

b) Increase in temperature

c) Decrease in cardiac output

d) Increase in mean arterial pressure and cardiac output

6. Range of operation of baroreceptors is between :

a) 0-60 mmHg b) 0-200 mmHg

c) 60-200 mmHg d) 150-200 mmHg

7. Sudden death may occur in an individual following a massive heart attack due to activation of:

a) Bainbridge reflex

b) Cushing reflex

c) Bezold Jarisch reflex

d) Hering-Breurer reflex

8. According to Frank-Starling Law, cardiac output is increased by :

a) Increased end-systolic volume

b) Increased end-diastolic volume

c) Increased heart rate

d) Catecholamines

9. Which of the following has the maximum oxygen consumption (ml/min) at rest :

a) Brain

b) Skeletal muscle

c) Heart muscle

d) Kidneys

10. Which molecule has the greatest effect in controlling lung ventilation?

a) Oxygen in the blood

b) Hydrogen ions in the blood

c) Carbon dioxide in the blood

d) Oxygen in the cerebrospinal fluid

11. In which form is the majority of CO2 transported in the blood?
    a) As a dissolved solute
    b) Bound to plasma proteins
    c) As carbonic acid molecules
    d) As bicarbonate (HCO3–) ions
12. What are the cells that produce surfactant called?
    a) Mucus cells
    b) Ciliated cells
    c) Alveolar macrophages
    d) Type II pneumocytes
13. With regard to the respiratory centre, which of the following is TRUE?
    a) Blood oxygen concentration affects the respiratory centre.
    b) Anaesthetics don't affect respiration.
    c) Raised intracranial pressure increases ventilation.
    d) Narcotic drugs may depress ventilation.
14. Given that the lung contains a residual air volume of ~1.2 L and has an expiratory reserve volume of ~1.2 L and the dead space is about 150 ml, while resting tidal volume is about 500 ml, approximately what percentage of the volume of air in the lung is turned over during one normal tidal inhalation at rest?
    a) 5% b) 15%
    c) 60% d) 90%
15. Which of the following does NOT contribute to increasing the surface area of the small intestine?
    a) The brush border b) Plicae circulars
    c) Intestinal crypts d) D. Villi
16. A 65-year-old man eats a healthy meal. Approximately 40 minutes later the ileocecal sphincter relaxes and chyme moves into the cecum. Gastric distention leads to relaxation of the ileocecal sphincter by way of which reflex?
    a) Enterogastric
    b) Gastroileal
    c) Gastrocolic
    d) Intestino-intestinal

17. Which change would you expect to find in a patient consuming a high-sodium diet (200 mEq/day) compared with the same patient on a normal-sodium diet (100 mEq/day), assuming steady-state conditions?

a) Increased plasma aldosterone concentration

b) Increased urinary potassium excretion

c) Decreased plasma renin activity

d) Decreased plasma atrial natriuretic peptide

18. Which hormone causes an increase in permeability to water in the collecting ducts of the kidney?

a) Antidiuretic hormone b) Aldosterone

c) Angiotensin II d) Atrial natriuretic hormone

19. What effect does aldosterone have?

a) Increases the absorption of Na+ from the kidney tubules

b) Makes the kidney tubules more permeable to water

c) Catalyses the formation of angiotensin I

d) D. Blocks the release of ADH

20. The resting potential of a myelinated nerve fiber is primarily dependent on the concentration gradient of which of the following ions?

a) Ca++ b) Cl –

c) K+ d) Na+

SECTION "B"

Q. 2. Define Blood Pressure. Describe mechanism of short term regulation of Blood Pressure & add a note on primary hypertension. **1+6+3=10**

Q. 3. **Short notes- Reasoning type (5 out of 6)(3 marks each)** **3×5=15**

a) Why excitability is lost during absolute refractory period?

b) Why muscles get stiff after death?

c) How AV Nodal delay helps in sufficient ventricular filling?

d) How Rh incompatibility leads to erythroblastosis foetalis?

e) Why there is joint pain after deep see diving?

f) How trypsin inhibitor prevents autodigestion of pancrease?

Q. 4. **Short Notes (any 3 out of 4)** **3×5=15**

a. Regulation of Cardiac Output

b. Intrinsic pathway of coagulation.

c. Glomerular Filtration Rate.

d. Oxy-Haemoglobin dissociation curve.

SECTION "C"

Q. 5. **Short notes (any 4 out of 5) (5 marks each)** **4×5=20**

a. Juxta Glomerular Apparatus.

b. Myasthenia Gravis

c. Functions of RBC

d. Resting membrane potential.

e. Surfactant.

Q. 6. **Short notes (any 4 out of 5) (5 marks each)** **4×5=20**

a. Iron deficiency Anaemia.

b. What is empathy in clinical practice?

c. Cardiovascular responses to exercise.

d. Timed vital Capacity & its significance.

e. Diuretics & its clinical uses.

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RAN-2506000101022602

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First Year M.B.B.S. Examination September - 2025

Physiology (Paper - II) (Level - 2)

Time: 3 Hours] **[Total Marks: 100**

સૂચના : / Instructions

(1) નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
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Name of the Examination:
☛ **First Year M.B.B.S.**

Name of the Subject :
☛ **Physiology (Paper - II) (Level - 2)**

Subject Code No.: **2506000101022602 / 2406000101020602**

Seat No.:

Student's Signature

Section - "A" Multiple Choice Question (MCQ)

Instructions: Select one of the most appropriate choice out of four options in each Multiple Choice Question.

Q. 1. MCQ Based **(1×20=20)**

1. A 76-year-old man has a stroke that severely impairs his speech. Which area of his brain is most likely damaged?
   a) Primary motor cortex
   b) Premotor area
   c) Broca's area
   d) Cerebellum

2. Afferent signals from the periphery of the body travel to the cerebellum in which nerve tract?
   a) Ventral spinocerebellar
   b) Vestibulocerebellar
   c) Reticulocerebellar
   d) Dorsal spinocerebellar

3. Which cells receive direct synaptic input from Golgi tendon organs?
   a) Type Ia inhibitory interneurons
   b) Dynamic gamma motor neurons
   c) Alpha motor neurons
   d) Type Ib inhibitory interneurons

4. Retrograde amnesia is the inability to recall long-term memories. Damage to which brain region leads to retrograde amnesia?

a) Hippocampus
b) Dentate gyrus
c) Amygdaloid complex
d) Thalamus

5. In an otherwise normal person, dysfunction of which brain area will lead to behavior that is not appropriate for the given social occasion?

a) Ventromedial nuclei of hypothalamus
b) Amygdala
c) Corpus callosum
d) Fornix

6. Which structure serves as an "alternative pathway" for signals from the motor cortex to the spinal cord?

a) Red nucleus
b) Basilar pontine nuclei
c) Caudate nucleus
d) Thalamus

7. Which part of the brain allows us to control skilled voluntary muscle movements?

a) Basal nuclei
b) Cerebellum
c) Precentral Gyrus
d) Thalamus

8. Which part of the brain subconsciously provides precise timing for the movements of learned skeletal muscle contraction?

a) Cerebrum
b) Diencephalon
c) Brainstem
d) Cerebellum

9. What is the likely result of an injury that severs the spinal cord between C5 and C6?

a) Respiratory failure and death
b) Paraplegia
c) Hemiplegia
d) Quadriplegia

10. What is the function of the reticular formation (or reticular activating system) of the brain?
    a) It is the emotional or affective part of the brain.
    b) It allows emotion to override logic and vice versa.
    c) It controls our circadian rhythm.
    d) It receives and integrates all incoming sensory input.

11. Which one of the following is a primary sex characteristic of a male human?
    a) Spermiogenesis
    b) The prostate
    c) Comparatively deep voice
    d) Body hair

12. Spermatozoa are capacitated by mixing with the secretions of "peg" cells. Where are these cells located?
    a) In the seminal vesicles
    b) In the prostate gland
    c) In the epididymis
    d) In the fallopian tubes

13. After menopause, hormone replacement therapy with estrogen-like compounds is effective in preventing the progression of osteoporosis. What is the mechanism of their protective effect?
    a) They stimulate the activity of osteoblasts
    b) They increase absorption of calcium from the gastrointestinal tract
    c) They stimulate calcium reabsorption by the renal tubules
    d) They stimulate parathyroid hormone (PTH) secretion by the parathyroid gland

14. Which one of the following is NOT part of the endocrine system?
    a) The islets of Langerhans (pancreatic islets)
    b) The thyroid gland
    c) The acini cells of the pancreas
    d) The parathyroid glands

15. Which of the following statements about corticosteroids is true?
    a) They may also act as neurotransmitters.
    b) They are transported dissolved in blood.
    c) They are produced by the adrenal gland.
    d) They are amino acid derivatives.

16. Which hormones are soluble in blood?
    a) Steroid hormones
    b) Hormones produced by the adrenal cortex
    c) The sex hormones
    d) Those released by the pituitary gland

17. Iodine is an essential component of which hormone?
    a) Thyroid hormones
    b) Aldosterone
    c) Thyroid-stimulating hormones
    d) Parathyroid hormone.

18. Complete the sentence correctly. Parathyroid hormone:
    a) Is produced by the parafollicular cells of the thyroid gland
    b) Decreases the concentration of Ca++ in the blood
    c) Releases Ca++ from the sarcoplasmic reticulum
    d) Increases the concentration of Ca++ in the blood

19. Which neurons are unipolar?
    a) Neurons in the central nervous system
    b) Neurons in the retina
    c) Sensory neurons
    d) Motor neurons

20. Which of the following would conduct an action potential with the greatest speed?
    a) Myelinated, large diameter fibres
    b) Myelinated, small diameter fibres
    c) Unmyelinated, large diameter fibres
    d) Unmyelinated, small diameter fibres

Section - "B"

Q. 2. Enumerate the steps of Thyroid Hormone synthesis. Describe in detail the Causes, Clinical features & Management of Hyperthyroidism. **(4+6=10)**

Q. 3. **Short notes - Reasoning type (5 out of 6) (3 marks each)** **(3×5=15)**

1. Why microglial cells are called scavenger cells?
2. Why damage to Wernicke's area causes fluent aphasia?
3. Why hypoparathroidism causes Tetany?
4. Why lesion in basal ganglia causes Parkinsonism?
5. Why long distance air travel leads to "Jet lag" phenomena?
6. How Oral Contraceptive pills prevent the pregnancy?

Q. 4. **Short notes (any 3 out of 4) (5 marks each)** **(5×3=15)**

1. Functions of Autonomic Nervous System
2. Menstrual cycle
3. Organ of Corti
4. Functions of Hypothalamus

Section - "C"

Q. 5. **Short notes:- (any 4 out of 5) (5 marks each)** **(5×4=20)**

1. Functions of Thalamus.
2. Functions of Cerebellum
3. Myopia
4. Mechanisms of Heat Loss
5. Wallerian Degeneration

Q. 6. **Short Notes:- (4 out of 5) (5 marks each)** **(5×4=20)**

1. Clinical features of Diabetes Mellitus
2. Empathy in the Doctor-Patient relationship
3. Consequences of sedentary life style.
4. Management of hearing loss.
5. EEG changes during NREM sleep
