

First Professional MBBS Degree Regular/Supplementary Examinations July 2024 Physiology - Paper II

Time: 3 Hours

Total Marks: 100

- Answer all questions to the point neatly and legibly • Do not leave any blank pages between answers
- Indicate the question number correctly for the answer in the margin space
- Answer all parts of a single question together • Leave sufficient space between answers
- Draw table/diagrams/flow charts wherever necessary

1. Multiple Choice Questions

(1x20=20)

The Answers to MCQ questions (Q.No. i to Q.No. xx) shall be written continuously on the first two writing sheets (ie Page No. 3 & 4) only

Question numbers i-v are case scenario-based questions:

A 40-year-old female patient complains of excessive sweating, weight loss and muscle weakness for the past three months. The patient also complains of inability to sleep & extreme fatigue. On examination, the physician found a heart rate of 100 beats/ minute and fine tremors in the hands.

- Which of the following statements are **TRUE** about the above clinical condition
 - Mostly due to autoantibodies against TSH receptor
 - Toxic adenomas are the most common cause
 - There is a transient decrease in thyroid hormone
 - The patient will have cold intolerance
- The mineral essential for the normal biosynthesis of thyroid hormone is.....
 - Iron
 - Iodine
 - Zinc
 - Selenium
- The most accurate diagnostic test the physician would suggest to confirm his diagnosis is the measurement of
 - Thyroid-stimulating hormone
 - Thyroid stimulating immunoglobulins
 - Tri-iodothyronine
 - Free thyroxine
- The muscle weakness in this condition is due to increased
 - Synaptic excitability
 - Neuronal hyperexcitability
 - Protein catabolism
 - Glucose breakdown
- Deficiency of the thyroid hormone results in the following effects on female reproductive function
 - Amenorrhoea
 - Menorrhagia
 - Oligomenorrhoea
 - Normal menstrual cycle

For Questions vi-x there are two statements marked as - Assertion (A) and Reason (R). Mark your answer as per the options provided

- (A): Vitamin A is required for the formation of new 11 cis-retinal in the retina
(R): Night blindness occurs in patients with severe Vitamin A deficiency
 - Both A & R are correct and R is the reason for A
 - A is correct R is incorrect
 - A is incorrect R is correct
 - Both A & R are correct but R is not reason for A
- (A): Tabes dorsalis is characterized by loss of joint position sense
(R): The loss of joint sense in tabes dorsalis is due to bilateral degeneration of posterior nerve roots.
 - Both A & R are correct and R is the reason for A
 - Both A & R are correct but R is not reason for A
 - A is correct R is incorrect
 - A is incorrect R is correct
- (A): Somatomedins are released from hepatocytes
(R): Somatomedins mediate all the metabolic effects of growth hormone
 - A is correct R is incorrect
 - Both A & R are correct and R is the reason for A
 - A is incorrect R is correct
 - Both A & R are correct but R is not reason for A
- (A): In skeletal muscle, the neurotransmitter released by exocytosis excites the end plate membrane
(R): Botulinum toxin facilitates this neuromuscular transmission
 - Both A & R are correct and R is the reason for A
 - Both A & R are correct but R is not reason for A
 - A is correct R is incorrect
 - A is incorrect R is correct
- (A): Luteinizing Hormone (LH) surge results from negative feedback effects by estrogen
(R): LH surge is necessary for ovulation
 - Both A & R are correct and R is the reason for A
 - Both A & R are correct but R is not reason for A
 - A is correct R is incorrect
 - A is incorrect R is correct

Question numbers xi-xv are multiple response type questions. Read the statements and mark the answers appropriately.

- Extracellular fluid in adults differs from intracellular fluid in that its
 - Tonicity is lower
 - Lesser volume
 - 1, 2 and 3
 - 2, 3 and 4
 - Anions are mainly inorganic
 - pH is higher
- 1, 3 and 4
- 2, 3 and 4
- 1, 2 and 4

(PTO)

xii. The characteristic features of the upper motor neuron type of paralysis are

1) Spastic paralysis	3) Extensor plantar response		
2) Hypotonia	4) Exaggerated deep tendon reflexes		
a) 1, 3 and 4	b) 2, 3 and 4	c) 1, 2 and 3	d) 1, 2 and 4

xiii. During accommodation to a near object, all the following statements are **TRUE**

1) Lens assumes a more convex shape	3) Dilatation of pupils due to sympathetic stimulation		
2) Convergence of axis of eyeball	4) Contraction of the medial rectus muscle of the eye		
a) 1, 2 and 3	b) 2, 3 and 4	c) 1, 3 and 4	d) 1, 2 and 4

xiv. Saltatory conduction

1) It occurs only in myelinated fibers			
2) It does not depend on ionic conduction at the Nodes of Ranvier			
3) It has a slower velocity in cold than in warm conditions			
4) Transmits impulses with a velocity proportional to fiber diameter			
a) 1, 2 and 3	b) 2, 3 and 4	c) 1, 3 and 4	d) 1, 2 and 4

xv. In a typical "fight or flight response," there will be

1) Dilatation of pupils	2) Tachycardia	3) Vasoconstriction	4) Hypotension
a) 1, 2 and 3	b) 2, 3 and 4	c) 1, 3 and 4	d) 1, 2 and 4

Questions xvi-xx are single response type questions

Long essays

$$(2 \times 10 = 20)$$

2. A 15 year old boy presents with sudden onset of severe pain around the umbilicus, radiating to the right iliac fossa. He also has fever and nausea.

- Explain any two theories that explain the basis of this type of pain.
- Explain the pathways of pain with a neat labelled diagram.
- Explain the supraspinal analgesia mechanism that modulates pain perception (3+4+3)

3. What is the normal serum calcium level. Describe the calcium homeostasis in our body. Describe the physiological basis for tetany. (1+6+3)

Short Essays

$$(6 \times 6 = 36)$$

4. Explain the functions of middle ear.
5. Explain the molecular mechanism of skeletal muscle contraction.
6. Describe the errors of refraction.

(4+2)

7. Explain the basis of clinical features of Parkinsonism with the help of basal ganglia circuits.
8. Explain the anti-inflammatory and immunosuppressive actions of cortisol. Add a note on cushings syndrome (3+3)
9. Describe the changes that occur in the uterine endometrium during the menstrual cycle with the hormonal basis.

Short Answers

$$(6 \times 4 = 24)$$

10. Describe the degenerative changes that occur following peripheral nerve injury.
11. Depict the types of active transport with suitable examples.
12. Draw and label the feto-placental unit. Describe its significance.
13. Enumerate the critical components of the doctor-patient relationship.
14. Explain the role of the hypothalamus in the regulation of food intake.
15. Describe the physiological basis for cretinism.
