Q.P. Code: 114001 Reg. no.: .....

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.

i. Which of the following statements are **TRUE** about the above clinical condition
   a) Mostly due to autoantibodies against TSH receptor
   b) Toxic adenomas are the most common cause
   c) There is a transient decrease in thyroid hormone
   d) The patient will have cold intolerance

ii. The mineral essential for the normal biosynthesis of thyroid hormone is.....
   a) Iron b) Iodine c) Zinc d) Selenium

iii. The most accurate diagnostic test the physician would suggest to confirm his diagnosis is the measurement of .....
   a) Thyroid-stimulating hormone
   b) Thyroid stimulating immunoglobulins
   c) Tri-iodothyronine
   d) Free thyroxine

iv. The muscle weakness in this condition is due to increased
   a) Synaptic excitability
   b) Neuronal hyperexcitability
   c) Protein catabolism
   d) Glucose breakdown

v. Deficiency of the thyroid hormone results in the following effects on female reproductive function
   a) Amenorrhoea
   b) Menorrhagia
   c) Oligomenorrhoea
   d) 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

vi. (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
   a) Both A & R are correct and R is the reason for A
   b) A is incorrect R is correct
   c) A is correct R is incorrect
   d) Both A & R are correct but R is not reason for A

vii. (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.
   a) Both A & R are correct and R is the reason for A
   b) Both A & R are correct but R is not reason for A
   c) A is correct R is incorrect
   d) A is incorrect R is correct

viii. (A): Somatomedins are released from hepatocytes
   (R): Somatomedins mediate all the metabolic effects of growth hormone
   a) A is correct R is incorrect
   b) Both A & R are correct but R is not reason for A
   c) Both A & R are correct and R is the reason for A
   d) A is incorrect R is correct

ix. (A): In skeletal muscle, the neurotransmitter released by exocytosis excites the end plate membrane
   (R): Botulinum toxin facilitates this neuromuscular transmission
   a) Both A & R are correct and R is the reason for A
   b) Both A & R are correct but R is not reason for A
   c) A is correct R is incorrect
   d) A is incorrect R is correct

x. (A): Luteinizing Hormone (LH) surge results from negative feedback effects by estrogen
   (R): LH surge is necessary for ovulation
   a) Both A & R are correct and R is the reason for A
   b) Both A & R are correct but R is not reason for A
   c) A is correct R is incorrect
   d) A is incorrect R is correct

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

xi. Extracellular fluid in adults differs from intracellular fluid in that its
   1) Tonicity is lower
   2) Lesser volume
   3) Anions are mainly inorganic
   4) pH is higher
   a) 1, 2 and 3 b) 2, 3 and 4 c) 1, 3 and 4 d) 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

xvi. In what way does the 21st day of the menstrual cycle differ from the seventh day
a) Thin endometrium c) High plasma progesterone level
b) Low endometrial glycogen d) High plasma FSH level

xvii. Where is the most likely site of lesion when the light reflex is present, and the accommodation reflex is absent
a) Pretectal nucleus c) Edinger-Westphal Nucleus
b) Retinal ganglion cells d) Visual cortex

xviii. What is the likely clinical feature below the level of the lesion in right hemi-section of the spinal cord at C7 level
a) Loss of pain sensation in the right leg c) Loss of conscious proprioception in left leg
b) UMN paralysis in the right leg d) Respiratory failure

xix. The following cranial nerve **DOES NOT** transmit the taste sensations from tongue to brain
a) Facial b) Hypoglossal c) Glossopharyngeal d) Vagus

xx. Which of the following pathways is responsible for conscious perception
a) Dorsal spinocerebellar c) Dorsal column- Medial lemniscus
b) Ventral spinocerebellar d) Spinothalamic

Long essays **(2x10=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.
   a) Explain any two theories that explain the basis of this type of pain.
   b) Explain the pathways of pain with a neat labelled diagram.
   c) 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 **(6x6=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 **(6x4=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.

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