2019 Scheme

Q.P. Code: 113001 **Reg. no.: .....**

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

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 28-year-old female patient, Mrs. Radha, visits her Physician with complaints of extreme tiredness over the past six months. She has become breathless on exertion in the past few days. Her feet have become numb, and she has started to become unsteady. On examination, her conjunctiva is pale, and her pulse rate is 114 beats/ minute. She has sensory loss in a glove and stocking distribution with a severe loss of joint position sense. Answer the following questions based on this scenario.

i. The Physician would suggest an assay of which dietary constituent to confirm his diagnosis.
   a) Iron
   b) Ferritin
   c) Vitamin B_{12}
   d) Vitamin C

ii. Which of the following is **TRUE** regarding the above clinical condition
   a) The mean corpuscular volume is less than 80 fl
   b) Failure of final maturation of RBC is the primary pathology here
   c) It can be treated by replacement of iron
   d) RBCs have different shapes and size

iii. The basis of breathlessness on exertion in this patient is
   a) Tissue hypoxia as oxygen supply cannot meet the excessive oxygen demand
   b) Decreased cardiac output
   c) Increased cardiac workload
   d) Increased stimulation of respiratory centers

iv. Which of the following RBC indices will be the most reliable indicator for diagnosing hematological disorders
   a) Mean Corpuscular Volume
   b) Mean Corpuscular Hemoglobin
   c) Mean Corpuscular Hemoglobin concentration
   d) Color Index

v. Which of the hemodynamic parameters is known to **INCREASE** in the above clinical condition
   a) Cardiac output
   b) Blood viscosity
   c) Peripheral resistance
   d) Oxygen carrying capacity

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

vi. (A): Parasympathetic stimulation slows the cardiac conduction
(R): Acetylcholine released at vagal endings decreases the excitability of AV fibers

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

vii. (A): Proximal tubular cells have a large number of tight junctions
(R): 80% of the sodium filtered is reabsorbed in the proximal convoluted tubule
a) Both A & R are correct but R is not reason for A
b) Both A & R are correct and R is the reason for A
c) A is correct R is incorrect
d) A is incorrect R is correct

viii. (A): Biot's breathing is an irregularly irregular breathing pattern
(R): It is caused by diabetic ketoacidosis
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

ix. (A): The pattern of motor activity in the gastrointestinal tract during the fed state is called the migratory motor complex
(R): Motilin is mainly responsible for migratory motor complex
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): Nitrogen Narcosis occurs at high nitrogen pressures at about 120 feet depth
(R): Nitrogen narcosis has features similar to alcohol intoxication
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. The first heart sound corresponds in time with
1. Closure of the atrioventricular valves.
2. The P wave of the electrocardiogram
3. A fall in atrial pressure
4. A rise in ventricular pressure
a) 1, 2 and 3
b) 2, 3 and 4
c) 1, 3 and 4
d) 1, 2 and 4

xii. Juxtaglomerular apparatus consists of the following structures
1. Mesangial cells
2. Juxtaglomerular cells
3. Principal cells
4. Macula densa
a) 1, 2 and 3
b) 2, 3 and 4
c) 1, 3 and 4
d) 1, 2 and 4

xiii. Loss of pulmonary elastic tissue in 'emphysema' reduces
1. Physiological dead space
2. Gas exchange
3. Vital capacity
4. Forced expiratory volume in 1st second
a) 1, 2 and 3
b) 2, 3 and 4
c) 1, 3 and 4
d) 1, 2 and 4

xiv. Which of the following are the physiological actions of Cholecystokinin-Pancreozymin
1. Relaxation of the lower esophageal sphincter
2. Gall bladder contraction
3. Increased pancreatic secretion
4. Increased gastric secretion
a) 1, 2 and 3
b) 2, 3 and 4
c) 1, 3 and 4
d) 1, 2 and 4

xv. Surgical removal of 90 percent of the small intestine may cause a decrease in
1. Bone mineralization (osteomalacia)
2. The fat content of the stools
3. Blood hemoglobin level
4. Body weight
a) 1, 2 and 3
b) 2, 3 and 4
c) 1, 3 and 4
d) 1, 2 and 4

Question numbers xvi-xx are single response type questions

xvi. A laboratory report showing normal clotting time with an increased bleeding time is associated with
a) Hemophilia A
b) Thrombocytopenia purpura
c) Christmas disease
d) Vitamin K deficiency

xvii. The ECG changes in First degree Heart Block shows
a) Prolonged QT interval
b) Prolonged PR interval
c) ST-segment elevation
d) ST segment depression

xviii. Chloride ions are exchanged with one of the following ions during the chloride shift.
a) Hydrogen
b) Calcium
c) Sodium
d) Bicarbonate

xix. Cholagogues are substances that cause.....
a) Contraction of gallbladder
b) Increase bile secretion
c) Concentrate bile
d) Acidify bile

xx. The prime driving force for a counter current multiplier system is .....
a) Urea recycling
b) Medullary hyperosmolarity
c) Action of ADH in collecting duct
d) Sodium reabsorption in thick ascending loop of Henle

Long essays **(2x10=20)**

2. A 25 year old male nurse reported to the medicine department complaining of chronic cough with sputum and fever with night sweats for the past 6 months, which is not relieved with routine antibiotic therapy. His lab report showed: Total WBC-13000/cumm^3, N- 32%, L-55%, M-8%, E-4%, B-1%, ESR-50. Chest x-rays showed cavities
   a) Name the most probable clinical condition (1)
   b) Comment on the ESR of this patient and describe the physiological basis for that (1+3)
   c) Describe cell mediated immunity (4)
   d) List the functions of lymph (1)
3. Mention the location of neural centers that regulate respiration. Describe the interaction between the various neural centers in regulation of respiration. Explain the effect of the transection at different levels in the brainstem. (2+4+4)

Short Essays: **(6x6=36)**

4. Describe the baroreceptor response to high blood pressure.
5. Describe the mechanism of clotting in glass tubes during blood collection.
6. Describe water reabsorption in the different parts of nephron. Explain the role of hormones in water reabsorption. (4+2)
7. Describe the regulation of the different phases of gastric secretion.
8. A two-day-old newborn child had severe pallor and jaundice on examination. The mother reveals a history of previous miscarriages, and her blood group was "O" negative. What is the most probable reason for this clinical condition. Write briefly on the skills needed to educate the family about this clinical condition. (1+5)
9. Explain the role of dynamic lung function tests in the diagnosis of respiratory disorders.

Short Answers **(6x4=24)**

10. Describe various physiological mechanisms that operate in response to heat.
11. Explain the physiologic basis of vagotomy in the treatment of peptic ulcer.
12. Describe physiological mechanisms to reduce the effects of hypoxia in natives of high altitude.
13. With the help of a neat, labelled diagram depict the factors that prevent accumulation of excess fluid in the interstitium.
14. Describe the mechanisms regulating glomerular filtration rate.
15. With the help of a neat labelled diagram depict the physiological basis for ECG changes in acute myocardial infarction.

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