

001/25

The West Bengal University of Health Sciences
MBBS 1st Professional Examination (New Regulation),
October-November 2025

Subject: Physiology

Full Marks: 100

Paper: I

Time: 3 hours

Attempt all questions. The figures in the margin indicate full marks.

1. A 20-year old male was brought to the emergency department following a road traffic accident with history of blood loss. On examination pulse was rapid and thready, BP was 60/40 mm Hg, skin was cold and clammy. 2+4+6+3

- i. What was the type of shock the patient was suffering from?
- ii. What are the different types of shock? Give example of each type.
- iii. Explain the homeostatic mechanism that came into play as life saving measures for this patient.
- iv. State the physiological basis of treatment of above patient.

2. Explain the following statements:

5x3

- i) Biconcave shape of RBC is advantageous.
- ii) A patient with chronic pancreatitis suffers from impaired digestion of proteins and fats.
- iii) Depolarization of nerve action potential stops at +35 mv and does not reach sodium equilibrium potential.
- iv) Pulmonary TB commonly affects lung apex.
- v) Heart muscle can not be tetanised.

3. Short questions (Applied aspect):

4x5

- i) Why Na^+K^+ ATPase pump is important in maintaining cell volume?
- ii) Cardiovascular, respiratory and metabolic changes associated with regular exercise.
- iii) What is the pathophysiology behind coagulation disorder in obstructive jaundice?
- iv) Why babies born prematurely may suffer from respiratory distress and oxygen should be given to them with caution?

4. Short notes:

3x6

- i) Components of liver function tests with their significance.
- ii) Rh-incompatible Pregnancy and its consequences.
- iii) Neural centres in respiratory regulation.

5. Write short notes on the following:

4x5

- i) Migrating motor complex.
- ii) Movement of Large intestine.
- iii) Define AETCOM and explain how effective communication impacts doctor patient relationship.
- iv) Physiological effects of meditation.

6. Choose the correct option among each of the following:

12x1

- i) A 24 year old female patient complains of fluctuating weakness of skeletal muscle, double vision, dropping of eyelids, which are aggravated in the afternoon. Most likely she is suffering from:
a) Myxoedema b) Shellfish poisoning c) Graves' disease d) Myasthenia Gravis

- ii) A 23 year old mountaineer develops headache, fatigue and nausea at 12000 feet. What is the likely cause?
- a) Respiratory centre dysfunction
 - b) Decreased arterial pO₂
 - c) Metabolic alkalosis
 - d) Pulmonary hypotension
- iii) A 16 year old girl attended emergency with acute respiratory distress. She had taken some sea-food just before the attack. All of the following are true except:
- a) This is a type I immune hypersensitivity reaction.
 - b) Subcutaneous Adrenalin injection is the treatment of choice.
 - c) Pulmonary function test will establish the diagnosis.
 - d) Steroids are used in treatment of this case.
- iv) A new-born baby was detected having central cyanosis. In which of the following cardiac conditions is it likely to be seen?
- a) Atrial Septal defect
 - b) Ventricular Septal defect
 - c) Mitral stenosis
 - d) Tetralogy of Fallot
- v) A 20-year old student consumes a glucose-rich drink. Glucose is rapidly absorbed through the intestinal epithelial cells into the blood, even though the glucose concentration inside the cells is already high. Which transport mechanism is most likely responsible for glucose absorption into the intestinal epithelial cells?
- a) Simple diffusion through lipid bilayer
 - b) Facilitated diffusion using GLUT2 transporters
 - c) Primary active transport using ATP
 - d) Secondary active transport with Na⁺Co-transport
- vi) A 25 year old male with liver cirrhosis presents with abdominal distension. Physical examination confirms ascites. Lab investigations reveal markedly low serum albumin levels. Which of the following best explains the development of ascites in this patient?
- a) Increased hydrostatic pressure in hepatic veins.
 - b) Decreased plasma oncotic pressure due to hypoalbuminemia.
 - c) Increased capillary permeability due to inflammation.
 - d) Excessive synthesis of clotting proteins.
- vii) A 45-year-old man presents with difficulty in swallowing (dysphagia). Barium swallow reveals failure of lower oesophageal sphincter to relax and absence of peristalsis in the lower Oesophagus. Which condition and physiological mechanism are most likely involved here?
- a) Gastroesophageal Reflux; Increased gastric acid secretion.
 - b) Achalasia Cardia; Defective myenteric plexus.
 - c) Peptic ulcer; Loss of mucosal barrier.
 - d) Zollinger-Ellison syndrome; Excessive secretion of Gastrin.
- viii) If cardiac output is 5L/min and body surface area is 1.5m², cardiac index is equal to:
- a) 4.3L/min/m²
 - b) 3.3L/min/m²
 - c) 2.5L/min/m²
 - d) 5.3L/min/m²
- ix) A 44 year old actress wanted to reduce her facial wrinkles. Which of the following may be used?
- a) Bungarotoxin
 - b) Curare
 - c) Botulinum toxin
 - d) Succinyl choline
- x) A patient has a dead space of 150 ml, functional residual capacity of 3L, tidal volume of 650ml, expiratory reserve volume of 1.5L, total lung capacity of 8L, and respiratory rate of 15 breaths/min. What is the residual volume?
- a) 500ml
 - b) 1000ml
 - c) 1500ml
 - d) 2500ml
- xi) A 60 year old patient suffering from heart failure showed alternate phases of apnoea and hyperpnoea. This type of breathing is called:
- a) Biot's breathing
 - b) Apneustic breathing
 - c) Cheyne-Stokes breathing
 - d) Oxygen debt
- xii) A 45 year old diabetic patient suffering from chest pain on exertion was prescribed 75mg Aspirin daily to:
- a) Reduce chest pain
 - b) Improve diabetic control
 - c) Reduce risk of Myocardial Infarction
 - d) Delay the process of atherosclerosis