



001/24

The West Bengal University of Health Sciences
MBBS 1st Professional Examination ((New Regulations),
August 2024

Full Marks: 100

Time: 3 hours

Subject: Physiology

Paper: I

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

1. a) A 73 year old male patient presented with dyspnoea on climbing the staircase and difficulty in talking for last 3 months. He had difficulty in breathing while lying down. On examination, jugular venous pulse (JVP) was raised, liver was palpable and had pedal edema. 1+4+5+4+1
 - i) What is the condition from which the elderly person is suffering?
 - ii) Define cardiac output and cardiac index mentioning their normal values.
 - iii) Elucidate the factors that control cardiac output.
 - iv) Briefly explain heterometric regulation of cardiac output.
 - v) Mention a non-invasive method of determining cardiac output.
- b) A 35 year old male is brought to the emergency department with complaints of headache, weakness, shortness of breath, nausea and vomiting. He was working in a factory where Carbon monoxide (CO) leakage was suspected.
 - i) Which type of hypoxia must have occurred in this case?
 - ii) What are the features in this type of hypoxia?
 - iii) Define and classify hypoxia.
 - iv) Draw the normal Oxygen hemoglobin dissociation curve and show the change that occurs in case of CO poisoning and explain why this shift happens. 1+3+5+6
2. a) A 12 year old boy sustained an injury to his leg while playing football and started bleeding from the site of injury. Explain the steps involved in the spontaneous arrest of this bleeding. Describe the definitive arrest of the bleeding. 5+5
- b) What is a sarcomere? Describe the banding pattern in a sarcomere with a diagram. Briefly describe the mechanism of contraction of a skeletal muscle with a flowchart. 1+3+1+5
- c) Write down the steps of gastric emptying. Describe the factors that regulate gastric emptying. Delay in gastric emptying helps in digestion absorption process- Justify. 4+4+2
3. Write short notes on the following: 2x5
 - a) Starling forces.
 - b) The attributes of Indian Medical Graduate as defined by National Medical Commission.
4. Explain the following statements: 5x4
 - a) Level of albumin is the most important factor that contributes to colloidal osmotic tension.
 - b) About 20% of bile pigments are reabsorbed by body even though it is a metabolic waste product.
 - c) Fetus does not evoke any immunological response in mother.
 - d) Shaking of injured finger decrease pain perception.
 - e) Coronary blood flow decreases in massive pericardial effusion.

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5. Choose the correct option for each of the following.
- i) One of the following statements is true about hemolytic disease of the newborn:
- a) Affects mainly babies of Rh-positive mothers.
 - b) Occurs mainly in babies who have D antigen on their RBC.
 - c) Can be treated by transfusing the affected baby with Rh-positive blood.
 - d) Can be prevented by injecting the mother with Anti-D agglutinins just after delivery.
- ii) Rejection of liver transplant is prevented by all of the following methods except:
- a) Treatment which reduces the blood lymphocyte count.
 - b) Keeping the recipient in a germ-free environment.
 - c) Drug treatment which inhibits cell division.
 - d) Transplanting between identical twins.
- iii) Platelet count reduces in Dengue fever due to all of the following except:
- a) Decreased platelet aggregation.
 - b) Bone marrow suppression.
 - c) Immune mediated destruction.
 - d) Decreased platelet activation.
- iv) The effect which protects the heart against volume and pressure overload in the veins, atria and pulmonary circulation is the:
- a) Bainbridge reflex.
 - b) Baroreceptor reflex.
 - c) Marey's law.
 - d) Bezold – Jarish reflex.
- v) One of the following increases airway resistance:
- a) Sympathetic stimulation.
 - b) Elastic recoil of chest wall.
 - c) Negative intra thoracic pressure.
 - d) Forced expiration.
- vi) The primary force moving water molecules from the blood plasma to the interstitial fluid is:
- a) Active transport.
 - b) Facilitated diffusion.
 - c) Filtration.
 - d) Co-transport with sodium.
- vii) Compensatory mechanism for hypovolemic shock include all except
- a) Increased Epinephrine secretion from adrenal medulla.
 - b) Increased Atrial Natriuretic Peptide secretion.
 - c) Renin Angiotensin Aldosterone System activation.
 - d) Sympathetic nerve stimulation.
- viii) Fall in DBP in severe exercise occurs due to all of the following except:
- a) Sympathetic vasodilator fibres.
 - b) Parasympathetic vasodilator fibres.
 - c) Stimulation of β_2 receptors in blood vessels of skeletal muscles.
 - d) Accumulation of metabolites.
- ix) Which of the following is not found in denervation of skeletal muscle?
- a) Atrophy of the muscle.
 - b) Flaccid paralysis.
 - c) Fibrillation.
 - d) Fasciculation.
- x) A 24 year old female patient complains of fluctuating weakness and double vision for last 3 weeks. She has noticed difficulty in lifting objects and getting out of bed. She denies muscle pain. The symptoms become worse in afternoon. The most probable diagnosis is:
- a) Botulinum toxin poisoning.
 - b) Myasthenia Gravis.
 - c) Lambert Eaton syndrome.
 - d) Paralytic Shellfish poisoning.