

001/22

**The West Bengal University of Health Sciences**  
**MBBS 1<sup>st</sup> Professional Examination (New Regulation),**  
**February - March 2022**

Subject: Physiology

Full Marks: 100

Paper: I

Time: 3 hours

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

1. a) A 66 year old male sought medical care at the hospital due to severe chest pain lasting for 24 hours. The patient was aware of being hypertensive and was a smoker. The ECG disclosed extensive ongoing anterior acute myocardial infarction, an inactive area in the inferior wall; the presence of ST-elevation at V1 to V5 and ST depression in leads I, II, and aVF; ST elevation in aVR.
  - i) What is myocardial infarction?
  - ii) Write in brief about PR interval and the different changes that occur in different types of heart block in correlation to ECG. Add a note on sinus arrhythmia
  - iii) Describe in brief the long-term mechanisms involved in the regulation of blood pressure.
  - iv) Enumerate the changes in ECG with changes in ionic composition of blood.

2+(4+2)+5+2
- b) Draw a schematic diagram of erythrocyte membrane and label the different components of it. How the shape of this corpuscle is maintained? Define and explain the osmotic fragility. What is hereditary spherocytosis?
 

5+4+4+2
2. a) Differentiate between innate and acquired immunity. Write an account on B and T lymphocytes. Discuss how B lymphocytes are playing important role in the regulation of humoral immunity.
 

3+3+4
- b) Draw and describe the oxygen-haemoglobin dissociation curve. List the factors that shift the curve, and comment on the physiological significance.
 

5+5
- c) Enumerate various functions of liver. Give an account of bile salts and explain their role in digestion of fat.
 

5+5
3. Write a short note on the following:
 

2x5

  - a) What is meant by a "DOCTOR".
  - b) Megaloblastic anaemia.
4. Explain the following statements:
 

5x4

  - a) Pancreas is not digested by powerful protein splitting enzymes secreted from it.
  - b) Normal cell volume and pressure depends on Na<sup>+</sup>K<sup>+</sup>ATPase.
  - c) Coronary perfusion decreases with increasing heart rate.
  - d) Muscle is a machine for converting chemical into mechanical energy.
  - e) Hematocrit of the venous blood is more than that of arterial blood.
5. Choose the correct option in each of the following:
 

10x1

  - i) Diastolic blood pressure depends on :
    - a) Venous compliance.
    - b) Velocity of blood flow.
    - c) Peripheral resistance.
    - d) Cardiac contractility.

- ii) All are coagulation factors except:
  - a) Calcium ion.
  - b) Calmodulin.
  - c) Prothrombin.
  - d) Kininogen.
- iii) The main determinant of coronary blood flow is-
  - a) Hypoxia.
  - b) Potassium ion.
  - c) Bicarbonate ion.
  - d) Adenosine.
- iv) If transport of  $Ca^{++}$  into the sarcoplasmic reticulum is inhibited, the resulting continuous contraction is called:
  - a) Summation of contraction.
  - b) Complete tetanus.
  - c) Incomplete tetanus.
  - d) Contracture.
- v) Parasympathetic stimulation to the gut leads to all except:
  - a) Increased glandular secretion.
  - b) Sphincteric constriction.
  - c) Increased motility.
  - d) Proper digestion.
- vi) Which type of hypoxia does not stimulate peripheral chemo receptors?
  - a) Hypoxic hypoxia.
  - b) Anaemic hypoxia.
  - c) Histotoxic hypoxia.
  - d) Stagnant hypoxia.
- vii) Acetylcholine acts in the neuromuscular junction of skeletal muscle on :
  - a) Alpha receptor.
  - b) M1 muscarinic receptor.
  - c) Nn nicotinic receptor.
  - d) Nm nicotinic receptor.
- viii) Exocytosis, is best described by the following example of:
  - a) Phagocytosis.
  - b) Pinocytosis.
  - c) Receptor-mediated invagination.
  - d) Secretory vesicle fusion and content release.
- ix) Following are the constituents of Plasma Protein except:
  - a) Coagulation factor proteins.
  - b) Ankyrin.
  - c) Fibrinolytic system.
  - d) Ceruloplasmin.
- x) The law governing the pulmonary gas exchange, includes all of the following factors except :
  - a) Haemoglobin concentration of the pulmonary blood.
  - b) Solubility of the gas.
  - c) Available surface area of the blood-gas-barrier.
  - d) Thickness of the blood-gas-barrier.