

001/22

The West Bengal University of Health Sciences
MBBS 1st 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:
a) What is meant by a "DOCTOR".
b) Megaloblastic anaemia.

2x5
4. Explain the following statements:
a) Pancreas is not digested by powerful protein splitting enzymes secreted from it.
b) Normal cell volume and pressure depends on Na⁺K⁺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.

5x4
5. Choose the correct option in each of the following:
i) Diastolic blood pressure depends on :
a) Venous compliance.
b) Velocity of blood flow.
c) Peripheral resistance.
d) Cardiac contractility.

10x1

- 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.