

Time Allowed : 3 Hours

PHYSIOLOGY - PAPER-I

Full Marks : 200

If the questions attempted are in excess of the prescribed number, only the questions attempted first up to the prescribed number shall be valued and the remaining ones ignored.

Answers may be given either in English or in Bengali but all answers must be in one and the same language.

GROUP - A (Any Three)

- 1a) Explain Henderson-Hasselbalch equation and its significance. (10)
 - b) Discuss the factors affecting the buffer capacity of a solution. (10)
 - c) Discuss the role of lungs and kidney in the regulation of blood pH. (10)
 - d) State the laws of Osmosis. (5)
 - e) State the characteristics of carrier-mediated transport with examples. (5)
- 2a) Name the different types of lipoproteins. Why HDL is called protective lipoproteins?(10)
 - b) Name the essential amino acids and their physiological importance. (10)
 - c) Discuss the various types of lipids found in membranes with their significance. (10)
 - d) Explain why high level of lipids are responsible for coronary heart diseases? (10)
- 3a) Discuss the regulatory role of HMG-CoA reductase in cholesterol biosynthesis. (10)
 - b) TCA cycle is a metabolic integrator in our body - Discuss. (10)
 - c) How fatty acid synthesis and breakdown takes place in our body? (10)
 - d) Discuss the biochemical reactions and significance of HMP-pathway. (10)
- 4a) Explain with two examples : inborn errors of metabolism. (10)
 - b) Explain the role of food guide pyramid in the preparation of healthy diets. (10)
 - c) Mention the values of two Zn-containing food items. Mention the physiological role and deficiency symptoms of Zn in our body. (10)
 - d) Mention the normal blood level (with units) of the followings : i) Sugar ii) Cholesterol iii) Urea iv) Uric acid v) Protein (2x5=10)
- 5a) Discuss the role of iron, folic acid, vitamin B12 in anemia. (10)
 - b) Discuss the synthesis of haem in human body. (10)
 - c) How you can separate plasma protein in the laboratory? (10)
 - d) Mention the clinical significance of glycosylated haemoglobin. (5)
 - e) What is erythroblastosis foetalis? (5)

GROUP - B (Any Two)

- 6a) State and explain Poiseuille's law and Einthoven's law. (10)
 - b) Discuss pulmonary blood circulation with a flow diagram. (10)
 - c) Compare the properties of cardiac muscle and smooth muscle. (10)
 - d) What is angina pectoris and acute myocardial infarction? (10)
- 7a) State and explain Bohr's effect and Halden's effect. (10)
 - b) Discuss the role of sino-aortic mechanism in the regulation of blood pressure. (10)
 - c) Discuss the neural regulation of heart rate. (10)
 - d) Discuss the role of vagus nerve on heart. What is vagal escape? (10)
- 8a) Compare oxygen and carbon-dioxide dissociation curve. (10)
 - b) State the physiological significance of vital capacity and lung function test. (10)
 - c) Discuss the mechanics of breathing. (10)
 - d) Discuss the chemical control of respiration. (10)
- 9a) Discuss the mechanism of absorption of glucose and sodium by the renal tubules. (10)
 - b) State the normal values of the following in urine (with units): i) nitrogen (total) ii) Urea iii) creatine iv) creatinine v) uric acid (2x5=10)
 - c) Discuss the factors controlling volume of urine. (10)
 - d) Discuss the mechanism of micturition with special reference to : i) role of centers ii) role of reflexes (10)