

2021

PHYSIOLOGY

PAPER-I

Time Allowed — 3 Hours

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 same language.*

Group-A

Answer any six questions.

1. (a) Explain briefly Vant-Hoff's Laws of osmotic pressure.
(b) Distinguish between isotonic and iso-osmotic solutions.
(c) State the significance of osmotic pressure in the human body. 10+6+4=20
2. (a) What is a buffer? Give example.
(b) Name the buffers present in blood.
(c) Explain isoelectric pH with example.
(d) Explain Handerson-Hasselbach Equation and state its significance. (2+2)+4+4+(4+4)=20
3. (a) What is aldose-ketose isomerism?
(b) What is racemic mixture?
(c) "Glucose and galactose are epimers of each other"— explain.
(d) What are polysaccharides?
(e) Mention the differences between starch and glycogen. 4+4+4+4+4=20
4. (a) Classify lipoproteins. Explain their biological significance.
(b) What is the normal range of cholesterol level in adult plasma?
(c) State the physiological importance of cholesterol in the human body. (6+6)+2+6=20
5. (a) Classify amino acids giving suitable examples.
(b) Write down the systemic names of glycine and phenylalanine.
(c) Distinguish between nucleoside and nucleotide.
(d) What are the differences between DNA and RNA? 10+4+4+2=20

6. (a) What are the key enzymes of glycolysis?
(b) Discuss with a flow chart the oxidative phase of glycolysis, mentioning the names of the enzymes.
(c) What is substrate level phosphorylation? Give example. 4+12+(2+2)=20
7. (a) Name the substrates which produce acetyl CoA.
(b) Which is the substrate level phosphorylation step in TCA-cycle?
(c) What are the steps in TCA-cycle which release CO₂?
(d) How many ATPs are generated in one rotation of TCA-cycle? 6+4+8+2=20
8. (a) Explain with a flow chart the β-oxidation of fatty acids.
(b) What is the product of β-oxidation of odd carbon fatty acid?
(c) Calculate the numbers of ATP generated from complete oxidation of palmitic acid (16C saturated fatty acid). 12+2+6=20
9. (a) What do you mean by transamination and deamination?
(b) Name the enzymes involved in transamination.
(c) What are the physiological significances of transamination? 6+4+10=20
10. (a) Define food groups.
(b) What are the different food groups according to ICMR classification?
(c) Define balanced diet. 2+15+3=20

Group-B

Answer any four questions.

11. (a) Why blood is called a connective tissue?
(b) Classify leucocytes with a neat flow chart.
(c) What are the functions of haemoglobin?
(d) What is Lansteiner's Law?
(e) What is 'erythro blastosis foetalis'? 2+4+8+2+4=20
12. (a) Distinguish between innate and acquired (adaptive) immunity.
(b) Mention two functions of plasma proteins in the human body.
(c) What is a reticulocyte? Why is it so called?
(d) What are the advantages of biconcave shape of an erythrocyte? 6+8+4+2=20

13. (a) Why cardiac muscle is never fatigued?
(b) Define cardiac cycle.
(c) Discuss about the different phases of ventricular cycle. 4+2+14=20
14. (a) Critically discuss the ionic basis of Pacemaker potential.
(b) Draw and describe the normal human ECG waves. 10+10=20
15. (a) What is "Dead Space"?
(b) Write the definition, normal value and significance of
(i) Tidal Volume
(ii) Inspiratory Capacity
(iii) Residual Volume
(iv) Total Lung Capacity 4+(4×4)=20
16. (a) What is a glomerulus? Name the blood vessels entering and leaving it.
(b) Write briefly about the juxtaglomerular apparatus.
(c) Give a brief account of glucose reabsorption process in the renal tubules. (2+2)+6+10=20

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