2021
PHYSIOLOGY
[HONOURS]
Paper : I

Full Marks : 75 Time : 4 Hours

The figures in the right-hand margin indicate marks.
Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **five** questions from the following: 1×5=5

a) What is meant by MCHC?

b) Where in the nucleus can we find rRNA?

c) Name two coagulation hastening factors.

d) Name the amino acid which has no chiral carbon.

e) Write one important function of peroxisome.

f) Why are glucose and mannose called epimers?

g) What do you mean by pluripotent cells?

2. Answer any **six** questions from the following: 2×6=12

a) How many base pairs are present per turn of β-DNA?

b) How do coumarins act as anticoagulant?

c) Write down two physiological functions of serum albumin.

d) What is the difference between pluripotent and totipotent cells?

e) What is plasmapheresis?

f) What is the significance of MCV measurement?

g) Name four non-covalent interactions that stabilizes enzyme structure.

h) Name one reducing sugar. Why is it called so?

i) Write down two biological applications of C_{14}.

j) Give an example of covalent modification of enzyme.

3. Answer any **three** questions from the following: 6×3=18

a) Explain the process of myelinogenesis in CNS and PNS. 6

b) Discuss the cause of hemolytic disease of the newborn due to Rh incompatibility. Write one preventive measure. 4+2=6

c) What are the structural differences between the α-helix and the β-pleated sheet of protein? 6

d) What is the T- and R-state of haemoglobin? Discuss the role of biphosphoglycerate in haemoglobin functioning. 2+4=6

e) State the second law of Thermodynamics. How does this law fit into the body in a thermodynamic system? 2+4=6

4. Answer any **four** questions from the following: 10×4=40

a) i) How the conduction velocity of nerve impulse in sensory nerve fiber are affected by myelination and diameter of nerve fibers?

ii) Write down important functions of lymph in our body.

iii) What is erythroblastosis fetalis? 5+3+2=10

b) Write short notes on: $2\frac{1}{2}\times4=10$

i) Induced fit hypothesis of enzyme-substrate binding

ii) Bicarbonate buffer system in blood

iii) Thalassemia

iv) ESR

c) i) Write down the principle of autoradiography and its biological applications.

ii) Describe the structure and function of gap junction of cells. (2+3)+(3+2)=10

d) i) What is Gibbs-Donnan equilibrium? Discuss its physiological importance.

ii) Discuss the physiological process of fibrinolysis. (2+4)+4=10

e) i) Write down the characteristic features of DNA double helix.

ii) What is the strength-duration curve of a nerve fiber? How are chronaxie and rheobase related to that curve? 5+(1+4)=10

f) i) What are the different stages of erythropoiesis? State their characteristics.

ii) Discuss different factors that regulate erythropoiesis. 6+4=10
