2018

PHYSIOLOGY

[Honours]

PAPER – I

Full Marks : 90

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

Illustrate the answers wherever necessary

GROUP – A

Answer any **two** questions, taking at least **one** from each Subgroup :　　　15 × 2

Subgroup – A(a)

1. (*a*) Give an account of ultra-structure of endoplasmic reticulum.

(b) Mention the functions of smooth and rough endoplasmic reticulum on comparative basis.

(c) Describe the events of cell cycle.   5 + 5 + 5

2. (a) Describe the biosynthetic pathway of hemoglobin.

(b) State the functions of plasma proteins.

(c) State the differences between HbA and HbF. Describe the mechanism of regulation of blood volume.   5 + 4 + (2 + 4)

3. (a) What do you mean by polybasic acid and polyacidic base ? Give one example each.

(b) Name any one plasma buffer and mention its role in blood pH regulation.

(c) What do you mean by buffer capacity ?
(2 + 2 + 2) + (1 + 5 + 3)

Subgroup — A(b)

4. (a) Describe the Watson-Crick DNA double helix model.

(b) Mention the features of different types of RNA.

(c) What is Cot value ?   7 + 5 + 3

5. (a) What do you mean by pyranose and furanose form of glucose ?

(b) What are the differences between sugar acids and sugar esters ?

(c) State the physiological importance of disaccharides.

(d) What is anomerism ? Give example.
$$(2+2)+4+4+(2+1)$$

6. (a) What is K_m ? Mention its importance.

(b) Explain the effect of substrate concentration on hyperbolic kinetics of enzyme. $(2+2)+8+3$

GROUP – B

Answer any five questions, taking at least
two questions from each Subgroup : 8×5

(4)

Subgroup – B(a)

7. (a) Describe the mechanism of receptor mediated endocytosis.

   (b) Write briefly about peroxisomes.   4 + 4

8. What is Gibbs free energy ? Write down the differences between ΔG, ΔG° and $\Delta G^{\circ\prime}$. 2+2+2+2

9. (a) What is isoelectric pH ? Mention its significance.

   (b) What is sol-gel transformation ?   (2+3)+3

10. (a) Name any one artificial anticoagulant and mention its mode of action.

    (b) Write a brief note on haemophilia.   (1 + 4) + 3

11. (a) What are microtubules ? State their roles in stabilization of the shape of the cell.

    (b) Describe the significance of reticulocyte count and platelet count.   (1 + 3) + (2 + 2)

(5)

Subgroup — B(b)

12. (a) State the principle of electrophoresis.

(b) Mention the applications of agarose gel electrophoresis.

(c) State the importance of GLC.   3+3+2

13. (a) What are the modified sugars ? Mention their importance.

(b) Why sucrose is non-reducing sugar ? 2+3+3

14. (a) What is optical isomerism ? How it can be measured ?

(b) What is epimerism ?   (1 + 5) + 2

15. (a) What is tautomerism ? Give an example of tautomer. What will happen if a tautomer is formed in nucleic acid chain ?

(b) What is rancidity and how it occurs ?
       (1 + 1 + 2) + (2 + 2)

GROUP — C

Answer any **five** questions, taking at least **two** questions from each Subgroup : 4 × 5

Subgroup — C(a)

16. (*a*) What do you mean by acid number and acetyl number ?

   (*b*) Write physiological importance of sialic acids and lectins. 2 + 2

17. What do you mean by ROS ? Gives two examples. 4

18. What is enthalpy and how it is related with thermodynamics ? 4

19. State the functions of lymph. 4

Subgroup — C(b)

20. State the clinical significance of ESR and TC of RBC. 4

21. Describe the biological importance of Gibb's Donnan membrane equilibrium. 4

22. State the physiological importance of poly-saccharides.   4

23. What is homogenization ? State the importance of density gradient centrifugation.   4

Subgroup – C(c)

24. What are noncovalent bonds and how they stabilizes protein structure ?   4

25. Write a brief note on artificial pacemaker.   4

26. Describe the reaction of proteins with Sanger's and Edman's reagent.   2 + 2

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