2019

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** question from each Subgroup : 15 × 2

Subgroup–A(*a*)

1. (*a*) Describe the ultrastructure of Golgi apparatus.

(*b*) Describe the mechanism of phagocytosis.

(*c*) State the role of gap junction in intercellular communication. What is cytoribosome ?

4 + 5 + (4 + 2)

2. (*a*) Mention the principle and application of hydrogen electrode.

(*b*) What is Henderson-Hasselbach equation ?

(*c*) Discuss the role of lungs in the regulation of pH of body fluid. (3 + 2) + 4 + 6

3. (*a*) Discuss the various derivatives of haemoglobin.

(*b*) Write a brief note on thrombosis.

(*c*) Describe the process of lymph formation on the basis of Starling's forces. State the features of lymphatic vessels. How do they maintain the lymphatic circulation ?

3 + 3 + (4 + 2 + 3)

Subgroup—A (*b*)

4. (*a*) Describe Michaelis-Menten equation with suitable diagram. How Lineweaver-Burk double reciprocal plot is obtained from this equation ?

   (*b*) What do you mean by sigmoid kinetics of enzyme action ? What are *K* and *M* series of allosteric enzymes ? $(3 + 4) + (4 + 4)$

5. (*a*) Describe the structural features of A-DNA and B-DNA.

   (*b*) Enumerate the structure of different types of RNA with special reference to cloverleaf structure of t-RNA.

   (*c*) Discuss about biuret reaction. $(3 + 3) + (2 + 2 + 3) + 2$

6. (*a*) Mention the rate limiting enzymes of the process.

   (*b*) In which form is glucose stored in the liver ? Why ?

   (*c*) What are *D* – & *L* – sugars ? $(6 + 3 + 3) + (1 + 2)$

GROUP–B

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

Subgroup–B(a)

7. (a) Define Colloids.

(b) Discuss the electrical properties of colloids and state its physiological importance. $2 + (3 + 3)$

8. (a) Discuss briefly the three laws of thermodynamics.

(b) What is Carnot's cycle ? $6 + 2$

9. What is ABO system of Blood group ? What are the hazards of blood transfusion ? $4 + 4$

10. Describe the basic principle of fluorescence microscopy and state its biomedical uses. $4 + 4$

11. Describe the structure and functions of fight and gap junction. $4 + 4$

Subgroup–B(*b*)

12. (*a*) Describe the importance of thin layer chromatography mentioning its principle.

(*b*) What is ultracentrifugation. (2 + 3) + 3

13. (*a*) What is cis-transisomerism of unsaturated fatty acid ?

(*b*) Write down the composition of phospholipids citing examples. 4 + 4

14. (*a*) Describe the α-helix structure of protein.

(*b*) Mention the importance of primary structure of protein. 5 + 3

15. Discuss the biochemical reaction that occurs when glucose reacts with phenylhydrazine. What is the significance of this reaction ? 5 + 3

16. (*a*) Describe the D and L stereoisomerism of monosaccharides. Write down the structure of α-D-glucopyranose. Write a brief note on mutarotation.

(*b*) Write down the amylose and amylopectin structure of starch.

$(4 + 2 + 3) + 3 + 3$

GROUP–C

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

Subgroup–C(*a*)

17. What do you mean by iodine number and saponification number ? $2 + 2$

18. What do you understand by essential and non-essential amino acids ? Give two examples of each. $2 + 2$

19. State Gibbs-Thomson principle in relation to surface tension. 4

20. Name four radioisotopes used for scanning different organs, mentioning the uses of each of them. 4

21. (*a*) What is Reichert-Meissl number ?

(*b*) What is cardiolipi ? 2 + 2

Subgroup—C(*b*)

22. What is erythroblastosis foetalis ? 4

23. Briefly describe the mechanism of endoscopy. 4

24. (*a*) What is Zwitterions ?

(*b*) What is Lipoproteins ? Give two examples. 2 + 2

25. (*a*) What is the diagnostic importance of serum lipase ?

(*b*) What are isozymes ? 2 + 2

26. Mention the importance of amino sugars and deoxy sugars ? 2 + 2