

2016

**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.*

[ NEW SYLLABUS ]

GROUP – A

Answer any two questions, taking  
at least one from each Subgroup :

15 × 2

( Turn Over )

Subgroup— A (a)

1. (a) Describe the EM structure of smooth ER and state its functions.
- (b) Describe the mechanism of receptor-mediated endocytosis.
- (c) State the role of gap junction in intercellular communication. What is cytoribosome ?  
(3 + 3) + 4 + (3 + 2)
2. (a) Define buffer capacity.
- (b) Discuss the role of kidney in pH regulation of body fluid.
- (c) Mention the principle and application of hydrogen electrode. 2 + 8 + (3 + 2)
3. (a) Describe the mechanism of formation of lymph on the basis of Starling's forces.
- (b) State the features of lymphatic vessels. How do they maintain the lymphatic circulation ?

(c) Why does severe liver damage create edema ?

(d) Write a brief note on ESR. 4 + (2 + 3) + 3 + 3

Subgroup – A(b)

4. (a) Why glycogen is stored in liver instead of glucose ?

(b) Mention the physiological importances of mucopolysaccharides.

(c) State the properties of peptide bond.

(d) Describe the process of amino acid sequencing through Edman's reaction.

(e) Discuss the importance of Sanger's method in amino acid sequencing. 3 + 3 + 3 + 4 + 2

5. (a) State the principles of electrophoresis.

(b) Describe the process of separation of the cellular fractions through differential centrifugation along with a flowchart.

(c) Give a comparative account of SEM and TEM. 4 + 6 + 5

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

(b) What do you mean by sigmoid kinetics of enzyme action. Mention the effect of allosteric modulators on sigmoid kinetics of enzyme action. (2 + 3) + (3 + 7)

### GROUP – B

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

#### Subgroup-- B (a)

7. (a) Mention the functions of integrin as cell adhesion molecule.

(b) Give an account on liposome.

(c) What is totipotent cell ? 3 + 3 + 2

8. (a) State the role of Golgi complex in post-translational modification of proteins.
- (b) Mention the role of lysosome in hormone secretion and bone resorption. 4 + (2 + 2)
9. (a) What is Gibbs free energy? Mention the importance of this free energy in biological system.
- (b) Write down the differences between  $\Delta G^\circ$  and  $\Delta G^{\circ'}$ . (2 + 3) + 3
10. (a) Mention the factors affecting blood volume.
- (b) Describe the mechanism of regulation of blood volume. 3 + 5
11. (a) Describe the steps of biosynthesis of heme.
- (b) What is  $\beta$ -thalassemia? 6 + 2

Subgroup— B (b)

12. Name different non-covalent bonds and mention how they help in stabilizing protein structure. 2 + 6

13. (a) What do you mean by rate limiting enzymes? Mention their characteristics.

(b) What are abzymes? (2 + 4) + 2

14. (a) Describe the features of Watson-Crick's DNA double helix structure.

(b) Differentiate A -and B-DNA. 6 + 2

15. (a) State the reactions of glucose with concentrated mineral acids and phenyl hydrazine.

(b) What do you mean by pyranose form of sugar? (3 + 3) + 2

16. (a) Describe the principle of CT scan. Why CT is more powerful imaging technique than that of USG ?
- (b) Mention the limitation of CT scan. (4 + 2) + 2

GROUP – C

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

Subgroup – C (a)

17. State the events of cell cycle. 4
18. What is membrane fluidity? Mention its importance. 2 + 2
19. State the properties of a sol. 4
20. State the role of leucocytes in inflammatory response. 4
21. Mention how second law of thermodynamics is related to physiological steady state. 4

Subgroup— C (b)

22. Write briefly on covalent modification of enzyme activity with example. 4
23. What are the structural differences between cellulose and dextrin ? What are lectins ? 2 + 2
24. Why is cis-fatty acid more preferable than trans-fatty acid ? 4
25. Briefly enumerate the mechanism of endoscopy. 4
26. (a) What is meant by acid number ?
- (b) Mention the physiological importances of eicosanoids. 2 + 2
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