UG/I/PHY/H/I/15

2015

PHYSIOLOGY

[**Honours**]

PAPER – I (New)

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 Subgroups : 15 ×2

Subgroup – A(a)

1. (*a*) Describe the EM structure of mitochondria and state its important functions.

   (*b*) Mention briefly the endogenous sources and biological effects of reactive oxygen species (ROS).

   (*c*) Mention briefly the role of microtubules in cellular movements and secretions.

   (3 + 4) + 4 + 4

2. (*a*) Write Van't Hoff laws of osmosis.

   (*b*) Discuss the electrokinetic properties of colloid.

   (*c*) What are lyophobic and lyophilic colloids ?

   4 + 7 + 4

3. (*a*) Describe the extrinsic mechanism of blood coagulation.

   (*b*) What are natural and artificial anti-coagulants ?

(*Continued*)

(*c*) Discuss critically the role of vit-B_{12} and folic acid in erythropoiesis. 6 + 3 + (3 + 3)

Subgroup – A(b)

4. (*a*) Write short notes on :

(*i*) Mutarotation

(*ii*) Phospholipids

(*iii*) Saponification.

(*b*) Describe the physiological importances of lipoproteins. (3 + 3 + 3) + 6

5. (*a*) Describe the primary and secondary structures of proteins.

(*b*) What do you know about zwitterions and isoelectric point ?

(*c*) Describe the structure of A-DNA, B-DNA and Z-DNA. 6 + (2 + 2) + 5

6. (*a*) Describe the mechanism of action of enzymes especially on active site, specificity and enzyme-substrate complex.

(*b*) Discuss the kinetics of competitive, non-competitive and un-competitive inhibition. 6 + (3 + 3 + 3)

GROUP – B

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

Subgroup – B(a)

7. (*a*) Name the important characteristic features of epithelial tissue.

(*b*) What are the functions of ribosomes ? 4 + 4

8. (*a*) Define pH and buffer.

(*b*) Give the significance of Handerson -Hasselbalch equation. 4 + 4

9. (*a*) What do you mean by entropy and enthalpy ?

(*b*) Distinguish between adsorption and absorption. (2 + 2) + (2 + 2)

10. (*a*) Discuss the role of hypoxia in erythropoiesis.

(*b*) What is plasmapheresis ? 4 + 4

11. (*a*) What is the ABO system of blood group and 'Rh-antigens' ?

(*b*) State the significance of platelet count. (4 + 2) + 2

Subgroup – B(a)

12. (*a*) Why is PUFA content important in edible oil ?

(*b*) What is rancidity of fat and cis-trans isomerism ? 4 + (2 + 2)

13. Write the physiological importances of amino sugars, sugar acids, sugar alcohols and deoxy sugars. 2 + 2 + 2 + 2

14. (*a*) State the reactions of amino acids with ninhydrin and formaldehyde.

(*b*) What do you mean by amphoteric nature of amino acids ? (3 + 3) + 2

15. (*a*) State the Lineweaver-Burk Plot of enzyme kinetics.

(*b*) Write down its significances and limitations. 4 + (2 + 2)

16. (*a*) Write down the principle of ion exchange chromatography.

(*b*) Discuss the uses of radio isotopes in physiological studies. 4 + 4

GROUP – C

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

Subgroup – C(a)

17. Write the structure of nuclear sheath. What is gap junction ? 2 + 2

18. "Mitochondria are called the power house of a cell"– justify this statement with reasons. 4

19. Discuss the physiological importance of surface tension. 4

20. Distinguish between nutritional and sickle cell anaemia. 4

21. Write notes on : 2+2

(*i*) Schilling index

(*ii*) Reticulocyte count.

Subgroup – C(b)

22. Write short notes on *K*-and *M*-series of allosteric modulators. 4

23. What do you know about denaturation and annealing of DNA ? 2+2

24. What is artificial pacemaker ? 4

25. State the uses of USG. 4

26. Write the importances of creatine kinase and SGPT in clinical diagnosis. 2+2
