

2017

MICROBIOLOGY

[**Honours**]

PAPER – II

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 : 15 × 2

1. Distinguish between exo and endopeptidase with suitable example. Describe the steps of biosynthetic pathway of phenylalanine. Which enzyme is called nitrogen barometer of the cell and why? 3 + 8 + 4

(Turn Over)

2. What is the full form of SDS-PAGE ? Briefly describe polymerization process of acrylamide. What is the role of SDS in SDS-PAGE ? Discuss discontinuous PAGE with suitable diagram. How can you determine molecular weight of protein using SDS-PAGE ? 1 + 3 + 2 + 6 + 3
3. What is enthalpy of a thermodynamic system ? Distinguish between entropy and enthalpy. Prove that the increase in enthalpy of a system is equal to an amount of heat absorbed from the environment at constant pressure. What are exergonic and endergonic chemical reactions ? At one atmospheric pressure and 27°C temperature, will the vaporization of a liquid be spontaneous ? Given 2 + 3 + 5 + 2 + 3
 $\Delta H = 9710 \text{ cal}$ and $\Delta S = 26 \text{ cal. PK.}$
4. Describe pentose phosphate pathway (PPP) stepwise. Mention it's significance. Why PPP is called a shunt pathway ? Discuss role of glycogenin in glycogen synthesis. What are the difference between anaerobic respiration and fermentation ? 5 + 3 + 2 + 3 + 2

(3)

GROUP – B

Answer any five questions from the following : 8×5

5. Explain the structural characteristic of a water molecule. Mention some physical properties of it which are important for biological processes. If the ion product of water at room temperature is 10^{-14} , find the concentration H^+ at room temperature for pure water. 2 + 4 + 2
6. State and explain Lambert-Beer's law. Mention some biological application of UV-VIS spectroscopy. A compound in a solution exhibits molar absorbance $\epsilon = 20$ li/mole cm. The solution is in a cuvette and its absorbance is unity. Find the concentration of the solution. 3 + 2 + 3
7. What is pH of a solution ? Show that pH of a solution having molar H-ion concentration 3.2×10^{-4} is 3.5 [Given $\log (3.2) = 0.5$]. What do you understand by electrostatic bond ? What is extinction coefficient ? 3 + 2 + 3

8. What is the basis for the nomenclature of D/L isomer? What is meant by sugar acid and amino sugar? Describe with example. 3 + 5
9. What do you mean by pallindromic DNA sequence? Give an example. Differentiate between A-DNA and B-DNA. Write two characteristic of Z-DNA. 3 + 3 + 2
10. Mention the types of chromatographic methods by the states of their mobile and stationary phases. Write down the principle of paper chromatography and describe ascending and descending paper chromatography. Mention two hazards of radioactivity in living system. 2 + 4 + 2
11. Describe briefly the biosynthesis of a pyrimidire nucleotide. 8
12. Describe how an unsaturated fatty acid is synthesized. What do you mean by triacyl glycerol. 7 + 1

(5)

GROUP – C

Answer any five of the following questions : 4 × 5

13. Mention two each applications of lyophilizer and sonicator. 2 + 2
14. What is the difference between triose and trisaccharide. Give example. 2 + 2
15. What is the function of *t* RNA ? Schematically draw the structure of *m* RNA. 2 + 2
16. Write the name of two saturated and two unsaturated fatty acid. 2 + 2
17. Define Zymogen and Abzyme. 2 + 2
18. Distinguish between substrate level phosphorylation and oxidative phosphorylation. 4
19. What is artificial radioactivity. Give one example. The activity of a radioactive sample goes down to 12.5% in *x* days. What is its half life. 1 + 1 + 2
20. What happens when we put a cell in a hypertonic solution ? What is Donan equilibrium ? 2 + 2