



SN – 244

I Semester B.Sc. Examination, Nov./Dec. 2014

(Fresh) (CBCS) (2014-15 and Onwards)

BIOCHEMISTRY – I

Time : 3 Hours

Max. Marks : 70

- Instructions :**
- i) This paper is for the students of the **new** syllabus : 2014-15.
 - ii) The question paper has **two** Parts : Part **A** and Part **B**.
 - iii) Answer **any eight** questions from Part **A** and **any nine** questions from Part **B**.

PART – A

Answer the following. **Each** question carries **two** marks.

1. Express the following in S.I. units. (i) 0.5 calorie (ii) 1 mg cm^{-3} .
2. Derive S.I. units for surface tension from basic units.
3. Express 0.007 mole in terms of micromole and millipoise.
4. State Hund's rule of maximum multiplicity.
5. Mention any two factors that favours the formation of ionic bond.
6. Give any two differences between sigma (σ) and pi (π) bond.
7. What are chelates ? Mention the function of porphyrin in haem.
8. State group displacement law.
9. Calculate the molarity of oxalic acid solution, when 31.5 g of oxalic acid crystals is dissolved in 250 cm^3 of solution. [molecular weight of oxalic acid is 126].
10. What is the effect of temperature on solubility of solids ?
11. Calculate the electrode potential of copper electrode dipped in 0.1 M copper sulphate solution at 25°C assuming CuSO_4 to be completely dissociated. The standard electrode potential of Cu^{2+}/Cu is +0.34 V at 298 K.
12. Write the relationship between vapour pressure and boiling point of a liquid.

P.T.O.



PART - B

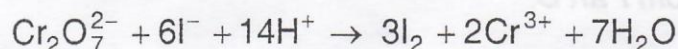
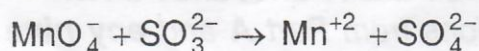
Answer the following. **Each** question carries **6** marks.

13. a) Name any four fundamental units and express it in terms of S.I. units.

b) Define surface tension. How it varies with temperature ?

(4+2)

14. a) Using the concept of oxidation number identify the oxidising and reducing agent in the reactions.



b) What concentration of SO_4^{2-} (sulphate ion) is required to precipitate calcium sulphate from a solution containing 6×10^{-3} mole litre $^{-1}$ of calcium ions ?

$$[\text{K}_{\text{sp}} = 2.4 \times 10^{-5}]$$

(4+2)

15. a) Calculate the bond order in oxygen and helium molecules.

b) Write a note on Donnan membrane equilibrium.

(4+2)

16. a) Explain the bond formation in H_3O^+ and NH_4^+ ions.

b) Explain common ion effect with example.

(4+2)

17. a) Derive an expression for decay constant from decay law.

b) What are Lewis acids and bases ? Give an example.

(4+2)

18. a) What is tracer technique ? Write any two applications of I^{131} and P^{32} .

b) Write Nernst equation for single electrode potentials. Name the terms involved in it.

(4+2)

19. a) Describe the determination of osmotic pressure of a solution by Berkely-Hartley's method.

b) The value of the universal gas constant in CGS unit is 1.987 Cal per degree per mole. Express it in S.I. unit.

(4+2)

20. a) Explain the construction and working of Calomel electrode.

b) Find the energy of a photon whose frequency is $5 \times 10^{14} \text{s}^{-1}$.

$$[h = 6.6 \times 10^{-34} \text{ Js}].$$

(4+2)



21. a) Calculate the pH of each of the buffer solution obtained by mixing.

i) 0.10 mol of ammonia and 0.10 mol of ammonium chloride.

$$[K_b = 1.75 \times 10^{-5}]$$

ii) 0.10 mol of acetic acid and 0.20 mol of sodium acetate. $[K_a = 1.8 \times 10^{-5}]$.

b) Explain the forces that stabilise the secondary structures of proteins. (4+2)

22. a) Explain the buffer action of an acidic buffer.

b) Mention the types of hydrogen bonding with examples.

(4+2)

23. a) State the laws of osmotic pressure and derive $PV = nRT$ for a dilute solution.

b) The mass defect of ${}^7\text{N}^{14}$ is found to be 0.112 amu. Calculate the binding energy. (4+2)

24. a) Mention any four applications of electrochemical series.

b) How is neutron/proton ratio related to stability of the nucleus ?

(4+2)

25. a) Describe the method to determine the viscosity of a solution using Ostwald's viscometer.

b) How is molal elevation constant related to molecular weight of the dissolved solute ? (4+2)