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SDCCB101

I Semester B.Sc. Degree Examination, December/January - 2025/26

(SEP Scheme)

BIOCHEMISTRY

Chemical Foundation of Biochemistry

Paper - I

Time : 3 Hours **Maximum Marks : 80**

Instructions :

1. *The question papers has three Sections*
2. *Section - A: Answer any Five questions.*
3. *Section - B: Answer* any Six questions.
4. *Section - C: Answer any Four questions.*

SECTION - A

Answer any Five of the following: **(5×2=10)**

1. a) Mention the Contribution of the following scientists Louis Pasteur and Emil Fischer.
   b) State Pauli's exclusion principle.
   c) What is meant by lattice energy?
   d) What are intermolecular hydrogen bondings? Give an example.
   e) What are homogeneous solutions?
   f) State Raoult's law.
   g) Define P^{Ka}
   h) What is rate equation?

SECTION - B

Answer any Six of the following: **(6×5=30)**

2. Write a note on the importance of biochemistry in everyday life.
3. What are quantum numbers? Give their significance.
4. Explain the formation of NaCl using Born-Haber cycle.
5. Explain the formation of ethene molecule based on hybridization.
6. Describe the factors influencing solubility.
7. Explain the preparation of Copper ferrocyanide semi-permeable membrane.
8. Explain the construction and working principle of SHE.
9. Distinguish between molecularity and order of a reaction.

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SECTION - C

Answer any Four of the following: **(4×10=40)**

10. a) Explain Miller's experiment of origin of life
    b) Derive de-Broglie's equation. Mention the terms involved in it. **(5+5)**
11. a) Illustrate Hund's rule of maximum multiplicity.
    b) Calculate the Oxidation number of Cr in $K_2Cr_2O_7$ and CrO_4^{2-} **(5+5)**
12. a) Define the terms:
        i) Ligands
        ii) Ebullioscopic constant
        iii) Rate of a reaction
    b) Comment on common ion effect. **(6+4)**
13. a) Explain the Geometry of NH_3 molecule using VSEPR theory
    b) What are buffer solutions? Mention the types with example. **(6+4)**
14. a) Write the postulates of Molecular orbital theory.
    b) Explain the molecular orbital diagram for the formation of H_2 Molecule **(5+5)**
15. a) Derive the rate constant for the second order reaction of type [a = b]
    b) Mention the characteristic of Catalyst. **(5+5)**