UG (CBCS) Even Semester Examination, May 2025

EDUCATION
(B.Sc. B.Ed.)

8th Semester

Course No. : BSCH - 802

(Physical Chemistry)

Full Marks : 50

Pass Marks : 20

Time : 2 hours

The figures in the margin indicate full marks for the questions

(*Answer five questions*)

1. (a) Using Huckel approximation find out the energies of the π-orbitals of cyclobutadiene. 8

   (b) Write a brief note on secular determinant. 2

Or

2. (a) Using LCAO-MO technique find out the molecular orbital wave functions of hydrogen molecule ion. 8

   (b) Write a brief note on delocalization energy. 2

3. (a) Write a detailed note on standard weston cadmium cell. 6

   (b) Write a brief note on standard hydrogen electrode (SHE) 4

Or

4. (a) Write a detailed account on the differences between potentiometric titration and conductomeric titration. 6

   (b) Write a brief note on glass electrode. 4

5. (a) Which observation of photoelectric effect could not be explained by the laws of classical physics. 2

   (b) Find out the wavefunction of a particle moving in a one dimensional box of length l. 8

Or

6. (a) Find r_{rms} for hydrogen atom in ls orbital. 6

$$\psi_{ls} = \left(\frac{1}{\pi a_0{}^3}\right)^{1/2} exp\left(-r/a_0\right)$$

   (b) Write down the postulates of quantum mechanics. 4

7. (a) Prove that the half-life of n^{th} order reaction $t_{1/2} \propto 1/a^{n-1}$. 5

   (b) Write a brief note on the collision theory of reaction rates. 5

Or

8. (a) Define enzyme catalysis. 2

   (b) For enzyme catalysis reaction derive the Michaelis-Menten equation. 6

   (c) Write a note on the method of half life period for the determination of order of a reaction. 2

9. (a) How the structure of the surfactants affect the critical micelle concentration in aqueous medium. 6

   (b) Write down the applications of conducting polymers. 4

Or

10. (a) Write a brief account on the cleaning action of soap. 5

   (b) What is Hardy-Schulze rule? 2

   (c) What is liquid crystal? 1

   (d) How many types of liquid crystals are there? 2

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