| Name: Utkarsh kumar Mishra | Printed Pages: 1 |
|---|---|
| Student University Roll No.: | |

School of Engineering
First Sessional Examination, Odd Semester (AS: 2023-24)

B. Tech: First Year Semester: I

| Course Title: Engineering Chemistry | Max Marks: 30 |
|---|---|
| Course Code: NBS 4103 | Time: 1 HOUR |

*Instructions if any: Read the question Carefully.*

| | SECTION 'A' Q.N.1. Attempt all parts of the following: | Course Objective | Marks |
|---|---|---|---|
| a) | Give Nernst equation. | CO 1 | 1 |
| b) | Give all four quantum number for $3d^{10}$ | CO 2 | 1 |
| c) | Write about cis-trans isomerism. | CO 2 | 1 |
| d) | Define Pseudo-order reaction | CO 4 | 1 |
| e) | Discuss the structure of Fullerene. | CO 2 | 1 |

| | SECTION 'B' Q.N.2. Attempt any two parts of the following: | Course Objective | Marks |
|---|---|---|---|
| a) | Discuss the classification of liquid crystal and its application. | CO 1 | 7.5 |
| b) | Derive density of unit cell? Krypton crystallizes in a structure that has four krypton atoms in each unit cell and the unit cell is a cube .the edge length of unit cell is 0.559 cm. Calculate the density of crystalline Kr. Z=4 M=36 | CO 1 | 7.5 |
| c) | What are stoichiometric and nonstoichiometric defects in crystal? | CO 4 | 7.5 |
| d) | What is optical activity? How it is measured? Give the stereoisomers of Tartaric Acid. | CO2 | 7.5 |

| | SECTION 'C' Q.N.3. Attempt any one part of the following: | Course Objective | Marks |
|---|---|---|---|
| a) | Draw energy level diagram of N2, O2+, NO and HF molecule. Give the configuration and magnetic behaviour of molecules. | CO1 | 10 |
| b) | Derive second order reaction when the concentrations of reactants are different. The rate of reaction becomes double when temperature increases from $10^0$c to $20^0$c.calculate the energy of activation R=8.314j/k/mole. | CO4 | 10 |
| c) | Write about Nanomaterials. Classify the nanomaterial on the basis of dimension. Give sol gel method for the synthesis of nanoparticle. | CO 1 | 10 |

*Table 1: Mapping between COs and questions*
*(Number of COs may vary from course to course)*

| COs | Questions Numbers | Total Marks |
|---|---|---|
| CO1 | 1a,2a,2b,3a,3c | 1+7.5+7.5+10+10=36 |
| CO2 | 1b,1c,1e,2d | 1+1+1+7.5=10.5 |
| CO4 | 1d,2c,3b | 1+7.5+10=18.5 |