

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP2023)

CLASS: IMSc
BRANCH: MATHEMATICS

SEMESTER : IV
SESSION : SP2023

SUBJECT: CH213 GENERAL CHEMISTRY-II

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

- | | | | |
|---|-----|-----------|---------------|
| Q.1(a) Graphically show the effect of temperature on distribution of molecular velocities and explain the nature of the plots. | [2] | CO
CO1 | BL
Compare |
| Q.1(b) What do you mean by compressibility factor (Z) of a gas? Under what conditions the behaviour of real gas approaches that of an ideal gas? Explain | [3] | CO1 | Evaluate |
| Q.2(a) Define Boyle's temperature. For easily liquefiable gases the value of Boyle's temperature will be high or low? | [2] | CO1 | Describe |
| Q.2(b) Write down the Clausius-Clapeyron equation. What is its significance? | [3] | CO1 | Estimate |
| Q.3(a) Explain the effect of temperature on viscosity of liquid. | [2] | CO1 | Explain |
| Q.3(b) Discuss the measurement of surface tension by capillary rise method. | [3] | CO1 | Evaluate |
| Q.4(a) Write-down all the resonating structures of aromatic electrophilic substitution reaction of benzene (consider nitration reaction) | [2] | CO3 | Distinguish |
| Q.4(b) Given $K_H/K_D = 7$. Explain the below reaction indicating the rate determining step. | [3] | CO3 | Evaluate |
| $\text{CH}_3\text{COCH}_3 + \text{Br}_2 \xrightarrow[\text{K}_H]{\text{OH}^-} \text{BrCH}_2\text{COCH}_3$ | | | |
| $\text{CD}_3\text{COCD}_3 + \text{Br}_2 \xrightarrow[\text{K}_D]{\text{OH}^-} \text{BrCD}_2\text{COCD}_3$ | | | |
| Q.5(a) $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{SEt}$ and $\text{CH}_3\text{CH}(\text{SEt})\text{CH}_2\text{OH}$ give same product when treated with dry HCl - Explain. | [2] | CO3 | Interpret |
| Q.5(b) Write down the product and mechanism for the radical addition of HBr to $\text{CH}_3\text{-CH=CH}_2$ in the presence of H_2O_2 . | [3] | CO3 | Illustrate |

:21/02/2023:M