

BS/2110

CHEMISTRY-3 -CODE: BHB14

5493/NH

TIME: THREE HOURS

MAXIMUM MARKS: 74

Note: The question paper consists of three sections A, B and C. Attempt five questions in all, selecting two questions each from Section A and B and the entire Section C.

SECTION-A

- I. Explain following:
- a) Why are the boiling points of alcohols higher than those of alkanes of comparable molecular mass? 5.5
 - b) Compare the acidic character of primary, secondary and tertiary alcohols? 5.5
- II. Why are phenols more acidic than alcohols? Discuss the effect of substituents on the acidity of phenols? 11
- III. What is an aldol condensation? Discuss the mechanism of acid and base catalyzed aldol condensation reactions? Illustrate your answers with examples? 11
- IV. Discuss briefly the effect of electron donating and electron withdrawing substituents on the acidity of aromatic acids? 11

SECTION-B

- V. Derive thermodynamic derivation of law of mass action? 11
- VI. What is entropy? Derive an expression for the calculation of the entropy change of an ideal gas when temperature and volume changes? 11
- VII. What is heat capacity? Derive expression for heat capacity at constant volume and at constant pressure? 11
- VIII. a) Explain Nernst heat theorem? 8
b) What are Gibbs function and Helmholtz functions? 3

SECTION-C

- IX. Write a note on the following:
- a) First and Second law of the thermodynamics
 - b) Cannizaro reaction
 - c) Give IUPAC name of CH_3COOH , CH_3CHO and $\text{CH}_3\text{CH}=\text{CHCHO}$
 - d) Give equations to convert: phenol to benzene and phenol to phenolphthalein
 - e) Name any two thermodynamic intensive properties
 - f) Criteria for spontaneity of a process
 - g) Entropy
 - h) Heat and work
 - i) Joule's law
 - j) Acidity of carboxylic acids
 - k) Gibbs free energy
 - l) Kolbe's reaction
 - m) Fries rearrangement
 - n) What is cumene
 - o) Heat capacity

(15x2)