

DSB – 260 (CHEM-UG)

Second Year B.Sc. Degree Examination, August/September 2008
Directorate of Correspondence Course
CHEMISTRY (Paper – II)

Time : 3 Hours

Max. Marks : 75

- Instructions :** 1) This paper consists of four Section. Answer *all* Sections.
2) Write equations and neat diagrams wherever necessary.

SECTION – A

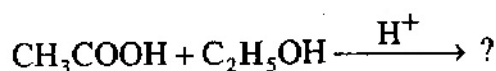
I. Answer the following questions in a **word** a **phrase** or a **sentence** : (10×1=10)

- 1) What are organometallic compounds ?
- 2) Write the structural formula of cumene.
- 3) How does semicarbazide reacts with acetone ?
- 4) What is + Inductive effect ?
- 5) Write the pH range value of methyl orange indicator.
- 6) Define the term degree of polymerisation.
- 7) State Gibb's phase rule.
- 8) What is co-ordinate bond ?
- 9) Define the term lattice energy.
- 10) What are pseudo halogens ?

SECTION – B

II. Answer **any FIVE** questions : (5×3=15)

- 11) Explain the hyperconjugation effect with an example.
- 12) Predict the product of following reaction and write its mechanism.



P.T.O.

- 13) How is order of reaction determined by differential method ?
- 14) The dissociation constant of acetic acid at 25°C is 1.8×10^{-5} . Calculate the pH of a solution containing 0.185 g mole acetic acid and 3.015 g mol sodium acetate per litre.
- 15) What are polar and non polar bonds ? Mention examples.
- 16) Halogens show variable oxidation states except fluorine why ?
- 17) Write the chemical equation when glycerol reacts with following reagents.
 i) KHSO_4 ii) Na iii) Oxalic acid (at 110°C)

SECTION - C

III. Answer any FIVE questions :

(5×6=30)

- 18) a) Arrange the following in order of increasing acid strength. Give reason.
 p-nitrophenol 24 dinitrophenol p-cresol 4
- b) Name the indicators used for the following titrations.
 i) Na_2CO_3 V/s HCl
 ii) NaOH V/s CH_3COOH 2
- 19) a) Derive an expression for rate constant of second order reaction involving two different reactants with different initial concentration. 4
- b) Explain why Acetone is less reactive than acetaldehyde. 2
- 20) a) How is lattice energy of sodium chloride crystal determined by Born-Haber cycle ? 4
- b) Write the structural formula of the following : 2
 i) TEL ii) Phloroglucinol
- 21) a) What is aldol condensation ? Explain its mechanism. 3
- b) Explain the Geometry of water molecule on the basis of VSEPR Theory. 3
- 22) a) Draw the labelled phase diagram of sulphur system and discuss its salient features. 4
- b) Explain intramolecular hydrogen bonding with an example. 2

- 23) a) Discuss sp^3 hybridisation with an example. 3
 b) Derive the relationship between C_p and C_v . 3
- 24) a) How is determined molecular weight of polymer by Viscosity method ? 3
 b) Discuss the geometry of xenon tetrafluoride. 3

SECTION – D

IV. Answer any TWO questions. (2×10=20)

- 25) a) Discuss bonding and structure of diborane. 4
 b) Calculate the degree of hydrolysis in 0.012 N solution of sodium acetate. Dissociation constant of acetic acid is 1.80×10^{-5} . Ionic product of water is 1×10^{-14} . 3
 c) Describe the action of nitrous acid on primary, secondary and tertiary amines. 3
- 26) a) How monocarboxylic acids are synthesized from
 i) Grignard reagents
 ii) Arndt eistert synthesis. 4
 b) What are isotopes ? Explain the use of radioactive isotope in the study of reaction mechanism. 3
 c) What are errors ? Mention types of determinate errors. 3
- 27) a) Derive an expression for work done in reversible isothermal expansion of an ideal gas. 4
 b) Draw molecular orbital energy level diagram of O_2 molecule. 3
 c) What are hydroxy acids ? Explain the effect of heat on β and γ hydroxy acids. 3