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.

$$CH_3COOH + C_2H_5OH \xrightarrow{H^+} ?$$

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 Cp and Cv. 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) Arnd't 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