

**Second Year B.Sc., Degree Examinations,  
December 2017**

(Directorate of Distance Education)

**CHEMISTRY**

**Paper: DSB – 260: CHEMISTRY – II**

Time: 3 hrs]

[Max. Marks: 75/85

**Instruction to the Candidates:**

1. This question paper consists of FIVE sections. Answer all the sections.
2. Write equations and neat diagrams where ever necessary.
3. Section – E is compulsory question for 85 marks scheme only
4. Section – A contains one mark questions and should be answered in first two pages of the main answer book. The questions Section – A answered in any other part will not be valued.

**SECTION – A**

**I. Answer the following in a word, a phrase or a sentence:** 10 x 1 = 10 Marks

1. Define Bond order.
2. What are intensive property?
3. Write Arrhenius equation.
4. What is Joule Thomson effect?
5. What are organometallic compounds?
6. Define order of a reaction.
7. What is meant by ionic bond?
8. Define precision.
9. Why formaldehyde does not undergo Aldol condensation?
10. What is cordite?

**SECTION – B**

**II. Answer any FIVE of the following questions:** 5 x 3 = 15 Marks

11. Explain the effect of substituent on acidity of phenol.
12. How does Grignard reagent react with aldehyde?
13. Explain artificial transmutation of elements using protons and neutrons with one example.
14. Explain the use of radio active isotope in the study of reaction mechanism of photosynthesis.
15. Give the uses of Helium, Neon and Argon.
16. What are polar and non-polar bonds? Explain with example.

Contd.....2

17. Explain half life period method of determination of order of reaction.

### SECTION – C

**III. Answer any FIVE of the following questions:**

5 x 6 = 30 Marks

18. a) Explain the isolation of noble gases from air.  
 b) Explain parallel reaction with an example. (4 + 2)
19. a) Write a note on basic properties of Iodine.  
 b) Explain Lindemann's hypothesis for unimolecular reactions. (3 + 3)
20. a) Derive the expression for workdone in reversible isothermal expansion of an ideal gas.  
 b) What happens when ethyl – magnesium bromide is treated with the following reagents and the products on hydrolysis?  
 (i) Acetaldehyde (ii) Carbon dioxide (4 + 2)
21. a) "Water has maximum density at 4°C". Justify the statement.  
 b) Define: (i) Activity  
 (ii) Activity coefficient  
 (iii) Mean activity coefficient (3 + 3)
22. a) Discuss the action of nitrous acid on 1°, 2° and 3° amines.  
 b) Deduce the relationship between hydrolysis constant ( $K_h$ ), ionic product of water ( $K_w$ ), dissociation constant of an acid [ $K_a$ ] & dissociation constant of a base [ $K_b$ ]. (3 + 3)
23. a) What is the effect of heat on  $\alpha$ ,  $\beta$  and  $\gamma$  – hydroxy acids?  
 b) Derive an expression for rate constant of a second order reaction in which initial concentration of reactants are same? (3 + 3)
24. a) Explain Cannizzaro's reaction with mechanism.  
 b) How is glycerol manufactured from spent lye? (3 + 3)

### SECTION – D

**IV. Answer any TWO of the following questions:**

2 x 10 = 20 Marks

25. a) Write a neat phase diagram for the sulphur system and explain curves, regions and triple point. (5)  
 b) i) Differentiate  $\sigma$  and  $\pi$  bond  
 ii) Explain  $SP^3$  hybridization taking methane as example. (2 + 3)

Contd.....3

26. a) Define lattice energy. What are the factors that influencing on lattice energy?  
b) Derive Kirchhoff's equation.  
c) Distinguish between isothermal and adiabatic process. (4 + 4 + 2)
27. a) i) Discuss the mechanism of esterification reaction.  
ii) Give the reaction of glycerol with oxalic acid. (3 + 2)  
b) i) Write a note on weight average molecular weight of a polymer.  
ii) Define degree of polymerization. (2 + 1)  
c) How carboxylic acids synthesized from Arndt – Eistert synthesis.? (2)

**SECTION – E**

**V. Answer any ONE of the following questions:** 1 x 10 = 10 Marks  
*(Compulsory question for 85 marks scheme only)*

28. a) On the basis of VSEPR theory, discuss the geometry of ammonia molecule. (5)  
b) i) Write the difference between BMO and ABMO.  
ii) Why does Helium molecule do not exist? (3 + 2)
29. a) Write a molecular orbital energy level diagram of oxygen molecule and explain  
(i) Bond order (ii) Magnetic property. (5)  
b) i) How is phenol manufactured from cumene process?  
ii) Give the method of synthesis of ketones. (3 + 2)

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