Second Year B.Sc., Degree Examinations

September / October 2015

(Directorate of Distance Education)

CHEMISTRY

PAPER – II : DSB 260: CHEMISTRY – II

Time: 3hrs.] *[Max. Marks: 75/85*

Instructions to the candidates:

i) ***This paper consists of FIVE sections. Answer all sections.***

ii) ***Write equations and neat diagrams where ever necessary.***

iii) ***Section – E is compulsory for 85 marks scheme only.***

iv) ***Section – A contains one mark questions and should be answered in first two pages of main answer book. The questions of Section – A answered in any other part will not be valued.***

SECTION – A

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

1. What are organometalic compounds?
2. Define precision.
3. Formaldehyde does not undergo Aldol condensation. Why?
4. Define Bond order.
5. Write Arrhenius equation.
6. What is Cordite?
7. Define order of reaction.
8. What is meant by ionic bond?
9. Define degrees of freedom.
10. What are intensive property?

SECTION – B

II. Answer any FIVE questions: 5 x 3 = 15 Marks

11. Explain half life period method of determination of order of reaction.
12. How does Grignard reagent react with aldehyde?
13. Give the uses of Helium, Neon and Argon.

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14. Explain the effect of substituent on acidity of phenol.
15. What are polar and non-polar bonds? Explain with example.
16. Explain artificial transmutation of elements using protons and neutrons with one example.
17. Explain the use of radioactive isotope in the study of reaction mechanism of photosynthesis.

SECTION – C

III. Answer any FIVE of the following questions: 5 x 6 = 30 Marks

18. a) Derive an expression for work done in reversible isothermal expansion of an ideal gas.

    b) What happens when ethyl-magnesium bromide is treated with the following reagents and the products is hydrolized.
    i) Acetaldehyde ii) Carbon dioxide (4 + 2)

19. a) Explain the isolation of noble gases from air.

    b) Explain parallel reaction with an example. (4 + 2)

20. a) What is the effect of heat on α, β & $\gamma-$ hydroxy acids?

    b) Derive an expression for rate constant of a second order reaction in which initial concentration of reactants are same. (3 + 3)

21. 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 a boye (k_b). (3 + 3)

22. a) Write a note on basic properties of Iodine.

    b) Explain Lindermann's hypothesis for unimolecular reactions. (3 + 3)

23. a) Explain Cannizaro reaction with mechansim.

    b) How is glycerol manufactured from spent lye? (3 + 3)

24. a) Water has maximum density at $4^{\circ}C$. Account.

    b) Define: i) Activity
    ii) Activity – co – efficient
    iii) Mean activity co – efficient (3 + 3)

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SECTION – D

IV. Answer any TWO of the following questions: 2 x 10 = 20 Marks

25. a) Define lattice energy. What are the factors that influence on lattice energy.

    b) Derive $C_P - C_V = R$

    c) Distinguish between isothermal and adiabatic process. (4 + 4 + 2)

26. 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)

27. a) Write a neat phase diagram for the sulphur system and explain curves, regions and triple point.

    b) i) Differentiate σ and π bond.

    ii) Explain the SP^3 hybridization taking methane as example. (5 + 2 + 3)

SECTION – E

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

28. a) Write a molecular orbital energy level diagram of oxygen molecule and explain
    i) Bond order ii) Magnetic property (5)

    b) i) How is phenal manufactured from Cumene process.
    ii) Give the method of synthesis of ketones. (3 + 2)

29. a) On the basis of VSEPR theory, discuss the geometry of ammonia molecule. (5)

    b) i) Write the difference between BMO and ABMO.

    ii) Helium molecule does not exist. Why? (3 + 2)

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