First Year B.Sc., Degree Examinations

September / October 2015

(Directorate of Distance Education)

CHEMISTRY

PAPER – I : DSA 260: CHEMISTRY – I

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. Define Aufbau principle.
2. What is ionization energy?
3. Write the IUPAC name of, $CH_3-\overset{CH_3}{\overset{|}{C}}=CH-\overset{CH_3}{\overset{|}{CH}}-CH_3$.
4. What are Carbanions?
5. Define Osmosis.
6. State Hardy-Schulze rule.
7. Define Calorific value.
8. State principle of corresponding states.
9. Write the general formula for alkenes.
10. Define electro negativity.

SECTION – B

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

11. What is atomic radius? How does it vary along the group and period?
12. Explain the mutual solubility curve of water phenol system.

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13. Write the characteristics of a good propellant?
14. Explain theory of electrical double layer. How does it explain the charge on colloidal particles?
15. How is Nitrogen detected by Lassaigne's test?
16. How do you determine the critical temperature experimentally?
17. Discuss the mechanism of bimolecular nucleophilic substitution reactions with an example.

SECTION – C

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

18. a) What is diagonal relationship? Discuss similarities between lithium and magnesium.
    b) Define ortho and para hydrogen. (4 + 2)
19. a) Calculate the osmotic pressure of 5% solution of glucose solution (molecular weight = 180) at $18^{\circ}C$. [R = 0.082 Litre – atmosphere]
    b) How is charge on colloidal particles determined by electrophoresis? (2 + 4)
20. a) State Paulis exclusion principle.
    b) Derive de-Broglie's equation for the wave particle duality of electron.
    c) Why do alkali metals show an oxidation state of +1 only? (2 + 3 + 1)
21. a) State and explain Halogenation of alkanes with mechanism.
    b) What are pi bonds?
    b) Define hybridization. (4 + 1 + 1)
22. a) What are fuels? Write the advantages of gaseous fuels.
    b) What is glass? Explain annealing properties glass. (3 + 3)
23. a) Describe the manufacture of Biogas.
    b) Explain Friedel-Craft alkylation of Benzene with mechanism. (3 + 3)
24. a) Derive an equation for critical constants.
    b) Which mixture is called as Nitrating mixture? (5 + 1)

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SECTION – D

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

25. a) Describe the manufacture of glass by tank furnace method.
    b) State and explain peroxide effect with mechanism. (5 + 5)

26. a) How do you determine molecular weight of non-volatile solute by Walker Lumsden method?
    b) Explain Wurtz reaction.
    c) What are the factors influencing the anamolous behavior of Li? (5 + 2 + 3)

27. a) Define isoelectronic ions. How does ionic radii vary in isoelectronic ions?
    b) State Markownikoff's rule. Write the mechanism.
    c) Discuss Desilverisation of lead by Parke's process. (3 + 5 + 2)

28. a) Explain the constituents of paints, and their functions.
    b) Deduce a mathematical expression for the elevation in Boiling point and molecular mass of the solute. (5 + 5)

SECTION – E

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

29. a) How do you determine osmotic pressure of a solution by Berkley and Hartley's method?
    b) Describe the manufacture of water gas and mention its uses. (5 + 5)

30. a) Discuss the general properties of alkali metals.
    b) Explain SN_1 reaction with mechansim.
    c) What are acetylides? Give examples. (5 + 3 + 2)

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