First Year B.Sc., Degree Examinations,

December 2017

(Directorate of Distance Education)

CHEMISTRY

Paper: DSA – 260: CHEMISTRY – I

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 whereever 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. State Modern periodic law.
2. Define Calorific value of a fuel.
3. What is the role of gypsum in cement?
4. Define RMS velocity.
5. Define Colligative properties.
6. What is a gel?
7. What is hybridization of atomic orbitals?
8. Write the general formula of Alkynes.
9. What is a carbocation?
10. Write the IUPAC name of $C(CH_3)_4$.

SECTION – B

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

11. What is Ionization energy? How it varies along the group and period?
12. What are the constituents of paints? Mention their function.
13. Write a note on Adsorbtion indicators.
14. Explain C S T of Triethylamine - H_2O system?
15. How is Halogens detected by Lassaigne's test?
16. Explain the structure of Ethene molecule on the basis of hybridization
17. Discuss the mechanism of SN^2 reaction with a suitable example.

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SECTION – C

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

18. a) Write any three similarities between Li and Mg.
    b) What are Ortho and Para hydrogens?
    c) Give reason: Alkali metals show an Oxidation state of + 1 only. (3 + 2 + 1)

19. a) Define black body and Explain black body radiation.
    b) Explain the production of Biogas. (3 + 3)

20. a) Write the boiling point – composition diagrams for three types of miscible liquid mixtures.
    b) Explain briefly Maxwel's distribution of molecular velocities. (3 + 3)

21. a) Deduce the relationship between relative lowering of Vapour pressure and molar mass of the solute on the basis of Raoult's law.
    b) The freezing point of a 9% solution of a non – volatile solute in water is 272.07K. The freezing point of pure water is 273K. Calculate the molecular mass of the solute. Given that K_f for water is $1.86 Kkgmol^{-1}$.
    c) What is Mutual coagulation? (3 + 2 + 1)

22. a) Explain Sachse – Mohr's theory of Strainless rings.
    b) How is an Alkane prepared by Waurtz's reaction?
    c) Write any two reactions to show acidity of Alkynes. (2 + 2 + 2)

23. a) Explain the mechanism of nitration of Benzene.
    b) How is an alkene prepared by dehydrohalogenation reaction?
    c) State Markownikoff's rule. (3 + 2 + 1)

24. a) 0.3 g of an organic compound on Kjeldahl's analysis gave enough ammonia to just neutralize 30ml of 0.1N H_2SO_4. Calculate the percentage of Nitrogen in the compound.
    b) Define the terms – i) Gold number ii) Flocculation value
    c) Give the composition of water gas. (3 + 2 + 1)

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) What are fuels? Write any four advantages of gaseous fuels.
    c) What are isoelectronic species? Give an example. How does ionic radii vary in isoelectric ions? (4 + 3 + 3)

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26. a) Describe the method of determining molecular mass of a solute by Walker – Lumsden method.

b) State Henry's law. Give any two limitations of the law.

c) Define the terms:
   i) Isotonic solutions
   ii) Cryoscopic constant

d) Mention any two applications of Steam distillation. (4 + 2 + 2 + 2)

27. a) Discuss the mechanism of addition of HBr to Propene

b) State and Explain Huckle's rule of aromaticity with a suitable example.

d) Write Freunds method for the preparation of Cycloalkanes.

d) Define the terms
   i) Electrophile
   ii) Free radical (3 + 3 + 2 + 2)

28. a) Explain the mechanism of setting of cement

b) Discuss the flame coloration of alkaline earth metals

c) What are Azeotropes? Explain
   i) Minimum boiling azeotropes
   ii) Maximum boiling azeotropes

d) What is heterolysis? Give an example (3 + 2 + 3 + 2)

SECTION – E

V. Answer any ONE of the following questions: 1 x 10 = 10 Marks

(Compulsory question for 85 marks scheme only)

29. a) Discuss the process of Steam distillation.

b) Explain the mechanism of Chlorination of methane.

c) What is Electron affinity? Mention any two factors which influences on electron affinity. (4 + 4 + 2)

30. a) Explain molecular orbital structure of Benzene.

b) Describe Berkeley and Hartley's method for the determination of Osmotic pressure of a dilute solution.

c) Write Schrodinger wave equation and explain the terms involved in it. (4 + 4 + 2)

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