

Q.P. Code – 50623

First Year B.Sc. Degree Examination

OCTOBER/NOVEMBER 2014

(Directorate of Distance Education)

(DSA 260) Paper I – CHEMISTRY

Time : 3 Hours]

[Max. Marks : 75/85

Instructions to Candidates :

- 1) *This paper consists of five Sections. Answer all Sections.*
- 2) *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 of answer book will not be valued.*
- 3) *Write equations and neat diagrams wherever necessary.*
- 4) *Section-E is **compulsory** for **85** marks scheme only.*

SECTION – A

Answer **ALL** the following questions in a word, a phrase or in a sentence :

10 × 1 = 10

1. Define electron affinity.
2. State Heisenberg's uncertainty principle.
3. What are carbocations?
4. Write the IUPAC name of $\text{CH}_2 = \overset{\text{CH}_3}{\underset{|}{\text{C}}} - \text{CH}_2 - \text{CH}_3$.
5. What is gold number?
6. State Raoult's law.
7. What is glass?
8. Define ebullioscopic constant.
9. What are pi bonds?
10. Define covalent radius.

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SECTION – B

Answer any **FIVE** of the following :

5 × 3 = 15

11. State and explain Hund's rule of maximum multiplicity with the example of nitrogen.
12. What is meant by dual nature of an electron? Calculate the wavelength of the wave associated with a mass of 1.0 kg moving with a speed of 10 m/s. Given $h = 6.63 \times 10^{-34}$ Js.
13. Beryllium and magnesium do not give flame colouration but Ba, Ca and Sr do. Why?
14. Explain the origin of charge on colloidal particles.
15. Discuss the mechanism of unimolecular nucleophilic substitution reactions with an example.
16. Explain the mutual solubility curve of water phenol system.
17. What happens when HBr is added to propene in the presence of benzoyl peroxide? Explain the mechanism.

SECTION – C

Answer any **FIVE** of the following :

5 × 6 = 30

18. (a) Describe the estimation of halogen by Carius method.
(b) What is ionization energy? Explain the factors affecting ionization energy. **3 + 3**
19. (a) Derive the relationship between molar mass of a non-volatile solute and relative lowering of vapour pressure.
(b) Organic compounds containing 0.35 g of nitrogen in Kjeldahl's experiment liberated ammonia which neutralised 11.5 ml of 1N H_2SO_4 . What is the percentage of nitrogen in the organic compound?
(c) State Hardy Schultz rule. **3 + 2 + 1**

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20. (a) What are fuels? Give any four advantages of gaseous fuels.
(b) Explain the effect of temperature on distribution of molecular velocities. **4 + 2**
21. (a) Discuss the orbital picture of benzene. What are the limitations of Kekule's structure?
(b) Give four differences between lyophilic colloids and lyophobic colloids. **4 + 2**
22. (a) Describe the manufacture of cement by dry process.
(b) State Henry's law. Mention its limitations. **4 + 2**
23. (a) Discuss the variation of covalent radii of elements across the period and down the groups in periodic table.
(b) Explain the mechanism of nitration of benzene. **3 + 3**
24. (a) State Nernst distribution law. Give its application in the de-silverisation of lead.
(b) Explain Sachse-Mohr theory taking cyclohexane as an example. Which form is more stable? **3 + 3**

SECTION – D

Answer any **TWO** of the following : **2 × 10 = 20**

25. (a) Account for the following :
- (i) Alkali metals show an oxidation state of +1 only.
 - (ii) Degree of hydration of ions decreases from Li^+ to Cs^+ .
 - (iii) Alkali metal compounds are ionic in general.
 - (iv) Alkali metals show different flame colouration.
- (b) Describe the types of organic reactions with one example for each class. **4 + 6**
26. (a) What are semipermeable membranes? Give their classification with examples.
(b) Explain sp^3 hybridization taking methane as an example.
(c) Describe the manufacture of water gas. **3 + 3 + 4**

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27. (a) What is Diagonal relationship? Discuss similarities between lithium and magnesium.
- (b) Describe with mechanism addition of hydrochloric acid to ethyne.
- (c) Derive Langmuir adsorption isotherm. **4 + 3 + 3**
28. (a) Explain the significance of quantum numbers.
- (b) Deduce mathematical expressions for critical constants by using van der Waal's equation. **5 + 5**

SECTION – E

Compulsory Question for **85** marks scheme only :

Answer any **ONE** of the following : **1 × 10 = 10**

29. (a) What are ideal and real solutions? Discuss the vapour pressure composition curves of solutions of type-III.
- (b) Discuss the classification of elements into *s*, *p*, *d*, *t* blocks. **5 + 5**
30. (a) Describe the manufacture of glass by tank furnace method.
- (b) Explain the preparation of
- (i) Alkanes
 - (ii) Alkenes and
 - (iii) Alkynes
- from alkyl halides. **4 + 6**
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