**Q.P. Code – 50723**

## Second Year B.Sc. Degree Examination
### OCTOBER/NOVEMBER 2014
### (Directorate of Distance Education)
### (DSB 260) Paper II – CHEMISTRY

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

**Instructions to Candidates :**

1) *This paper consists of five Sections. Answer all Sections.*

2) *Write equations and neat diagrams wherever necessary.*

3) *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.  What is an aldol?

2.  What is inductive effect?

3.  Give an example for a trihydric alcohol.

4.  Give the general formula of Grignard reagent.

5.  What is the bond order or helium molecule?

6.  Write the shape of ammonia molecule.

7.  Define accuracy.

8.  Give the expression for rate constant of a second order reaction.

9.  What are parallel reactions?

10. What is an isobaric process?

SECTION – B

Answer any **FIVE** questions :                                    **5 × 3 = 15**

11.  How do you distinguish primary, secondary and tertiary alcohols by dehydrogenation method?

12.  Explain giving mechanism how does acetaldehyde react with HCN.

13.  How does n/p ratio explain nuclear stability?

14.  What are Radioactive series? How are they classified?

15.  Deduce the relation between $K_h$, $K_w$ and $K_a$ for a salt of weak acid and strong base.

16.  What are bonding and antibonding orbitals? Give their significance.

17.  How do you explain the hardness of diamond and electrical conductivity of graphite on the basis of their structures?

SECTION – C

Answer any **FIVE** questions :                                    **5 × 6 = 30**

18.  (a)  Discuss the banana bond structure of Diborane.                 **4**

     (b)  Give two differences between order and molecularity of a reaction.   **2**

19.  (a)  What are pseudohalogens? Compare their properties with halogens.    **3**

     (b)  How is order of a reaction determined by Ostwald isolation method?   **3**

20.  (a)  Derive Kirchoff's equation.                              **4**

     (b)  Give any two synthetic applications of Grignard reagent.            **2**

21.  (a)  State Ostwald dilution law. Give its applications and limitations.      **3**

     (b)  Explain intermolecular hydrogen bonding with an example.          **3**

22. (a) Describe the method for the preparation of amines by ammonolysis. **3**

    (b) Derive Henderson equation for pH of a acidic buffer mixture. **3**

23. (a) Why do aldehydes and ketones show some common properties? Illustrate this taking any two properties as examples. **3**

    (b) Write a note on perkins reaction. **3**

24. (a) How are monohydric alcohols classified? Give one example for each type. **2**

    (b) Write a note on Collision theory of reaction rates. **4**

## SECTION – D

Answer any **TWO** questions : **2 × 10 = 20**

25. (a) Write the molecular orbital energy level diagram of $O_2$ molecule and explain (i) bond order (ii) magnetic property. **5**

    (b) Draw a neat labelled phase diagram of water system and discuss the importance of various points, lines and areas. **5**

26. (a) Describe osmotic pressure method for the determination of molecular weight of a polymer. **5**

    (b) Explain the reasons for the following :

    (i) Phenols are acidic while alcohols are not. **3**

    (ii) 2, 4, 6-Trinitrophenol is strongly acidic. Explain. **2**

27. (a) State and explain First Law of thermodynamics. What are its limitations? **4**

    (b) How can we obtain lattice energy of solid with the help of Born-Haber cycle? **4**

    (c) Six moles of an ideal gas expands isothermally and reversibly from a volume of 1 $dm^3$ to volume of 10 $dm^3$ at 27°C. What is the maximum work done? **2**

SECTION – E

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

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

28. (a)  What are the postulates of VSEPR theory?                    **5**

    (b)  Explain $sp^2$ hybridisation taking $BF_3$ as example.                    **5**

29. (a)  Explain the Band theory of metals.                    **5**

    (b)  How primary, secondary and tertiary alcohols distinguished by Victor Meyer's method?                    **5**

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