

C 5599

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Name.....

Reg. No.....

SECOND SEMESTER B.Sc. DEGREE EXAMINATION, MAY 2016

(CUCBCSS—UG)

Core Course—Chemistry

CHE 2B 02—THEORETICAL AND INORGANIC CHEMISTRY—II

Time : Three Hours

Maximum : 80 Marks

Section A (One word)

*Answer all questions.
Each question carries 1 mark.*

1. P-orbitals are _____ shaped.
2. Give the electronic configuration of Cr _____.
3. According to modern periodic law, the physical and chemical properties of elements are periodic functions of their _____.
4. Atomic radii of elements _____ along a period.
5. Arrange O_2 , O_2^+ and O_2^- in the increasing bond order.
6. The unit of dipole moment is _____.
7. _____ is the hybridization state of carbon in ethyne.
8. The shape of XeF_4 molecule is _____.
9. Among C_2 , B_2 and N_2 the paramagnetic species is _____.
10. The band theory is used to explain the bonding in _____.

(10 × 1 = 10 marks)

Section B (Short Answer)

*Answer any ten questions.
Each question carries 2 marks.*

11. Ortho nitro phenol is more volatile than Para nitro phenol. Why ?

Turn over

12. Sketch the shapes of all the d-orbitals.
13. Write any *four* factors that influence the ionization energy of an element.
14. Define Eigen value and Eigen function.
15. Write the Schrodinger wave equation. Explain the terms.
16. What is meant by effective nuclear charge ?
17. Arrange the halogens in the increasing order of electron affinity and justify the order.
18. Write the Born-Lande equation and explain the terms.
19. Give any *two* of the Fajan's rules.
20. What is meant by polarity of a covalent bond ? How is it measured ?
21. Mention the different modes by which the vander Waal's forces originate.
22. Write the free electron theory of metallic bond.

(10 × 2 = 20 marks)

Section C (Paragraph)

*Answer any five questions.
Each question carries 6 marks.*

23. Explain the diagonal relationship of elements with example
24. Compare the radial distribution curve of 1S, 2S and 2P orbitals.
25. Obtain the solution of Schrodinger wave equation for a particle in a one dimensional box.
26. What is meant by Lattice energy of an ionic compound ? Explain the Born- Haber cycle in determining the lattice energy of NaCl crystal.
27. Draw the resonating structures of : (i) Carbonate ion ; (ii) Nitrate ion.
28. Give the MO configuration of CO and NO and discuss their bond order and magnetic behaviour.
29. Discuss the, SP^3d and SP^3d^2 hybridisations with suitable example.
30. Explain the Pauling and Mulliken scales of Electro negativity.

(5 × 6 = 30 marks)

Section D (Essay)

*Answer any two questions.
Each question carries 10 marks.*

31. (i) Write the important postulates of quantum mechanics.
(ii) What are quantum numbers ? How are they significant ?
32. Write notes on :
- (i) Aufbau Principle.
 - (ii) Hund's rule of maximum multiplicity, and
 - (iii) Paulis exclusion principle.
33. (i) What are the important postulates of VSEPR theory ?
(ii) How is VSEPR theory applied in determining the shapes of NH_3 , H_2O and ClF_3 molecules ?
34. Compare VB and MO theories of Chemical bonding.

(2 × 10 = 20 marks)