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Total Pages : 3

GSE/D-19

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CHEMISTRY

(Inorganic Chemistry)

Paper : CH-101

Time : Three Hours]

[Maximum Marks : 32

Note : Attempt *five* questions in all, selecting *two* questions from each Section. Question No. 1 is compulsory.

Compulsory Question

1. (a) Why dipole moment of CCl_4 is zero ?
- (b) How many degenerate orbitals are present in 3d subshell ?
- (c) Why size of anion is bigger than neutral atom ?
- (d) Which lattice defect decreases density of ionic crystal ?
- (e) Define Polarisability.
- (f) Why Li_2CO_3 is unstable while Na_2CO_3 is quite stable ?
- (g) Name the type of hybridisation of central atom in NO_3^{-1} ion.
- (h) When a subshell is labelled as 's' the value of l is and m has value (1×8)

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SECTION-A

2. (a) Write electronic configuration of Na^{+1} and Lanthanum ($z = 57$). 2
- (b) Draw shapes of 1s and 2s orbitals. What is basic difference between their structures ? 2
- (c) What are Normal and Orthogonal wave functions ? 2
3. (a) Calculate deBroglie wavelength of an electron having kinetic energy 4.55×10^{-25} J. Given $h = 6.6 \times 10^{-34}$ Kg $m^2 s^{-1}$ $m = 9.1 \times 10^{-31}$ Kg. 2
- (b) Calculate effective nuclear charge experienced by 3d electron of Iron ($z = 26$). 2
- (c) What is significance of Uncertainty principle in our daily life ? 2
- ✓ (a) Discuss various factors on which Ionisation energy depends. 2½
- (b) Why first ionisation energy of Aluminium is lower than magnesium ? 2
- (c) Write general electronic configuration of d-Block and f-Block elements. 1½
5. (a) Discuss Mulliken scale of electronegativity and give its disadvantages. 2½
- (b) Why ionisation energy of Na^{+1} is more than that of Neon ? 2
- (c) Why Electron affinity of Be and Mg are zero ? 1½

SECTION-B

6. (a) Discuss the shape of ClO_4^- on the basis of hybridization. 2
- (b) Sketch the shapes of molecular orbitals obtained by sidewise p-p overlapping of atomic orbitals. 2
- (c) Write various factors on which Bond energy depends. 2
7. (a) Draw molecular orbital energy level diagram for Nitric oxide (NO) molecule and calculate its bond order. 2
- (b) What are main postulates of molecular orbital theory ? 2
- (c) Dipole moment of H-X molecule is 1.92 D and bond distance is 1.2 Å. Calculate percentage of ionic character of H-X. 2
8. (a) Draw and discuss structure of Sodium chloride. 2½
- (b) What are Frenkel defects ? 2
- (c) Why molten NaCl can conduct electricity ? 1½
9. (a) Write down the factors favouring the formation of ionic bond. 2
- (b) Tabulate Radius ratio rule for ionic crystals. 2
- (c) Why silver halides are insoluble in water ? 2