**PSG COLLEGE OF ARTS & SCIENCE**
**(AUTONOMOUS)**

**BSc DEGREE EXAMINATION DECEMBER 2019**
**(First Semester)**

**Branch-CHEMISTRY**

**GENERAL CHEMISTRY -1**

**Time: Three Hours** **Maximum: 75 Marks**

**SECTION-A HO Marks)**
**Answer ALL questions**
**ALL questions carry EQUAL marks** **(10x1 = 10)**

**Find the Bohr's radius for Hydrogen atom in the ground state**

**0) r,** $\frac{n^2h^2}{4\pi^2me^2}$ **(ii) n** $\frac{h'}{27\pi me^2}$

**(iii) rn=-** $\frac{n^2h^2}{^^Zem}$ **(iv)** $r_n = \frac{n^2h^2}{2\% Zem}$

**Which of the following is Compton equation?**

(i) $AX - \frac{}{me}(1-\sin 0)$ (ii) $AX == \frac{}{me^2}{}^{x}\sin^2 0/2$

(iii) $AX = \frac{}{me}(1-\cos 0)$ (iv) $AX = \frac{}{me^2}{}^{y}\cos^2 0/2$

**What will be the period of an element with atomic number 6 in the periodic table?**
**(i) II$^{nd}$** **(ii) V$^{th}$**
**(iii) VI$^{th}$** **(iv) VII$^{th}$**

**What will be the nature of bond between two electrons having large difference of electronegativity?**
**(i) Purely covalent** **(ii) 50% covalent and 50% ionic**
**(iii) More covalent than ionic** **(iv) More ionic than covalent**

**Identify the non-directional bond**
**(i) Covalent bond** **(ii) Metallic bond**
**(iii) Co-ordinate bond** **(iv) botha&b**

**Which of the following exhibit variable valency?**
**(i) Noble gases** **(ii) Alkali metals**
**(iii) Transition elements** **(iv) All the above**

**What will be the number of molecular orbitals formed?**
**(i) Equal to the number of combining atomic orbitals**
**(ii) Less than the number of combining atomic orbitals**
**(iii) More than the number of combining atomic orbitals**
**(iv) Double the number of combining atomic orbitals**
**Which of the following cannot exist based on MO theory?**
**(i)** $He_2^+$ **(ii)** $He_2$
**(iii)** $H_2^+$ **(iv)**$C_2$

**Which hybridization is exhibited by carbon in methane?**
**(i) sp** **(ii) sp$^2$**
**(iii) sp$^3$** **(iv)sp d**

10 **Choose the more stable among the following**
**(i)**$CH_3^+$ **(ii)** $CH_3CH_2^+$
**(iii)** $(CH_3)_2CH^+$ **(iv)**$(CH_3)_3C^+$

## SECTION - B (25 Marks)

**Answer ALL questions**

**ALL questions carry EQUAL Marks ( 5 x 5 = 25)**

**11 a Outline the postulates of Bohr's model of atom and its limitations.**

**OR**

**b Bring out the De-Broglie equation and how can it be experimentally verified?**

**12 a Show the trends of atomic and ionic redii in the periodic table.**

**OR**

**b Explain the Ionization energy in detail.**

**13 a Outline the inert pair effect.**

**OR**

**b Explain hydrogen bonding with an example.**

**14 a Compare VB theory and MO theory.**

**OR**

**b Differentiate bonding and antibonding.**

**15a Describe the van der waals intraction and charge transfer reactions.**

**OR**

**b Compare the substitution and elimination reactions.**

## SECTION -C (40 Marks!

**Answer ALL questions**

**ALL questions carry EQUAL Marks ( 5 x 8 = 40)**

**16 a Discuss (i) Photoelectric effect (ii) Heisenberg's uncertainity principle.**

**OR**

**b Summarize Paulis Exclusion principle, Aufbau principle and Hund's rule.**

**17 a Analyze the construction of modem periodic table and Highlight its applications in explaining the chemical behaviour.**

**OR**

**b Discuss electronaffinity and electronegativity, their trends in periodic table and their determinations.**

**18 a Compare the ionic, covalent and co-ordinate covalent bonds and pointout the general characteristics of ionic compounds.**

**OR**

**b Discuss (i) Fajan's rule (ii) Bom-Haber cycle**

**19** a **Discuss the energy changes during bond formation and the correlation of bond energies and bond enthalpies.**

**OR**

**b Discuss the structure of $N_2$ and NO" based on MO theory.**

**20 a Discuss (i) Geometry of ethylene (ii) Steric effect.**

**OR**

**b Summarize the reactive intermediates.**

Z-Z-Z END