

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

**BSc DEGREE EXAMINATION DECEMBER 2022
(First Semester)**

Branch **CHEMISTRY**

GENERAL CHEMISTRY – I

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (5 x 1 = 5)

1. The correct order of electronegativity is

(i) $\text{Cl} > \text{F} > \text{O} > \text{Br}$	(ii) $\text{F} > \text{O} > \text{Cl} > \text{Br}$
(iii) $\text{F} > \text{Cl} > \text{Br} > \text{O}$	(iv) $\text{O} > \text{F} > \text{Cl} > \text{Br}$

2. The value of lattice energy is affected by

(i) size and charge of ions	(ii) size of ions only
(iii) charge of ions only	(iv) mass of ions

3. Antibonding molecular orbitals are produced by
 - (i) constructive interaction of atomic orbitals.
 - (ii) destructive interaction of atomic orbitals.
 - (iii) the overlap of the atomic orbitals of two negative ions
 - (iv) all of these

4. Which of the following quantity is kept constant in Boyle's law?

i) Gas mass only	(ii) Gas Temperature only
(iii) Gas Mass and Gas Pressure	(iv) Gas Mass and Gas Temperature

5. Hyperconjugation involves the delocalisation of _____

(i) σ bond orbital	(ii) π bond orbital
(iii) Both σ and π bond orbital	(iv) None of the mentioned

SECTION - B (15 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6. a. Explain the Heisenberg's uncertainty principle.
OR
b. Define the following terms.

i. Atomic radii	ii Ionic radii.
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7. a. Explain the variable valency and inert pair effect.
OR
b. Discuss the van der Waal's attraction with example.

8. a. Define the following terms.

i. Bond energy	ii. Bond length.
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OR
b. Explain the comparison between VB and MO theory.

Cont...

9. a. Explain the postulates of kinetic theory of gases.
OR
b. Describe the collision number and collision frequency.
10. a. Explain the hybridization with example.
OR
b. Discuss the carbocations and free radicals with example.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

11. a. Explain the quantum numbers.
OR
b. Discuss the Pauling scale of electronegativity.
12. a. Define electronegativity and explain the Born-Haber cycle.
OR
b. Describe the structure of NH_3 and H_2O using VSEPR theory.
13. a. Explain the molecular orbital diagram of O_2 .
OR
b. Describe the molecular orbital diagram of CO_2 .
14. a. Explain compressibility factor of van der Waals equation of state for real gases.
OR
b. Explain the Maxwell Boltzmann distribution laws of molecular velocities.
15. a. Discuss the hyperconjugation and steric effect.
OR
b. Explain the homolytic and heterolytic cleavage with example.

Z-Z-Z

END