

Topic :- Classification of Elements & Periodicity in Properties

- 1 (d)
SiO₂ structure is definite.
- 2 (d)
P in PO₄³⁻ has sp³-hybridization like S in SO₄²⁻.
- 3 (c)
C – F bond is more polar than C – Cl.
- 4 (b)
Ionic radii $\propto \frac{1}{Z_{\text{eff}}} \propto \text{charge of anion}$
 $\propto \frac{1}{\text{charge on cation}}$
Thus, the order of ionic radii is
N³⁻ > O²⁻ > F⁻ > Na⁺ > Mg²⁺
- 5 (c)
Ionic radii is the distance between the nucleus of an ion and a point upto which the nucleus has its influence on its electron cloud.
The size of ions increases on moving from top to bottom in a group. Hence, the maximum distance between the centres of cations and anions is in CsI because Cs is the largest cation and I is the largest anion.
- 6 (b)
Bond angles of BeF₂, H₂O, NH₃ and CH₄ are 180°, 104°31', 106°50', 109°28' respectively.
- 7 (b)
Count σ and π bonds.
- 8 (b)
The atomic radii decreases along the period and increases down the gp.
- 9 (b)
Ionisation energy increases along the period.
- 10 (d)
Due to dipole moment intramolecular forces of attraction becomes stronger and thus, liquefaction becomes easier.
- 11 (d)
He₂⁺ (B.O. = 0.5) < O₂⁻ (B.O. = 1.5)
< NO (B.O. = 2.5) < C₂²⁻ (B.O. = 3.0)

12 **(c)**
Larger is anion, more is covalent character.

13 **(c)**
Due to resonance structure of C_6H_6 .

14 **(a)**
 $5(\text{on P}) + 4(\text{on H}) - 1 = 8$.

15 **(a)**
Pauling scale is based upon the excess bond energies. Pauling equation for determining the electronegativity of an element is

$$X_A - X_B = 0.208\sqrt{\Delta}$$

where, X_A, X_B = electronegativity values of element A and B
 Δ = polarity of $A - B$ bond.

16 **(a)**
 Be^{2+} is smallest and Na^+ has largest radius.

17 **(b)**
Both have sp^2 -hybridization geometry.

18 **(d)**
Non-polar species exert van der Waals' forces among themselves.

19 **(d)**
 ICl_2^- has sp^3d -hybridization and has two bond pairs and three lone pairs of electrons.

20 **(d)**
Halogens are strong oxidising agents. The oxidising power halogen decreases from fluorine to iodine, because their reduction potential decreases from fluorine to iodine. The increasing order of their oxidising power is as

Element $I_2 < Br_2 < Cl_2 < F_2$

Reduction

potential +0.54 +1.06 +1.36 +2.87

ANSWER-KEY

Q.	1	2	3	4	5	6	7	8	9	10
A.	D	D	C	B	C	B	B	B	B	D
Q.	11	12	13	14	15	16	17	18	19	20
A.	D	C	C	A	A	A	B	D	D	D

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