

FINAL NEET(UG)-2020 EXAMINATION

 (Held On Wednesday 14th OCTOBER, 2020)

CHEMISTRY
TEST PAPER WITH ANSWER & SOLUTION

1. Which of the following statement is **NOT** true about acid rain ?
- (1) It is due to reaction of SO₂, NO₂ and CO₂ with rain water
 - (2) Causes no damage to monuments like Taj Mahal.
 - (3) It is harmful for plants.
 - (4) Its pH is less than 5.6

Ans. (2)
Sol. Acid rain causes to damage to monuments like Tajmahal.

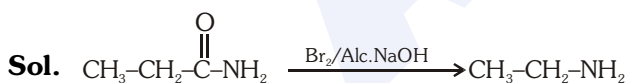
2. The oxidation number of the underlined atom in the following species
- (1) Cu₂O is -1
 - (2) ClO₃⁻ is +5
 - (3) K₂Cr₂O₇ is + 6
 - (4) HAuCl₄ is +3

Identify the incorrect option.

Ans. (1)

Sol. Ox. state of "O" in Cu₂O = -2
 Ox. state of "Cl" in ClO₃⁻ = +5
 Ox. state of "Cr" in K₂Cr₂O₇ = +6
 Ox. state of "Au" in HAuCl₄ = + 3
 ∴ (1) is incorrect

3. Reaction of propanamide with ethanolic sodium hydroxide and bromine will give
- (1) Ethylamine
 - (2) Methylamine
 - (3) Propylamine
 - (4) Aniline

Ans. (1)


Hoffmann bromamide degradation reaction.

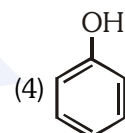
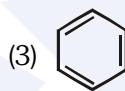
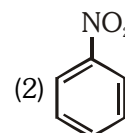
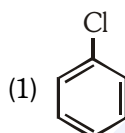
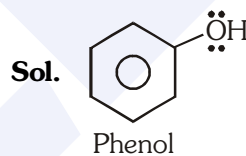
4. A liquid compound (x) can be purified by steam distillation only if it is
- (1) Steam volatile, immiscible with water
 - (2) Not steam volatile, miscible with water
 - (3) Steam volatile, miscible with water
 - (4) Not steam volatile, immiscible with water

Ans. (1)
Sol. Compounds purified by steam distillation which are immiscible in water but steam volatile.

5. Among the compounds shown below which one revealed a linear structure ?
- (1) NO₂
 - (2) HOCl
 - (3) O₃
 - (4) N₂O

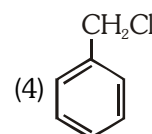
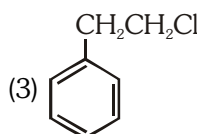
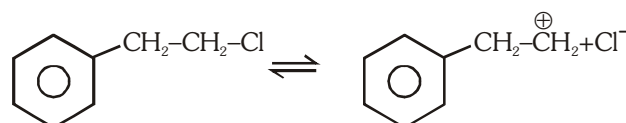
Ans. (4)
Sol. :N≡N→ $\ddot{\text{O}}$: (Linear)

6. Which of the following compound is most reactive in electrophilic aromatic substitution ?


Ans. (4)


+ R effect of -OH group enhances the reactivity in aromatic electrophilic substitution reaction.

7. Which of the following will **NOT** undergo S_N1 reaction with $\bar{\text{O}}\text{H}$?

 (1) CH₂ = CH - CH₂Cl (2) (CH₃)₃ CCl

Ans. (3)
Sol. Reactivity in case of S_N1 reaction depends upon formation of carbocation.


Primary carbocation is less likely to be formed (due to unstability)

8. Which of the following is **not** true about chloramphenicol ?

- (1) It inhibits the growth of only gram positive bacteria.
- (2) It is a broad spectrum antibiotic.
- (3) It is not bactericidal.
- (4) It is bacteriostatic.

Ans. (1)

Sol. Chloramphenicol is a broad spectrum antibiotic which can inhibit the growth of gram positive bacteria and gram negative bacteria.

9. Which of the following statement is correct about Bakelite ?

- (1) It is a cross linked polymer.
- (2) It is an addition polymer.
- (3) It is a branched chain polymer.
- (4) It is a linear polymer.

Ans. (1)

Sol. Bakelite is an example of cross-linked polymer.

10. If for a certain reaction $\Delta_r H$ is 30 kJ mol^{-1} at 450 K, the value of $\Delta_r S$ (in $\text{JK}^{-1} \text{mol}^{-1}$) for which the same reaction will be spontaneous at the same temperature is

- (1) 70
- (2) -33
- (3) 33
- (4) -70

Ans. (1)

Sol. $\Delta G = \Delta H - T\Delta S$

For spontaneous,

$$\Delta G < 0$$

$$\Delta H - T\Delta S < 0$$

$$\Delta S > \frac{\Delta H}{T}$$

$$\Delta S > \frac{30 \times 10^3 \text{ J mol}^{-1}}{450 \text{ K}}$$

$$\Delta S > 66.6 \text{ J mol}^{-1} \text{ K}^{-1} \text{ (Check by options)}$$

11. Match the element in column I with that in column II.

Column-I

- (a) Copper
- (b) Fluorine
- (c) Silicon
- (d) Cerium

Column-II

- (i) Non-metal
- (ii) Transition metal
- (iii) Lanthanoid
- (iv) Metalloid

Identify the correct match :

- (1) (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)
- (2) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)
- (3) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)
- (4) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

Ans. (2)

Sol. Copper – Transition metal

Fluorine – Non metal

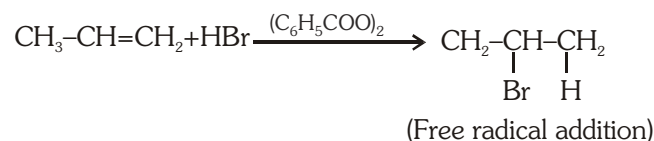
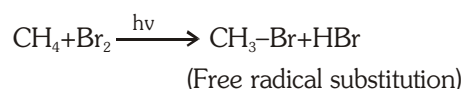
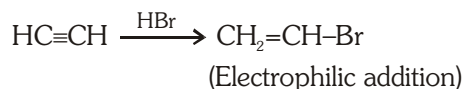
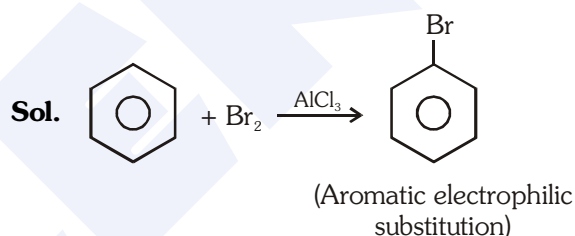
Silicon – Metalloids

Cerium – Lanthanoid

12. Which of the following is a free radical substitution reaction ?

- (1) Benzene with $\text{Br}_2/\text{AlCl}_3$
- (2) Acetylene with HBr
- (3) Methane with $\text{Br}_2/h\nu$
- (4) Propene with $\text{HBr}/(\text{C}_6\text{H}_5\text{COO})_2$

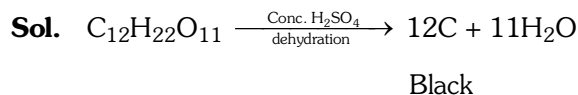
Ans. (3)



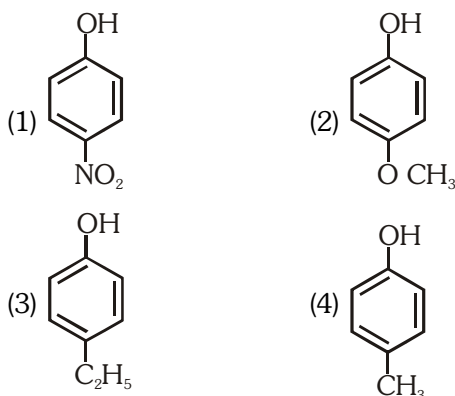
13. The reaction of concentrated sulphuric acid with carbohydrates ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) is an example of

- (1) Dehydration
- (2) Oxidation
- (3) Reduction
- (4) Sulphonation

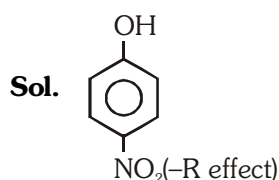
Ans. (1)



14. Which of the following substituted phenols is the strongest acid?



Ans. (1)



-NO₂ group is electron withdrawing group. Which increases the acidic strength of phenol.

15. Match the compounds of Xe in column I with the molecular structure in column II.

Column-I	Column-II
(a) XeF ₂	(i) Square planar
(b) XeF ₄	(ii) Linear
(c) XeO ₃	(iii) Square pyramidal
(d) XeOF ₄	(iv) Pyramidal
(1) (a)-(ii) (b)-(i) (c)-(iii) (d)-(iv)	
(2) (a)-(ii) (b)-(iv) (c)-(iii) (d)-(i)	
(3) (a)-(ii) (b)-(iii) (c)-(i) (d)-(iv)	
(4) (a)-(ii) (b)-(i) (c)-(iv) (d)-(iii)	

Ans. (4)

Sol. XeF₂ → Linear
XeF₄ → Square planar
XeO₃ → Pyramidal
XeOF₄ → Square pyramidal

16. The half-life for a zero order reaction having 0.02 M initial concentration of reactant is 100 s. The rate constant (in mol L⁻¹ s⁻¹) for the reaction is

- (1) 1.0 × 10⁻⁴ (2) 2.0 × 10⁻⁴
(3) 2.0 × 10⁻³ (4) 1.0 × 10⁻²

Ans. (1)

Sol. $(t_{1/2})_{\text{zero}} = \frac{[A]_0}{2K}$

$$100s = \frac{0.02M}{2K}$$

$$K = \frac{0.02M}{2 \times 100} = 1 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$$

17. Identify the **incorrect** statement from the following:

- Zirconium and Hafnium have identical radii of 160 pm and 159 pm, respectively as a consequence of lanthanoid contraction.
- Lanthanoids reveal only +3 oxidation state.
- The lanthanoid ions other than the f⁰ type and the f¹⁴ type are all paramagnetic.
- The overall decrease in atomic and ionic radii from lanthanum to lutetium is called lanthanoid contraction.

Ans. (2)

Sol. Lanthanoids shows general oxidation state +3 but some elements can shows +2 as well as +4.

18. Match the following aspects with the respective metal.

Aspects	Metal
(a) The metal which reveals a maximum number of oxidation states	(i) Scandium
(b) The metal although placed in 3d block is considered not as a transition element	(ii) Copper
(c) The metal which does not exhibit variable oxidation states	(iii) Manganese
(d) The metal which in +1 oxidation state in aqueous solution undergoes disproportionation	(iv) Zinc

Select the correct option :

- (a)-(i) (b)-(iv) (c)-(ii) (d)-(iii)
- (a)-(iii) (b)-(iv) (c)-(i) (d)-(ii)
- (a)-(iii) (b)-(i) (c)-(iv) (d)-(ii)
- (a)-(ii) (b)-(iv) (c)-(i) (d)-(iii)

Ans. (2)

Sol. In the given options
 The metal which reveals a maximum number of oxidation state \rightarrow Mn
 The metal although placed in 3d block is considered not as a transition element is \rightarrow Zn
 The metal which does not exhibit variable oxidation state is \rightarrow Sc (only +3)
 The metal which in +1 oxidation state in aqueous solution undergoes disproportionation is \rightarrow Cu

- 19.** If 8g of a non-electrolyte solute is dissolved in 114 g of n-octane to reduce its vapour pressure to 80%, the molar mass (in g mol^{-1}) of the solute is [Given that molar mass of n-octane is 114 g mol^{-1}]
 (1) 40 (2) 60
 (3) 80 (4) 20

Ans. (1)

Sol. Assuming dilute solution,

$$\frac{P_0 - P_s}{P_s} \approx \frac{P_0 - P_s}{P_0} = \frac{n_{\text{solute}}}{n_{\text{solvent}}}$$

Let $P_0 = 100$, V.P reduced to 80%, $\therefore P_s = 80$

$$\frac{100 - 80}{80} = \frac{8 / m}{114 / 114}$$

$m = 40$

- 20.** Match the coordination number and type of hybridisation with distribution of hybrid orbitals in space based on Valence bond theory.

Coordination number and type of hybridisation

(a) 4, sp^3

(b) 4, dsp^2

(c) 5, sp^3d

(d) 6, d^2sp^3

Distribution of hybrid orbitals in space

(i) trigonal bipyramidal

(ii) octahedral

(iii) tetrahedral

(iv) square planar

Select the correct option :

(1) (a)-(ii) (b)-(iii) (c)-(iv) (d)-(i)

(2) (a)-(iii) (b)-(iv) (c)-(i) (d)-(ii)

(3) (a)-(iv) (b)-(i) (c)-(ii) (d)-(iii)

(4) (a)-(iii) (b)-(i) (c)-(iv) (d)-(ii)

Ans. (2)

Sol. sp^3 - tetrahedral, dsp^2 - square planar
 sp^3d - trigonal bipyramidal, d^2sp^3 - octahedral

- 21.** The number of angular nodes and radial nodes in 3s orbital are
 (1) 0 and 2, respectively
 (2) 1 and 0, respectively
 (3) 3 and 0, respectively
 (4) 0 and 1, respectively

Ans. (1)

Sol. No. of angular nodes = ℓ
 No. of Radial nodes = $n - \ell - 1$
 For 3s ; $n = 3$ and $\ell = 0$
 \therefore No. of angular nodes = 0
 \therefore No. of radial nodes = 2

- 22.** Identify the correct statement from the following.
 (1) The order of hydration enthalpies of alkaline earth cations
 $\text{Be}^{2+} < \text{Mg}^{2+} < \text{Ca}^{2+} < \text{Sr}^{2+} < \text{Ba}^{2+}$
 (2) Lithium and Magnesium show some similarities in their physical properties as they are diagonally placed in periodic table.
 (3) Lithium is softer among all alkali metals.
 (4) Lithium chloride is deliquescent and crystallises as a hydrate, $\text{LiCl} \cdot \text{H}_2\text{O}$.

Ans. (2)

Sol. Li & Mg shows diagonal relationship that's why they shows similarity in their physical properties.

- 23.** Deficiency of which vitamin causes osteomalacia ?
 (1) Vitamin A
 (2) Vitamin D
 (3) Vitamin K
 (4) Vitamin E

Ans. (2)

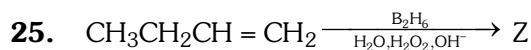
Sol. Deficiency of vitamin D causes osteomalacia (soft bones and joint pain in adults)

- 24.** Identify the wrongly matched pair.

Molecule	Shape or geometry of molecule
(1) PCl_5	Trigonal planar
(2) SF_6	Octahedral
(3) BeCl_2	Linear
(4) NH_3	Trigonal pyramidal

Ans. (1)

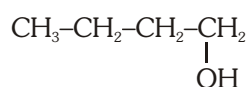
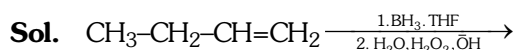
Sol. PCl_5 - Trigonal bipyramidal



What is Z ?

- (1) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
- (2) $\text{CH}_3\text{CH}_2\underset{\text{OH}}{\text{CH}}\text{CH}_3$
- (3) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$
- (4) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$

Ans. (1)



(Hydroboration-oxidation)

26. Identify the reaction from following having top position in EMF series (Std. red. potential) according to their electrode potential at 298 K.

- (1) $\text{Mg}^{2+} + 2e^- \rightarrow \text{Mg}_{(s)}$
- (2) $\text{Fe}^{2+} + 2e^- \rightarrow \text{Fe}_{(s)}$
- (3) $\text{Au}^{3+} + 3e^- \rightarrow \text{Au}_{(s)}$
- (4) $\text{K}^+ + 1e^- \rightarrow \text{K}_{(s)}$

Ans. (3)

Sol. According to electrode potential series, $\text{Au}^{3+} + 3e^- \rightarrow \text{Au}_{(s)}$ (has topmost position \Rightarrow max. SRP)

27. Match the elements in Column I with methods of purification in Column II.

Column I

- (a) Boron
- (b) Tin
- (c) Zirconium
- (d) Nickel

Column II

- (i) Van Arkel method
- (ii) Mond's process
- (iii) Liquefaction
- (iv) Zone refining

- (1) (a)-(iv) (b)-(iii) (c)-(i) (d)-(ii)
- (2) (a)-(iv) (b)-(iii) (c)-(ii) (d)-(i)
- (3) (a)-(ii) (b)-(i) (c)-(iv) (d)-(iii)
- (4) (a)-(iii) (b)-(iv) (c)-(i) (d)-(ii)

Ans. (1)

Sol. B - Purified by Zone Refining

Sn - Liquefaction

Zr - Van arkel method

Ni - Mond's process

28. Which among the following salt solutions is basic in nature ?

- (1) Ammonium chloride
- (2) Ammonium sulphate
- (3) Ammonium nitrate
- (4) Sodium acetate

Ans. (4)

Sol. $\text{CH}_3\text{COONa} \Rightarrow$ Salt of CH_3COOH (WA) + NaOH (SB)
 \therefore Solution of CH_3COONa shows basic nature.

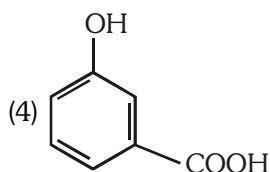
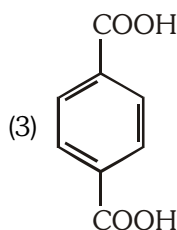
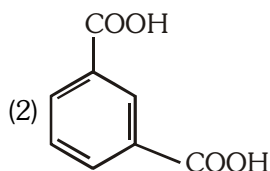
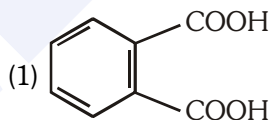
29. In which of the sols, the colloidal particles are with negative charge ?

- (1) TiO_2
- (2) Haemoglobin
- (3) Starch
- (4) Hydrated Al_2O_3

Ans. (3)

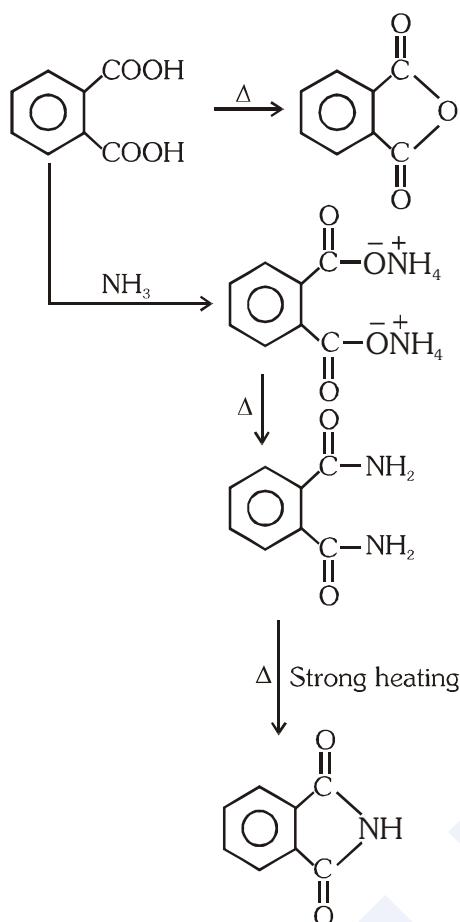
Sol. Starch is example of negative sol.

30. Which of the following acid will form an (a) Anhydride on heating and (b) Acid imide on strong heating with ammonia ?



Ans. (1)

Sol.



31. In a typical fuel cell, the reactants (R) and product (P) are :-

- (1) $R = H_{2(g)}, O_{2(g)}; P = H_2O_{2(l)}$
- (2) $R = H_{2(g)}, O_{2(g)}; P = H_2O_{(l)}$
- (3) $R = H_{2(g)}, O_{2(g)}, Cl_{2(g)}; P = HClO_{4(aq)}$
- (4) $R = H_{2(g)}, N_{2(g)}; P = NH_{3(aq)}$

Ans. (2)

Sol. In typical fuel cell

Reactants = H_2, O_2

Products = H_2O

32. In collision theory of chemical reaction, Z_{AB} represents

- (1) the fraction of molecules with energies greater than E_a
- (2) the collision frequency of reactants, A and B
- (3) steric factor
- (4) the fraction of molecules with energies equal to E_a

Ans. (2)

Sol. Z_{AB} = Collision frequency

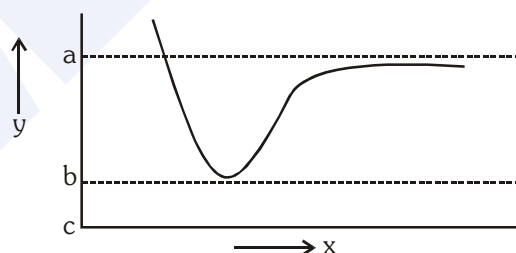
33. Which of the following statement is **not** true about glucose ?

- (1) It is an aldohexose.
- (2) It contains five hydroxyl groups.
- (3) It is a reducing sugar.
- (4) It is an aldopentose.

Ans. (4)

Sol. $\begin{array}{c} \text{CHO} \\ | \\ (\text{CHOH})_4 \\ | \\ \text{CH}_2\text{OH} \\ \text{Glucose} \end{array}$ It is an aldohexose sugar.

34. The potential energy (y) curve for H_2 formation as a function of internuclear distance (x) of the H atoms is shown below.



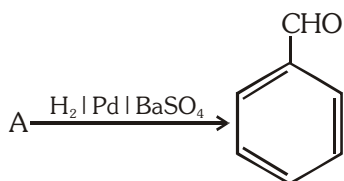
The bond energy of H_2 is :

- (1) $(b - a)$
- (2) $\frac{(c - a)}{2}$
- (3) $\frac{(b - a)}{2}$
- (4) $(c - a)$

Ans. (1)

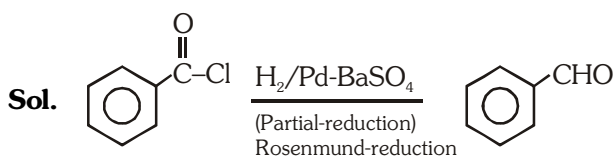
Sol. As per the given curve bond energy is the amount of energy is released during the bond formation is i.e. = Final - Initial
= $b - a$

35. Identify compound (A) in the following reaction :

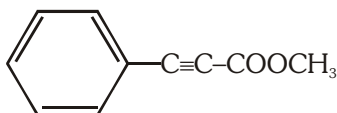


- (1) Benzoyl chloride
- (2) Toluene
- (3) Acetophenone
- (4) Benzoic acid

Ans. (1)

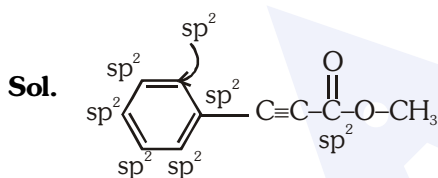


36. How many (i) sp^2 hybridised carbon atoms and (ii) π bonds are present in the following compound ?



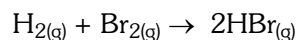
- (1) 7, 5
- (2) 8, 6
- (3) 7, 6
- (4) 8, 5

Ans. (3)



7- sp^2 carbons, 6 π bonds

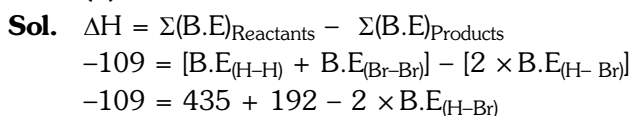
37. At standard conditions, if the change in the enthalpy for the following reaction is -109 kJ mol^{-1}



Given that bond energy of H_2 and Br_2 is 435 kJ mol^{-1} and 192 kJ mol^{-1} , respectively, what is the bond energy (in kJ mol^{-1}) of HBr ?

- (1) 368
- (2) 736
- (3) 518
- (4) 259

Ans. (1)



$$B.E_{(H-Br)} = \frac{435 + 192 + 109}{2} = 368 \text{ KJ/mol}$$

38. The minimum pressure required to compress 600 dm^3 of a gas at 1 bar to 150 dm^3 at 40°C is

- (1) 4.0 bar
- (2) 0.2 bar
- (3) 1.0 bar
- (4) 2.5 bar

Ans. (1)

Sol. By Boyle's law

$$P_1V_1 = P_2V_2$$

$$1 \text{ bar} \times 600 \text{ dm}^3 = P_2 \times 150 \text{ dm}^3$$

$$P_2 = 4 \text{ bar}$$

39. What is the role of gypsum, $CaSO_4 \cdot 2H_2O$ in setting of cement ? Identify the correct option from the following :

- (1) to fasten the setting process
- (2) to provide water molecules for hydration process
- (3) to help to remove water molecules
- (4) to slow down the setting process

Ans. (4)

Sol. The purpose of adding gypsum is only to slow down the process of setting of cement so that it gets sufficiently hardened

40. Which of the following oxide is amphoteric in nature?

- (1) SnO_2
- (2) SiO_2
- (3) GeO_2
- (4) CO_2

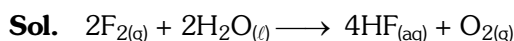
Ans. (1)

Sol. SnO_2 - amphoteric

41. Which one of the following reactions does not come under hydrolysis type reaction ?

- (1) $SiCl_{4(l)} + 2H_2O_{(l)} \rightarrow SiO_{2(s)} + 4HCl_{(aq)}$
- (2) $Li_3N_{(s)} + 3H_2O_{(l)} \rightarrow NH_{3(g)} + 3LiOH_{(aq)}$
- (3) $2F_{2(g)} + 2H_2O_{(l)} \rightarrow 4HF_{(aq)} + O_{2(g)}$
- (4) $P_4O_{10(s)} + 6H_2O_{(l)} \rightarrow 4H_3PO_{4(aq)}$

Ans. (3)



It's a type of Redox reaction.

42. Which one of the following compounds shows both, Frenkel as well as Schottky defects ?

- (1) AgBr
- (2) AgI
- (3) NaCl
- (4) ZnS

Ans. (1)

Sol. AgBr shows both schottky and frenkel defect

43. One mole of carbon atom weighs 12 g, the number of atoms in it is equal to, (Mass of carbon – 12 is 1.9926×10^{-23} g)

- (1) 1.2×10^{23}
- (2) 6.022×10^{22}
- (3) 12×10^{22}
- (4) 6.022×10^{23}

Ans. (4)

Sol. 1 mole of carbon = 6.022×10^{23} atoms

44. Isotonic solutions have same

- (1) vapour pressure
- (2) freezing temperature
- (3) osmotic pressure
- (4) boiling temperature

Ans. (3)

Sol. Isotonic solutions have same osmotic pressure.

45. The solubility product for a salt of the type AB is 4×10^{-8} . What is the molarity of its standard solution?

- (1) 2×10^{-4} mol/L
- (2) 16×10^{-16} mol/L
- (3) 2×10^{-16} mol/L
- (4) 4×10^{-4} mol/L

Ans. (1)

Sol. K_{sp} for AB = $s^2 = 4 \times 10^{-8}$

$$\therefore \text{Molarity of solution} = \text{solubility} = \sqrt{K_{sp}}$$

$$= \sqrt{4 \times 10^{-8}}$$

$$= 2 \times 10^{-4} \text{ mol/L}$$