

Select the correct order of percentage yield of products A, B & C respectively -

- (1) $A > B > C$ (2) $B > A > C$ (3) $A > C > B$ (4) $C > B > A$

Ans. (4)

2. Statement-1: Thermal power plant waste is non biodegradable.

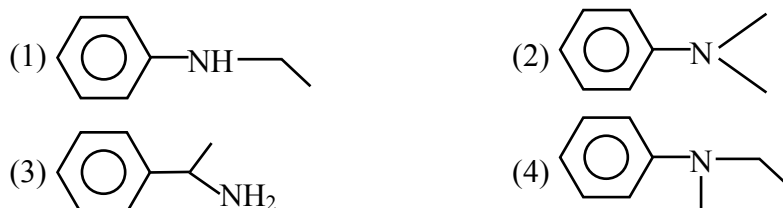
Statement-2: Biodegradable detergent causes eutrophication.

- (1) Both Statement-1 and Statement-2 are correct
 (2) Both Statement-1 and Statement-2 are false
 (3) Statement-1 is correct and Statement-2 is false
 (4) Statement-1 is false and Statement-2 is correct

Ans. (1)

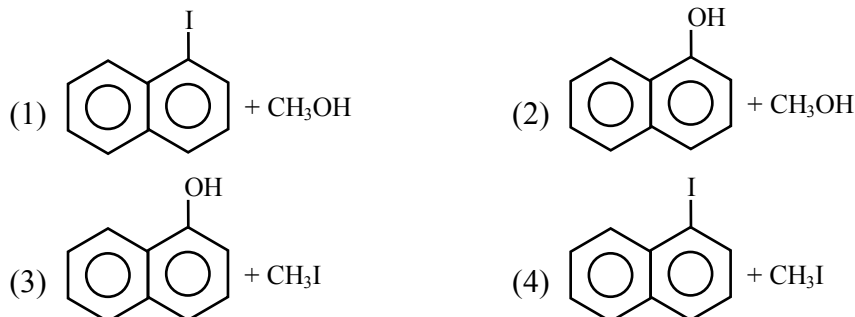
3. Compound A reacts with benzene sulfonyl chloride to form B which is soluble in NaOH.

Compound A is-

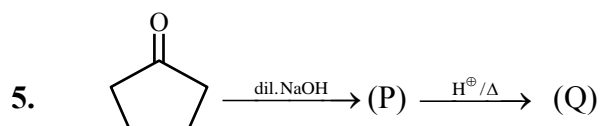


Ans. (3)

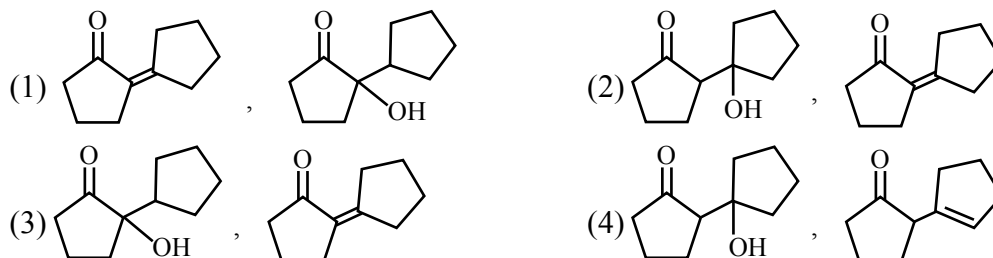
4. What product are obtained when 1-Methoxy naphthalene reacts with hydroiodic acid?



Ans. (3)



(P) and (Q) respectively are :



Ans. (2)

6. Match the column

Column-I

- (A) Artificial sugar
(B) Tranquilizer
(C) Antifertility drug
(D) Antacid

Column-II

- (i) Meprobamate
(ii) Ranitidine
(iii) Norethindrone
(iv) Alitame

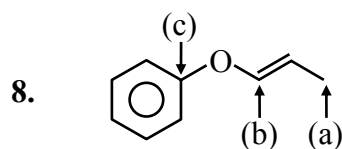
- (1) (A) → (iv) ; (B) → (i) ; (C) → (iii) ; (D) → (ii)
(2) (A) → (iv) ; (B) → (i) ; (C) → (ii) ; (D) → (iii)
(3) (A) → (iv) ; (B) → (iii) ; (C) → (i) ; (D) → (ii)
(4) (A) → (i) ; (B) → (iii) ; (C) → (iv) ; (D) → (ii)

Ans. (1)

7. Vitamin K deficiency causes -

- (1) increased blood clotting time. (2) decreased blood clotting time.
(3) increased fragility of RBCs. (4) night blindness.

Ans. (1)

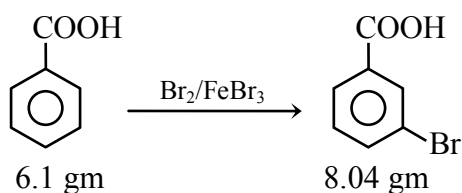


Hybridisation of marked carbon atoms a, b and c are respectively-

- (1) sp^3 , sp^3 , sp^3 (2) sp^2 , sp^2 , sp^3 (3) sp^3 , sp^2 , sp^2 (4) sp^3 , sp^2 , sp

Ans. (3)

9. Percentage yield of product obtained in the following reaction is



Ans. (80)

10. In the reaction of benzamide with hypobromite CO group is obtained in the form of -

- (1) CO (2) CO₂ (3) CO₃⁻² (4) HCO₃⁻

Ans. (3)

11. Match the column

Column-I

- (A) Be
(B) Mg
(C) Ca
(D) Ra

Column-II

- (P) Used in treatment of cancer
(Q) Used in reduction of metals
(R) Used for making windows of x-ray tubes
(S) Used in signal & explosive

- (1) (A) →(R) ; (B) →(S) ; (C) →(Q) ; (D) →(P)
(2) (A) →(P) ; (Q) →(S) ; (C) →(Q) ; (D) →(R)
(3) (A) →(P) ; (B) →(Q) ; (C) →(R) ; (D) →(S)
(4) (A) →(R) ; (B) →(Q) ; (C) →(S) ; (D) →(P)

Ans. (1)

12. H₂O₂ in basic medium shows which of the following reaction

- (A) Mn²⁺ → Mn⁴⁺
(B) I₂ → I⁻
(C) PbS → PbSO₄

- (1) A & B (2) A only (3) B & C (4) B only

Ans. (1)

Sol. ⇒ PbS(s) + H₂O₂ → PbSO₄ (s) + H₂O

This reaction occurs in acidic medium

⇒ all other occur in basic medium.

13. An ideal gas is taken in a container which is divided into 2 parts by a partition. Entropy of the parts is S₁ & S₂. What will be the entropy if partition is removed?

- (1) S₁ + S₂ (2) S₁ × S₂ (3) $\frac{S_1}{S_2}$ (4) $\frac{S_2}{S_1}$

Ans. (1)

Sol. Entropy is an extensive property

14. $2A \longrightarrow A_2$
 $T = 400 \text{ K}$,
 $K_{\text{eq}} = x \times 10^{-4}$,
 $\Delta G^\circ = 25.2 \text{ kJ/mol}$,
 $R = 8.3 \text{ J/k-mol}$
 Determine x?

Ans. (5)

Sol. $\Delta G^\circ = -RT \ln K$

$$25.2 \times 10^3 = -2.3 \times 8.3 \times 400 \log_{10} K_{\text{eq}}$$

$$\log_{10} K_{\text{eq}} = -3.3$$

$$\therefore K_{\text{eq}} = 5 \times 10^{-4}$$

15. In a first order reaction, $t_{1/2} = 1 \text{ min}$. Time taken for 99.9% completion is min.

$$(\ln 2 = 0.69, \ln 10 = 2.3)$$

Ans. (10)

Sol. $k = \frac{1}{t} \ln \left(\frac{C_0}{C_t} \right)$

$$\frac{\ln 2}{1} = \frac{1}{t} \ln \left(\frac{100}{0.1} \right) \therefore t = \frac{\ln 1000}{\ln 2} = \frac{3 \times 2.3}{0.69} = 10$$

16. Match the column

Column-A

Metals

(A) Ni

(B) Si

(C) Cu

(D)

(1) A — p ; B— r ; C—q ; D—

(2) A — p ; B— q ; C—r ; D—

(3) A — r ; B— p ; C—q ; D—

(4) A —; B— r ; C—q ; D—p

Column-B

Refining process

(p) Vapour phase refining

(q) Electrolytic refining

(r) Zone refining

Ans. (1)

17. **Statement-1** : Bohr's model helps in explaining spectral lines and stability of Li^+

Statement-2 : Bohr's model fails to explain splitting of spectral lines in magnetic field.

(1) Both Statement-1 and Statement-2 are correct

(2) Both Statement-1 and Statement-2 are false

(3) Statement-1 is correct and Statement-2 is false

(4) Statement-1 is false and Statement-2 is correct

Ans. (4)

18. CdS & TiO₂ have _____ & _____ charged colloidal particles.

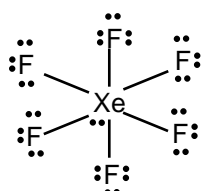
- (1) -, + (2) +, + (3) -, - (4) +, -

Ans. (1)

19. Upon partial hydrolysis of A, XeO₂F₂ gets formed. Number of lone pairs in A = ?

Ans. (19)

Sol. $\text{XeF}_6 \xrightarrow{\text{Partial hydrolysis}} \text{XeO}_2\text{F}_2 + \text{HF}$



No. of lone pair = $3 \times 6 + 1 = 19$

20. CuSO₄.5H₂O has x secondary valency of Cu²⁺ & y H₂O molecules bonded through H-bonding. x & y are respectively :

- (1) 4, 1 (2) 6, 4 (3) 6, 1 (4) 1, 4

Ans. (1)

21. Boiling point of 2 molal aqueous solution of a non volatile solute is 100.52°C. Determine percentage of dimerisation of solute in solution. (Given K_b = 0.52 K kg mol⁻¹ of H₂O)

Ans. (100)

Sol. $\Delta T_b = K_b \times i \times m$

$$0.52 = 0.52 \times i \times 2$$

$$i = \frac{1}{2}$$

$$\text{for dimerisation } i = 1 + \left(\frac{1}{2} - 1 \right) \alpha = \frac{1}{2}$$

$$\alpha = 1 \text{ (100 \%)}$$

22. Arrange the following species in decreasing order of oxidation number of nitrogen.

NO, N₂O, NO₃⁻, NO₂

- (1) NO₃⁻ > NO₂ > NO > N₂O (2) NO₂ > NO₃⁻ > NO > N₂O
 (3) N₂O > NO > NO₂ > NO₃⁻ (4) NO₃⁻ > NO₂ > N₂O > NO

Ans. (1)

Sol. NO₃⁻

$$x + 3(-2) = -1$$

$$x = +5$$

NO₂

$$x + 2(-2) = 0$$

$$x = 4$$

NO

$$x + 1(-2) = 0$$

$$x = 2$$

N₂O

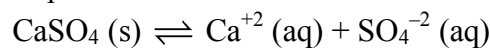
$$2x + 1(-2) = 0$$

$$x = 1$$

- 23.** Solubility of CaSO₄ in pure water is 8×10^{-4} M. If solubility of CaSO₄ in 0.01 M H₂SO₄ is $x \times 10^{-6}$ M, determine x.

Ans. (64)

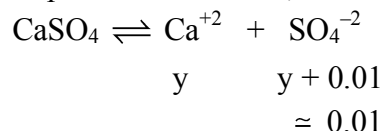
Sol. In pure H₂O



$$K_{\text{sp}} = x^2 \quad (x: \text{solubility in pure H}_2\text{O})$$

$$K_{\text{sp}} = 64 \times 10^{-8} = 6.4 \times 10^{-7}$$

In presence of H₂SO₄, Let solubility = y mol/L



$$\Rightarrow k_{\text{sp}} = [\text{Ca}^{+2}] [\text{SO}_4^{-2}]$$

$$\Rightarrow 6.4 \times 10^{-7} = y (10^{-2})$$

$$\Rightarrow y = 6.4 \times 10^{-5} = 64 \times 10^{-6} = x \times 10^{-6}$$

$$x = 64$$

- 24.** If O₂ behaves as ideal gas, find ratio of root mean square velocity & average velocity.

$$(1) \sqrt{\frac{3\pi}{8}} \qquad (2) \sqrt{\frac{3}{3}} \qquad (3) \sqrt{\frac{8\pi}{3}} \qquad (4) \sqrt{\frac{3\pi}{2}}$$

Ans. (1)

Sol. $v_{\text{rms}} = \sqrt{\frac{3RT}{M_o}}$

$$v_{\text{avg}} = \sqrt{\frac{8RT}{\pi M_o}}$$

$$\frac{v_{\text{rms}}}{v_{\text{avg}}} = \sqrt{\frac{3\pi}{8}}$$

25. The molar conductivity of BaSO_4 at infinite dilution is :-

Given: $\lambda_m^\circ (\text{BaCl}_2) = 278 \Omega^{-1}\text{mol}^{-1}\text{cm}^2$

$$\lambda_m^\circ (\text{H}_2\text{SO}_4) = 860 \Omega^{-1}\text{mol}^{-1}\text{cm}^2$$

$$\lambda_m^\circ (\text{HCl}) = 426 \Omega^{-1}\text{mol}^{-1}\text{cm}^2$$

Ans. (286)

Sol. $\lambda_m^\circ (\text{BaCl}_2) = \lambda_m^\circ (\text{Ba}^{+2}) + \lambda_m^\circ (\text{SO}_4^{-2})$

$$= \lambda_m^\circ (\text{BaCl}_2) + \lambda_m^\circ (\text{H}_2\text{SO}_4) - 2\lambda_m^\circ (\text{HCl})$$
$$= 278 + 860 - 2 \times 426$$
$$= 286 \Omega^{-1}\text{mol}^{-1}\text{cm}^2$$