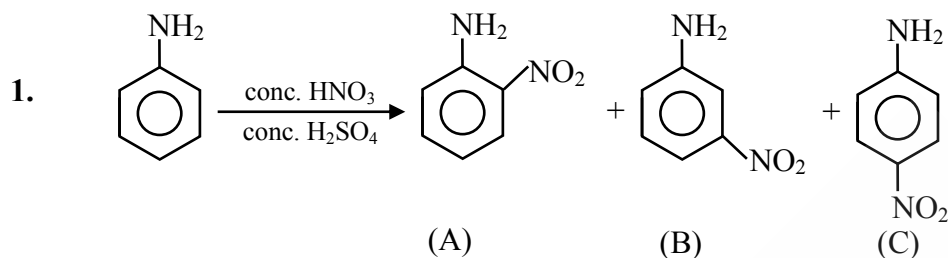


CHEMISTRY



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)

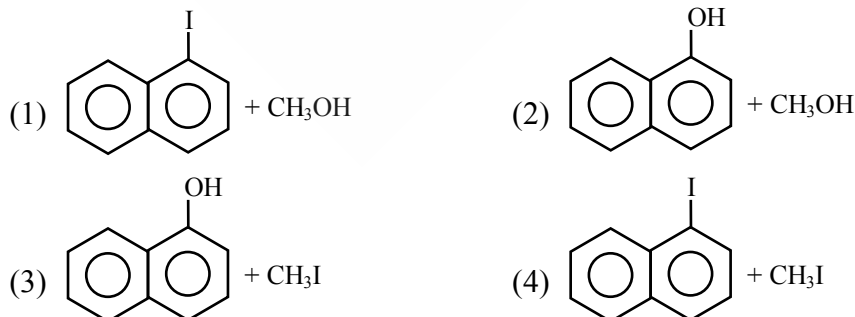
3. Compound A reacts with benzene sulfonyl chloride to form B which is soluble in NaOH.

Compound A is-

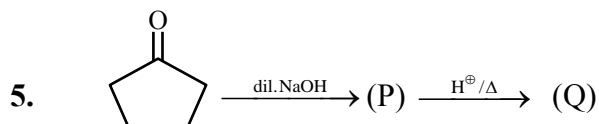


Ans. (3)

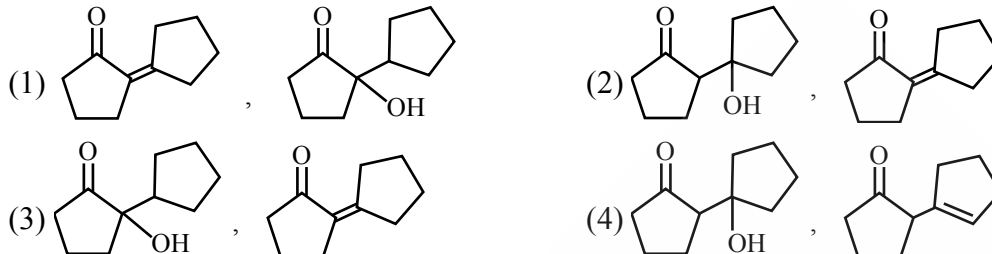
4. What product are obtained when 1-Methoxy naphthalene reacts with hydroiodic acid?



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

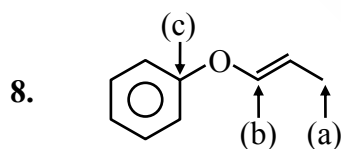
- (1) (A) → (iv) ; (B) → (i) ; (C) → (iii) ; (D) → (ii)
(2) (A) → (iv) ; (B) → (i) ; (C) → (ii) ; (D) → (iii)
(3) (A) → (iv) ; (B) → (iii) ; (C) → (i) ; (D) → (ii)
(4) (A) → (i) ; (B) → (iii) ; (C) → (iv) ; (D) → (ii)

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)

QUESTIONS & SOLUTIONS

Reproduced from Memory Retention

 18 March, 2021

SHIFT-2

 03:00 pm to 06:00 pm



Duration : 3 Hours

Max. Marks : 300

SUBJECT - CHEMISTRY

JEE (MAIN) FEB 2021 RESULT

Legacy of producing
Best Results Proved again

RELIABLE
TOPPER



100%tile
in **MATHS**

PRANAV JAIN
Roll No. : 20771421
99.993%tile
Overall

100%tile
in **MATHS & PHYSICS**

KHUSHAGRA GUPTA
Roll No. : 20975433

RESULT HIGHLIGHTS

21 Students
Secured
100%tile
in Maths / Physics

138
students secured
above **99%**tile (Overall)

All are from **KOTA CLASSROOM** only



TARGET
JEE (MAIN+ADV.)
2021

SHAKTI
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Course
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250+
Hrs

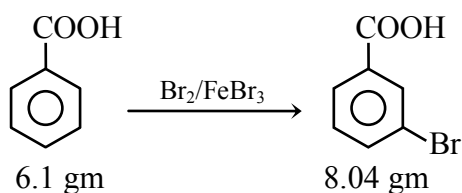
Starting from



22nd MAR
2021

Course will be available in both
Offline & Online mode

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)

Column-B
Refining process

- (p) Vapour phase refining
 (q) Electrolytic refining
 (r) Zone refining

- (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

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.

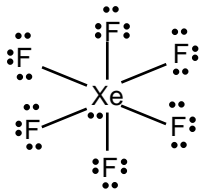
- (1) -, + (2) +, + (3) -, - (4) +, -

Ans. (1)

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

Ans. (19)

Sol. XeF₆ $\xrightarrow{\text{Partial hydrolysis}}$ XeO₂F₂ + HF



No. of lone pair = 3 × 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

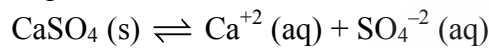
$$2x + 1(-2) = 0$$

$$x = 1$$

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)

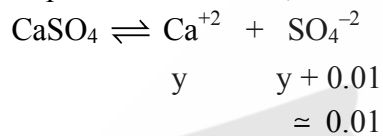
Sol. In pure H₂O



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

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

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) $\sqrt{\frac{3\pi}{8}}$

(2) $\sqrt{\frac{3}{3}}$

(3) $\sqrt{\frac{8\pi}{3}}$

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

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