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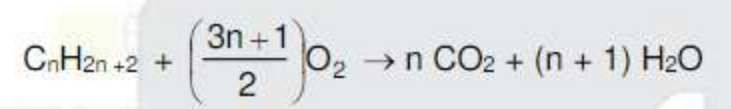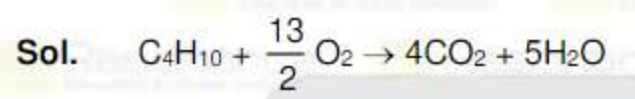
1. In the combustion of butane 72gm of H_2O is produced. The amount of butane taken initially is $[X] \times 10^{-1}$. The value of 'X' is

Ans. 464

Sol. $C_4H_{10} + \dfrac{13}{2} O_2 \rightarrow 4CO_2 + 5H_2O$

$C_nH_{2n+2} + \left(\dfrac{3n+1}{2}\right)O_2 \rightarrow n\,CO_2 + (n+1)\,H_2O$

∵ 1 mole C_4H10 produces 5 mole H_2O.
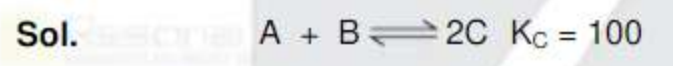
5 mole (5 × 18) = 90 gm.

90 gm → 58 gm

72 gm → $\left(\dfrac{58 \times 72}{90}\right)$ = 46.4 gm

2. $A + B \rightleftharpoons 2C$.

Initially 1 mole each of A, B and C are taken in 1 litre vessel. Equilibrium constant is 100. The concentration of C at equilibrium in $[X] \times 10^{-1}$. The value of 'X' is

Ans. (25)

Sol. $A + B \rightleftharpoons 2C \quad K_C = 100$

t = 0   1   1   1

t = $t_{eq.}$ 1−x   1−x   1 + 2x

$K_C = \dfrac{(1+2x)^2}{(1-x)^2}$

$100 = \dfrac{(1+2x)^2}{(1-x)^2}$ of [C]

$10 = \dfrac{(1+2x)}{(1-x)}$

$X = \dfrac{3}{4}$

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3. In the leaching of Bauxite, which Oxide is leached out using NaOH.

(1) Fe_2O_3 (2) Al_2O_3 (3) TiO_2 (4) SiO_2

Ans. (2)

Sol. $Al_2O_3 \cdot xH_2O + NaOH \longrightarrow NaAlO_2$

$\downarrow H_2O$

$Al(OH)_3 + NaOH$

$Al(OH)_3 \xrightarrow{1200K} Al_2O_3$ (pure)
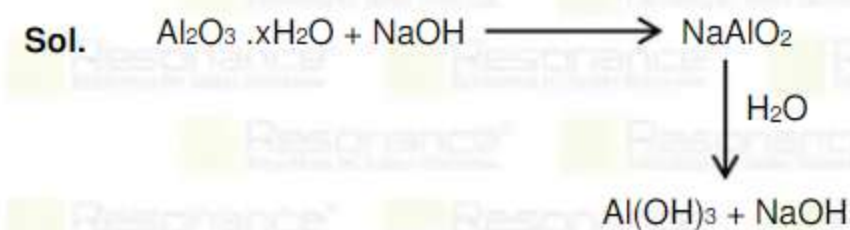
4. Among the given oxides

(i) CrO_3 (ii) V_2O_5 (iii) Fe_2O_3 (iv) MnO_2

The correct increasing order of oxidation state of metal is

(1) (i) < (ii) < (iii) < (iv)   (2) (ii) < (iii) < (i) < (iv)   (3) (iii) < (iv) < (i) < (ii)   (4) (iii) < (iv) < (ii) < (i)

Ans. (4)

Sol.

	Compound	Oxidation state of metal
(i)	CrO_3	+6
(ii)	V_2O_5	+5
(iii)	Fe_2O_3	+3
(iv)	MnO_2	+4

5. Find the concentration of Fe^{2+} (10 ml) required to reduce 15 ml of 0.1M $K_2Cr_2O_7$ Solution is:

Ans. 0.9

Sol. $Cr_2O_7^{2-} + Fe^{2+} \rightarrow Fe^{3+} + Cr^{3+}$

15 ml   10 ml

0.1 M

$N_1V_1 = N_2V_2$

$15 \times 0.1 \times 6 = 10 \times M \times 1$

6. Arrange the following ions in the increasing order of size, Na^+, K^+, Mg^{+2}, $Al1^{+3}$.

(1) $Al^{3+} < Mg2+ < Na^+ < K^+$

(2) $K^+ < Na^+ < Al^{3+} < Mg2+$

(3) $Al^{3+} < Mg2+ < K^+ < Na^+$

(4) $Mg2+ < < Al^{3} < K^+ < Na^+$

Ans. (1)

Sol.

$K^+ > Na^+$ {moving down the group size increases}

$Na+ > Mg^{+2} > Al^{3}$ {Isoelectronic species}

Z	11	12	13
E	10	10	10

7. Henry's law constant for CO_2 in water in $0.835 \times 2 \times 10^3$ bar. How many milimoles of CO_2 would dissolve in 0.9 litre water? Assume CO_2 gas exerts a partial pressure of 0.853 bar.

Ans. 25

Sol. $P_{CO_2} = K_H X_{CO_2}$

$$X_{CO2} = \frac{P_{CO2}}{K_H} = \frac{0.835}{0.835 \times 2 \times 10^3}$$

$X_{CO_2} = 0.5 \times 10^{-3}$

Number of moles of water $= \dfrac{900}{18} = 50$

$$\frac{n_{CO_2}}{n_{CO_2} + nH_2O} = 0.5 \times 10^{-3}$$

(n_{CO_2} in denominator is neglected as it is $<< 50$)

$n_{CO_2} = 0.5 \times 10^{-3} \times 50 = 25 \times 10^{-3}$ moles

$= 25$ milimoles

8. Which of the following does not exist.

(1) SiF_6^{2-}

(2) $SiCl_6^{2-}$

(3) $GeCl_6^{2-}$

(4) $Sn(OH)_6^{2-}$

Ans. (2)

Sol. The main reasons are :

9. Which of the following complex is active in magnetic field.

(1) $[Fe(H_2O)_6]^{3+}$ (2) $[Co(CN)_6]^{3-}$ (3) $[Ni(Co)_4]$ (4) $[Ni(CN)_4]^{2-}$

Ans. (1)

Sol. Fe^{3+}; $3d^5$

If will contain 5 unpaired electrons.

Thus it is paramagnetic and attracted in external magnetic field.

10. Empirical formula of a given octahedral complex is $CrCl_3.3NH_3.3H_2O$. It precipitates 3 moles of AgCl. What is the secondary valency of central atom.

(1) 4 (2) 3 (3) 1 (4) 6

Ans. (4)

Sol. $[Cr(NH_3)_3(H_2O)]Cl_3 + AgNO_3 \longrightarrow 3AgCl \downarrow$

White ppt.

11. For a process $\Delta H_{fusion} = 2.4$ l.Cal mol^{-1} and $DH_{Vaporistion} = 98.6$ k.Cal mol^{-1}. Then $\Delta H_{Sublimation}$ (on Kcal mol^{-1}) :

Ans. 101 K.Cal mol^{-1}

Sol. $\Delta H_{Sublimation} = \Delta H_{vap} + \Delta H_{fusion}$

$= 98.6 + 2.4$

$= 101$ K.Cal mol^{-1}

12. Which of the following statement is correct :

(1) H–H bond strength is equal to D–D bond strength.

(2) H–H bond strength is half of D–D bond strength.

(3) H–H bond strength is double the D–D bond.

(4) H–H bond strength is less than D–D bond strength

Ans. (4)

Sol. H–H bond denunciation energy 435 KJ/mol

D–D bond denunciation energy 450 KJ/mol

13. Which of the following about micelle formation is correct for sodium stearate [$C_{14}H_{35}COO^-Na^+$]

(1) Micelles formed are spherical with hydrocarbon part towards the centre of sphere

(2) Micelles formed are spherical with hydrocarbon part lying outside

(3) Micelles formed are Non spherical with hydrocarbon part towards the centre of sphere

(4) Micelles formed are Non-spherical with hydrocarbon part lying outside

Ans. (1)

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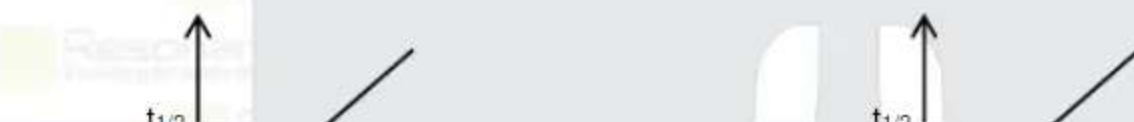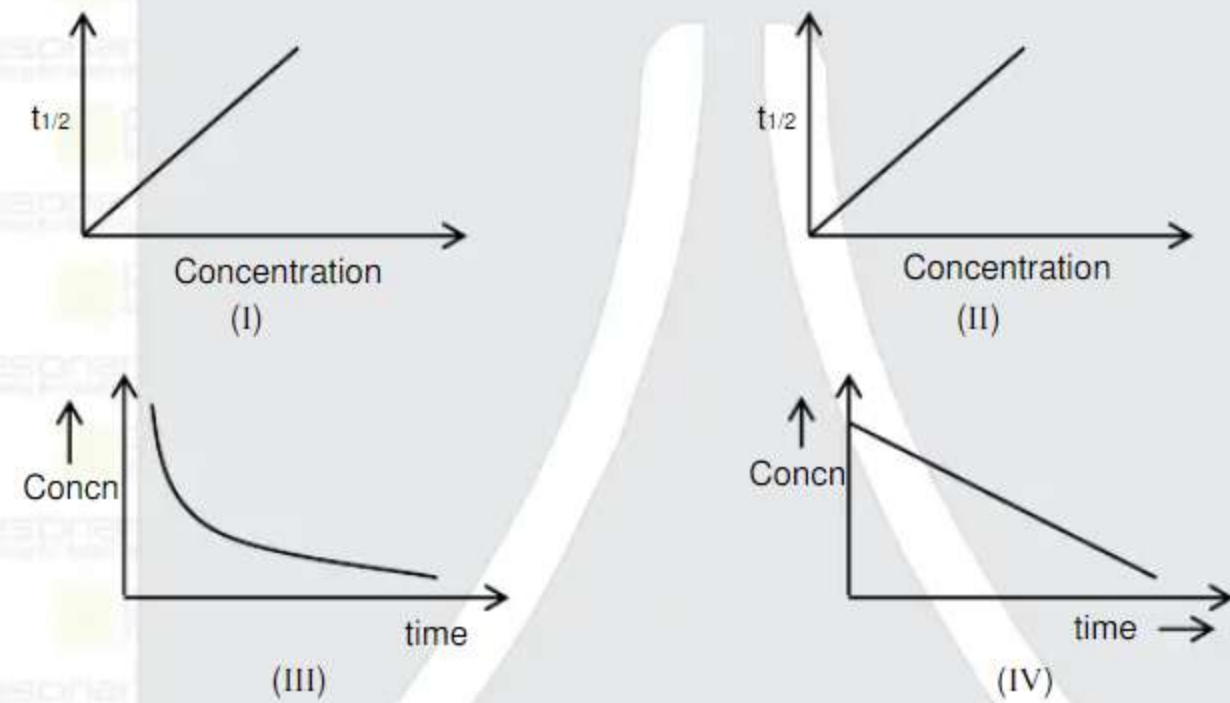This solution was download from Resonance JEE (MAIN) 2021 Solution portal   **PAGE # 4**

Resonance *Educating for better tomorrow* | **JEE MAIN-2021 | DATE : 25-07-2021 (SHIFT-1) | PAPER-1 | MEMORY BASED | CHEMISTRY**

Sol.

(a)   (b)
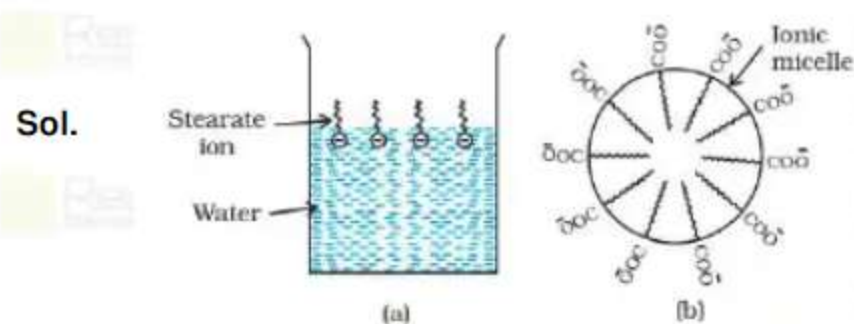
14. From the graphs given below. Select the correct statements.

14. From the graphs given below. Select the correct statements.

(1) I, III – First order ; II, IV – Zero order

(2) I, IV – zero order ; II, III – First order

(3) I, II – zero order ; III, IV – First order

(4) I, IV– First order ; II, IV – zero order

Ans. (2)

Sol. $A_t = (A)_0 - Kt.$: Zero Oder

$t_{1/2} = \left(\dfrac{A_0}{2K} \right)$

$A = A_0 e^{-Kt}$; First oder

$t_{1/2} = \dfrac{\ell n2}{K}$

15. Which of the following protein is soluble in water?

(1) Albumin   (2) Fibrin   (3) myosin   (4) Collagen

Ans. (1)

Sol. It is globular protein (water soluble)

16. Which of the following is not used for drying agent?

(1) $Cl_2C = CCl_2$ (2) Liquid CO_2 (3) H_2O_2 (4) CCl_4

Ans. (1)
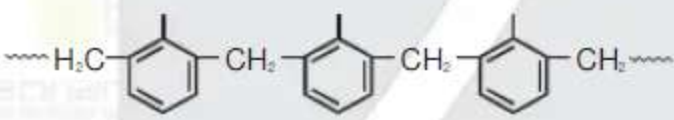
17. CH_3MgBr react which of the following to give methane gas?

(1) H_2S (2) H_2O (3) NH_3 (4) All of these

Ans. (4)

Sol. Grignard reagent act as strong base.

18. Number of σ bonds

$CH_3-CH=CH-C\equiv CH$

Ans. (10)

19. Given structure is
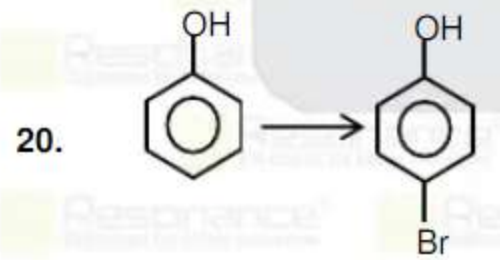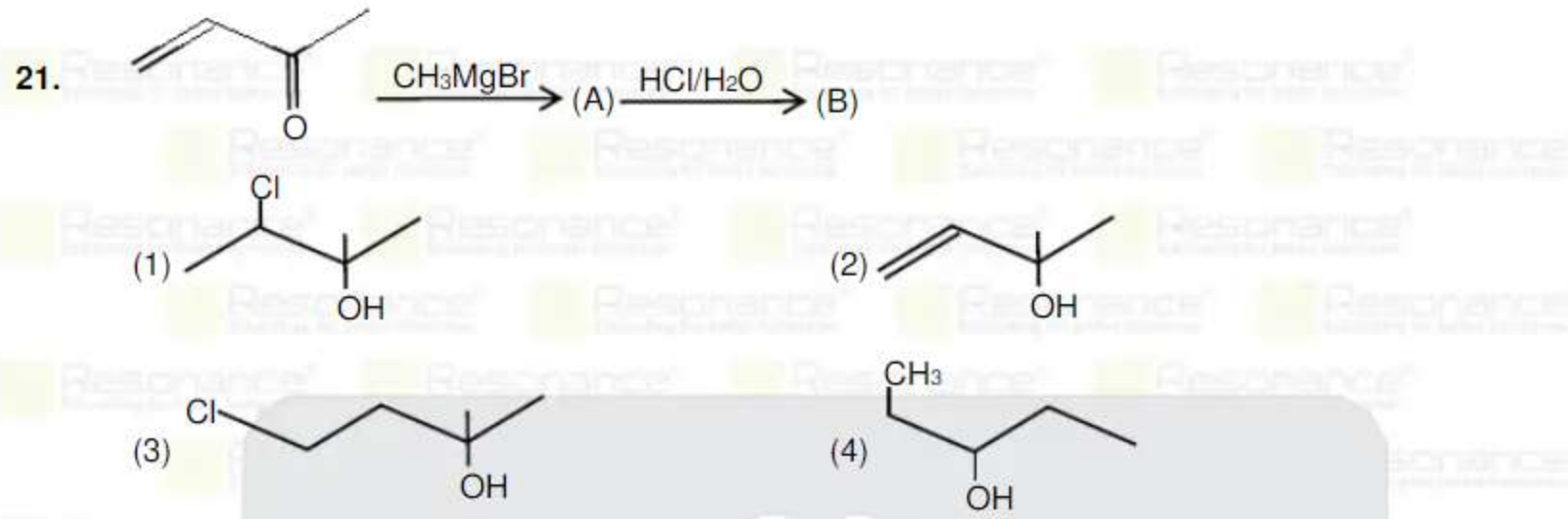
~~~H₂C─⟨⟩─CH₂─⟨⟩─CH₂─⟨⟩─CH₂~~~

(1) Buna-N   (2) Bakelite   (3) Novolac   (4) Styrene

Ans. (3)

Sol. Novolac is linear polymer.

20.

OH─⟨⟩ ⟶ OH─⟨⟩─Br

21.

$$\xrightarrow{CH_3MgBr} (A) \xrightarrow{HCl/H_2O} (B)$$
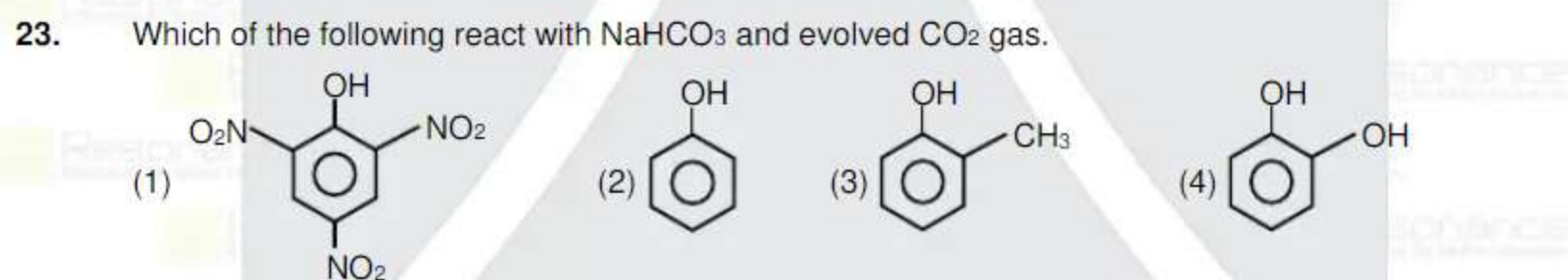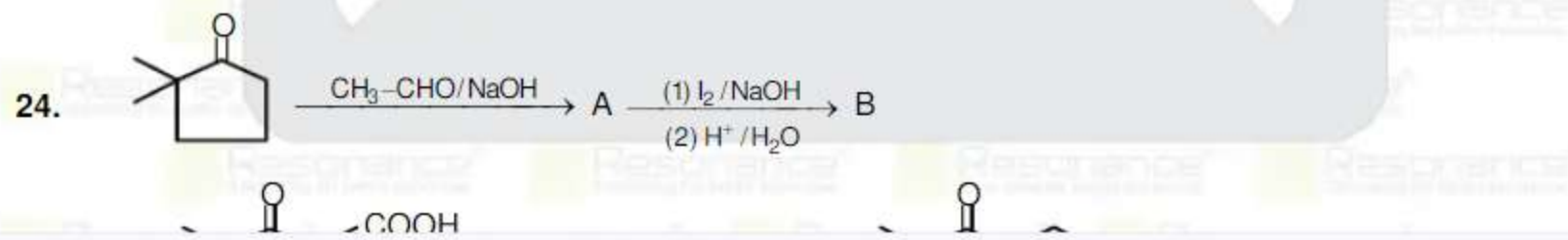
(1)

(2)

(3)

(4)

Ans. (2)

22. **Assertion:** Primary aromatic amine can't be prepared by gabrial-thalamide method.

Reason: Aryl halide cannot be undergo nucleophilic substitution reaction.

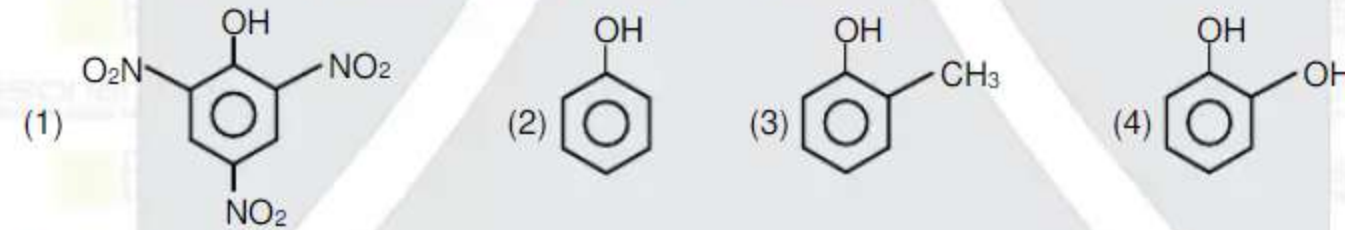(1) Assertion-1 is True, Reason-2 is True; Reason-2 is a correct explanation for Assertion-1.

(2) Assertion-1 is True, Reason-2 is True; Reason-2 is NOT a correct explanation for Assertion-1.
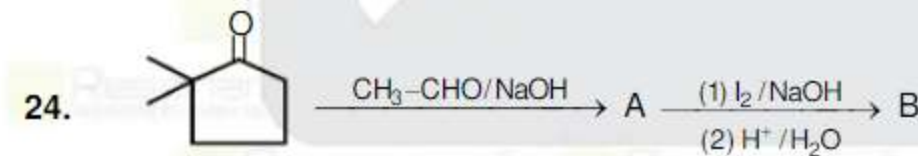
(3) Assertion-1 is True, Reason-2 is False.

(4) Assertion-1 is False, Reason-2 is True.

Ans. (1)

23. Which of the following react with $NaHCO_3$ and evolved CO_2 gas.

(1)

(2)

(3)

(4)

Ans. (1)

24.

$$\xrightarrow{CH_3-CHO/NaOH} A \xrightarrow[(2) H^+/H_2O]{(1) I_2/NaOH} B$$

(2) Assertion-1 is True, Reason-2 is True; Reason-2 is NOT a correct explanation for Assertion-1.

(3) Assertion-1 is True, Reason-2 is False.

(4) Assertion-1 is False, Reason-2 is True.

Ans. (1)

23. Which of the following react with $NaHCO_3$ and evolved CO_2 gas.

Ans. (1)

24.

Ans. (1)