**( ENGLISH VERSION )**

1. Answer the following questions ( Alternatives are to be noted ) :   2 × 5 = 10

   (a)   KBr undergoes 80% dissociation in its 0·5 (M) aqueous solution. Calculate osmotic pressure of the solution at 27°C temperature.   2

   **OR**

   What is azeotropic mixture ? Can it be considered as ideal solution ?   ( 1 + 1 ) = 2

   (b)   Write two differences between physisorption and chemisorption.   2

   **OR**

   What is peptisation ? Give one example.   ( 1 + 1 ) = 2

   (c)   Mention two differences between bleaching action of $SO_2$ and $Cl_2$.   2

   **OR**

   Which of the halogen hydracids forms bi-salt ? Write reasons.   ( 1 + 1 ) = 2

   (d)   Which type of isomerism is shown by the two complexes : $[Co(NH_3)_5SO_4]Br$ and $[Co(NH_3)_5Br]SO_4$ ? How would you distinguish between two complexes ?   ( 1 + 1 ) = 2

   (e)   Write the name of monomer units of Dacron and mention one use of it.   *Terelene*   ( 1 + 1 ) = 2

   CHEM   10 / 23

2. Answer the following questions ( Alternatives are to be noted ) : $3 \times 9 = 27$

(a) (i) Which type of stoichiometric defects is shown by AgBr crystal ?

(ii) Chromium (atomic mass = 52) metal has body-centred cubic structure. The radius of chromium atom is 124·3 pm. Calculate the density of chromium metal. $(1 + 2) = 3$
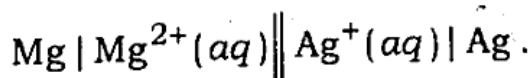
OR

(i) What do you mean by packing fraction of cubic unit cell ?

(ii) Calculate packing fraction of a face-centred cubic unit cell.

$(1 + 2) = 3$

(b) (i) What is the vapour pressure of pure water at 100°C temperature ?

(ii) 12 gm of a solid solute is dissolved in 90 gm pure water. Vapour pressure of the resulting solution is 750 mm Hg at 100°C temperature. Calculate molecular mass of the solute. [Solute does not undergo any dissociation or association in its aqueous solution.] $(1 + 2) = 3$

(c) Write cell reaction and calculate electrical work obtained from the following galvanic cell at standard condition :

$$Mg \mid Mg^{2+}(aq) \parallel Ag^{+}(aq) \mid Ag .$$

[Given : $E^{o}_{Mg^{2+}/Mg} = -2 \cdot 36$ volt & $E^{o}_{Ag^{+}/Ag} = 0 \cdot 80$ volt.]
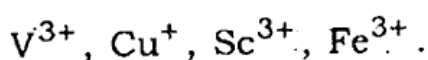
$(1 + 2) = 3$

CHEM

11 / 23

(d) (i) Write composition of copper matte.

(ii) Write balanced equations for the reactions involved in the extraction of copper from copper matte. $(1 + 2) = 3$
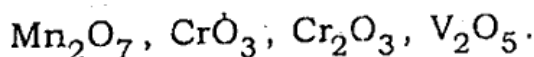
OR

(i) Which type of ores is concentrated by froth floatation process ?

(ii) What is thermit mixture ? Mention one use of it.

$1 + (1 + 1) = 3$

(e) (i) Which of the following are coloured in aqueous solution ? Give reasons :

$V^{3+}$, $Cu^+$, $Sc^{3+}$, $Fe^{3+}$.

(ii) Which of the following oxides are amphoteric ?

$Mn_2O_7$, $CrO_3$, $Cr_2O_3$, $V_2O_5$.

$(1 + 1) + 1 = 3$

OR

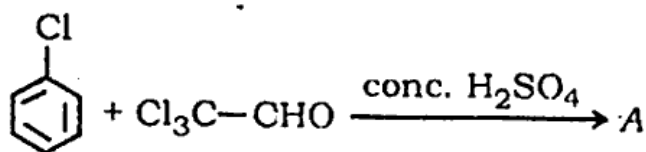(i) Explain why most of the Cu(I) compounds are unstable in aqueous solution.

(ii) What happens when $MnO_4^{2-}$ ion is kept in acid medium ? Write balanced equation. $(2 + 1) = 3$

(f) (i) Write R/S configurations of H —$\overset{OH}{\underset{COOH}{|}}$— $CH_3$ and $H_3C \cdots C \overset{D}{\underset{NH_2}{|}} H$

CHEM 12 /

(ii)   Write structural formula of 'A' for the following reaction :

$$\text{C}_6\text{H}_5\text{Cl} + \text{Cl}_3\text{C--CHO} \xrightarrow{\text{conc. H}_2\text{SO}_4} A$$

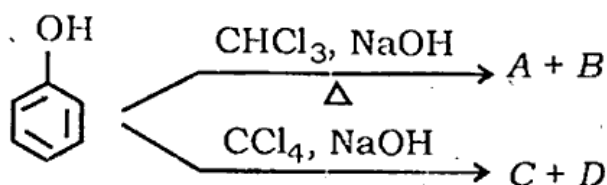                                                                 1

(iii)  Distinguish between propanone and pentan-3-one by a suitable chemical test.             1

(g)  (i)   Write the structural formulae of $A$, $B$, $C$, $D$ in the following reactions :

$$\text{C}_6\text{H}_5\text{OH} \begin{cases} \xrightarrow[\Delta]{\text{CHCl}_3,\ \text{NaOH}} A + B \\ \xrightarrow{\text{CCl}_4,\ \text{NaOH}} C + D \end{cases}$$
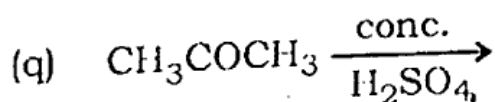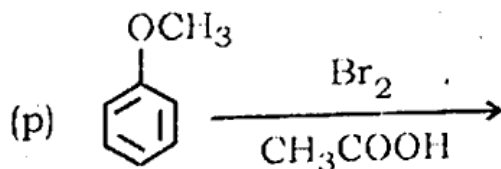
(ii)  Write equation of the following conversion :

Salicyclic acid to aspirin.                  ( 1 + 1 ) + 1 = 3

<div align="center">OR</div>

(i)   Write structural formulae of products obtained in the following reactions :

(p)  $$\text{C}_6\text{H}_5\text{OCH}_3 \xrightarrow[\text{CH}_3\text{COOH}]{\text{Br}_2}$$

(q)  $$\text{CH}_3\text{COCH}_3 \xrightarrow{\text{conc. H}_2\text{SO}_4}$$
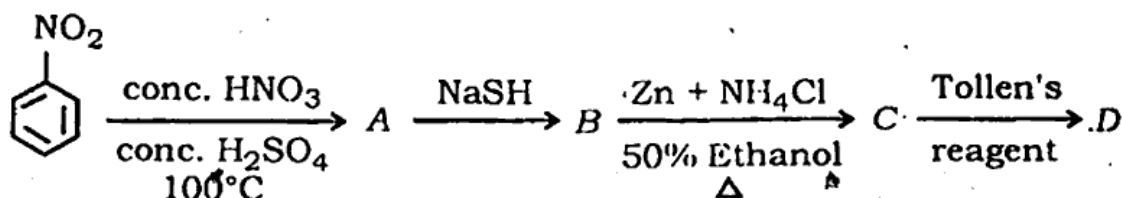
(ii)  Mention one use of Lucas' reagent.       ( 1 + 1 ) + 1 = 3

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(h) (i) Convert aniline to fluorobenzene.

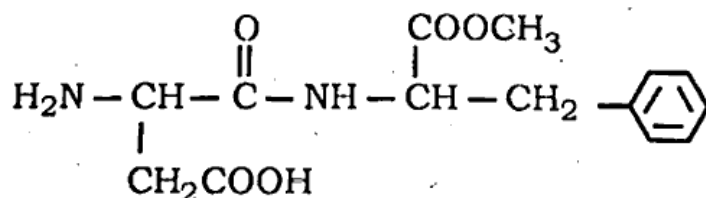(ii) Write structural formula of the compounds $A$ to $D$:

$$\underset{\text{NO}_2}{\text{C}_6\text{H}_5} \xrightarrow[\substack{\text{conc. H}_2\text{SO}_4 \\ 100°\text{C}}]{\text{conc. HNO}_3} A \xrightarrow{\text{NaSH}} B \xrightarrow[\substack{50\% \text{ Ethanol} \\ \Delta}]{\text{Zn + NH}_4\text{Cl}} C \xrightarrow[\text{reagent}]{\text{Tollen's}} D$$

( 1 + 2 ) = 3

OR

An organic compound $A$ ($C_3H_8O$) on treatment with Cu dust at 573 K gives $B$. $B$ does not reduce Fehling's solution but gives a yellow precipitate of compound $C$ with $I_2$/NaOH. Deduce the structures of $A$, $B$ and $C$ and their IUPAC names. 3

(i) (i) The following compound is an example of peptide :

$$\underset{\underset{\text{CH}_2\text{COOH}}{|}}{\text{H}_2\text{N}-\text{CH}}-\overset{\overset{\text{O}}{\|}}{\text{C}}-\text{NH}-\underset{\overset{|}{\text{COOCH}_3}}{\text{CH}}-\text{CH}_2-\text{C}_6\text{H}_5$$

(r) Write Zwitterion structure of the compound.

(s) How many amino acids will be obtained on hydrolysis of the compound ?

(ii) Write equation for the reaction of glucose with periodic acid.

( 1 + 1 ) + 1 = 3

CHEM

Answer the following questions ( Alternatives are to be noted ) :  $5 \times 3 = 15$

(a) (i) Draw the graph of half-life period ( $t_{\frac{1}{2}}$ ) versus initial concentration of reactant ( $[A]_0$ ) for a zero order reaction. Give reasons in favour of your answer.

(ii) The rate of a reaction at 400 K is 10 times than the rate of the reaction at 200 K. Calculate activation energy of the reaction.

$( 2 + 3 ) = 5$

OR

(i) The unit of rate constant of a chemical reaction is $L^2 mol^{-2} s^{-1}$. Calculate order of the reaction.

(ii) The rates of a first order reaction after 10 mins and 20 mins from the commencement of the reaction are 0·04 mol $L^{-1}s^{-1}$ and 0·03 mol $L^{-1}s^{-1}$ respectively. Calculate half-life period of the reaction.

$( 2 + 3 ) = 5$

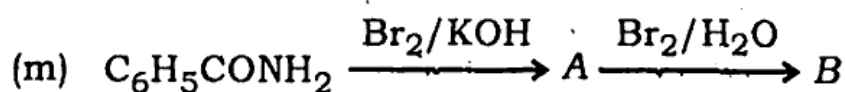(b) (i) What is the shape of $XeF_4$ molecule ? Write the chemical equation of the reaction of $XeF_4$ and KI ?
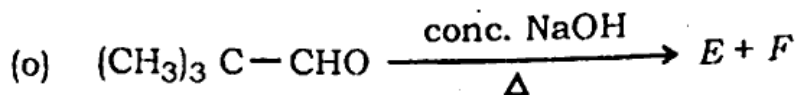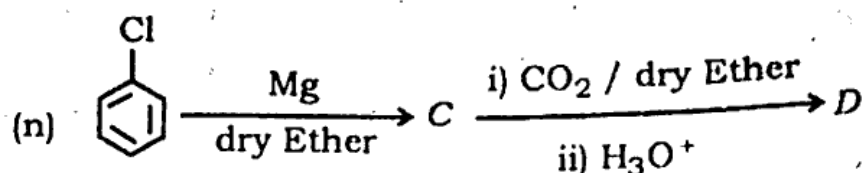
$NH_3$

(ii) What is Nessler's reagent ? Where is it used ?

(iii) $IF_7$ can be prepared but $BrF_7$ cannot be prepared. Why ?

$( 2 + 2 + 1 ) = 5$

(c) (i) Write structural formula of the compounds $A$ to $F$.

(m) $C_6H_5CONH_2 \xrightarrow{\text{Br}_2/\text{KOH}} A \xrightarrow{\text{Br}_2/\text{H}_2\text{O}} B$

**CHEM**

15 / 23

(n) $\underset{\text{dry Ether}}{\overset{\text{Mg}}{\longrightarrow}}$ C $\xrightarrow[\text{ii) } H_3O^+]{\text{i) } CO_2 \text{ / dry Ether}}$ D

(o) $(CH_3)_3 C-CHO \xrightarrow[\Delta]{\text{conc. NaOH}} E + F$

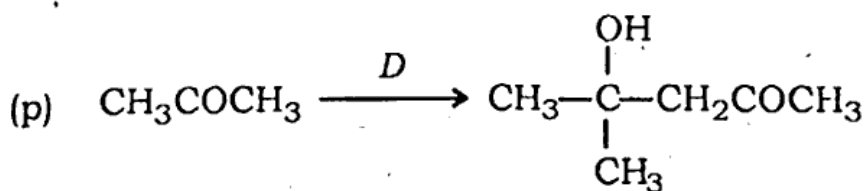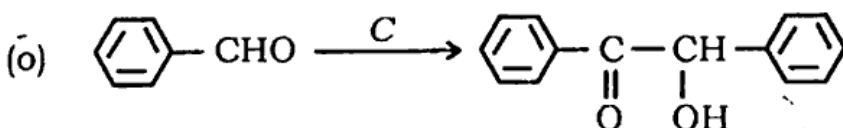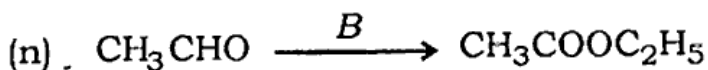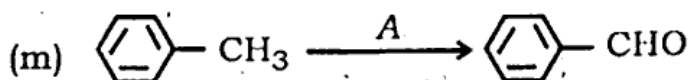(ii) Convert the following :

(p) Benzaldehyde to Cinnamic acid.

(q) Acetic acid to acetaldehyde. $\qquad ( 3 + 2 ) = 5$

OR

(i) What is the reason for the reducing property of formic acid ? Give example of its reducing property.

(ii) Mention the reagents used for the following conversions :

(m) $\langle\underline{\ }\rangle - CH_3 \xrightarrow{A} \langle\underline{\ }\rangle - CHO$

(n) $CH_3 CHO \xrightarrow{B} CH_3COOC_2H_5$

(o) $\langle\underline{\ }\rangle - CHO \xrightarrow{C} \langle\underline{\ }\rangle - \underset{O}{\overset{\|}{C}} - \underset{OH}{\overset{|}{CH}} - \langle\underline{\ }\rangle$

(p) $CH_3COCH_3 \xrightarrow{D} CH_3 - \overset{OH}{\underset{CH_3}{\overset{|}{\underset{|}{C}}}} - CH_2COCH_3$

(q) $CH_3CH_2COOH \xrightarrow{E} CH_3 - \underset{Br}{\overset{|}{CH}} - COOH$

(r) $CH_3COCH_3 \xrightarrow{F} CH_3COCH_2Br \qquad ( 1 + 1 ) + 3 = 5$

CHEM
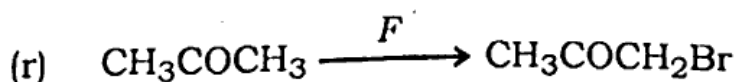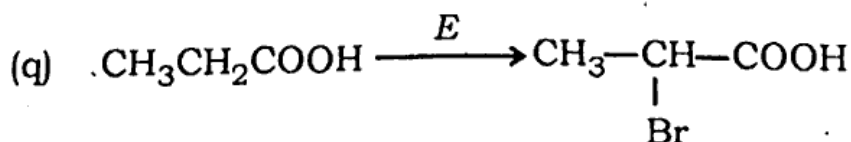
1. निम्नलिखित प्रश्नों के उत्तर दीजिए (वैकल्पिक प्रश्नों पर ध्यान दें) :     $2 \times 5 = 10$

(a) 0·5 (M) जलीय विलयन में KBr 80% वियोजित हो जाता है। 27°C तापमान पर उस विलयन का परासरण दाब की गणना कीजिए।     2

**अथवा**

एजीओट्रॉपिक मिश्रण क्या है ? क्या इसे आदर्श विलयन के रूप में माना जा सकता है ?     ( 1 + 1 ) = 2

(b) भौतिक शोषण तथा रासायनिक शोषण के बीच दो अंतर लिखिए।     2

**अथवा**

पेप्टाइजेशन क्या है ? एक उदाहरण दीजिए।     ( 1 + 1 ) = 2

(c) $SO_2$ तथा $Cl_2$ के विरंजक क्रिया के बीच दो अंतरों का उल्लेख कीजिए।     2

**अथवा**

कौन-सा हैलोजेन हाइड्रासिड बाइ-लवण निर्मित करता है ? कारणों को लिखिए।

    ( 1 + 1 ) = 2

(d) $[Co(NH_3)_5SO_4]Br$ तथा $[Co(NH_3)_5Br]SO_4$ संकर (complex) दो यौगिक किस तरह की समावयवता प्रदर्शित करते हैं ? इन दो संकर यौगिकों के बीच आप कैसे अंतर स्पष्ट करेंगे ?     ( 1 + 1 ) = 2

(e) डेक्रॉन के एकलक इकाइयों के नाम लिखिए तथा उसके एक प्रयोग का उल्लेख कीजिए।     ( 1 + 1 ) = 2

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