



No. J/S

14

इन्टरमीडिएट परीक्षा, 2016

आई०एससी० (I.Sc.)

28 पृष्ठों की उत्तरपुस्तिका

केन्द्राधीक्षक का हस्ताक्षर एवं मुहर

Hanna
वीक्षक का हस्ताक्षर

[हाशिया (Margin) छोड़कर पन्नों के दोनों पृष्ठों पर लिखें]

रोल कोड (Roll Code)	क्रमांक (Roll No.)	पंजीयन संख्या Registration No.)		विषय (Subject)	लिपि (Script)	तिथि (Date)					
		No.	वर्ष (Year)								
11062	10531	11062-RS-0615-2014		CHEMISTRY	ROMAN	27-02-16					
लब्धांक (MARKS OBTAINED)											
Question Number	1	2	3	4	5	6	7	8	9	10	TOTAL
Marks Obtained	1	1	1	1	1	1	1	1	1	1	10
Question Number	11	12	13	14	15	16	17	18	19	20	TOTAL
Marks Obtained	1	1	1	1	1	2	1	2	2	2	13
Question Number	21	22	23	24	25	26	27	28	29	30	TOTAL
Marks Obtained	2	2	2	3	2	3	2	2	3	3	24
Question Number	31	32	33	34	35	36	37	38	39	40	TOTAL
Marks Obtained	3	2	3	4							12
Grand Total	(In Words)		(Five Nine)				(In Figure)		59		
परीक्षार्थी हेतु निर्देश											
1. परीक्षार्थी ध्यान दें कि केवल एक ही उत्तर-पुस्तिका में पूरे प्रश्नों का उत्तर समाहित करना है। अतिरिक्त उत्तर-पुस्तिका नहीं दी जायेगी। 2. उत्तर लिखना शुरू करने के पहले प्रत्येक परीक्षार्थी के लिए अपनी उत्तर-पुस्तिका के आवरण पृष्ठ पर अपना रोल कोड, रोल नं., पंजीयन संख्या एवं वर्ष, विषय, लिपि तथा तिथि लिखना अनिवार्य है। परन्तु परीक्षार्थी को अपना अथवा अपने कॉलेज का नाम कदापि नहीं लिखना है। परीक्षार्थी को चेतावनी दी जाती है कि जिस उत्तर-पुस्तिका पर रोल कोड, क्रमांक और सूचीकरण संख्या स्पष्ट रूप से अंकित न होगी, उसे जाँची नहीं जायेगी। 3. यदि कोई परीक्षार्थी परीक्षा में दूसरे को सहायता करता या किसी प्रकार से अवैध सहायता लेने की चेष्टा करता हुआ अथवा परीक्षा में अनुचित लाभ उठाने के लिए किसी दूसरे अवैध उपाय का अवलम्बन करता हुआ पाया जायेगा तो उसे परीक्षा से निष्कासित कर दिया जायेगा। परीक्षा में परीक्षार्थियों को परस्पर किसी प्रकार से विचार विनिमय का अधिकार न होगा। परिपत्र द्वारा दिये गए प्रवेश पत्र, उत्तर-पुस्तिका, प्रश्न-पत्र तथा नियमानुकूल निर्दिष्ट उपकरणों के अतिरिक्त परीक्षार्थियों को अपने साथ परीक्षा कक्ष में मोबाइल, कैलकुलेटर, छाता, पुस्तक, किसी प्रकार का पत्र, पॉकेट बुक, नोट आदि या किसी भी प्रकार का कागज रखना वर्जित है, भले ही उसका सम्बन्ध उस समय की परीक्षा के विषय से हो या न हो। इसका उल्लंघन करने वाले परीक्षार्थियों को परीक्षा से निष्कासित कर दिया जायेगा। 4. लिखने का सम्पूर्ण काम उत्तर-पुस्तिका पर ही किया जाय और उसका कोई भी पृष्ठ फाड़ा न जाए। परीक्षा खत्म होने के बाद उत्तर-पुस्तिका वापस लौटा देना आवश्यक है। इस उत्तर-पुस्तिका के बदले दूसरी उत्तर-पुस्तिका नहीं दी जा सकती। जो लिखावट काटी हुई रहेगी उसकी जाँच नहीं होगी। उत्तर-पुस्तिका में यदि कोई फटा पृष्ठ मिले तो उसे निकाल नहीं देना चाहिए बल्कि वीक्षक को दिखाकर उसे मोड़ देना चाहिए। 5. प्रश्न-पत्र पर कोई उत्तर या कोई भी दूसरी बात लिखना वर्जित है। 6. प्रश्न-पत्र वितरण के बाद एक घंटे तक कोई भी परीक्षार्थी अपनी उत्तर-पुस्तिका वापस नहीं कर सकते हैं।											

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नोट - प्रत्येक पृष्ठों में अंकित दोनों हाशिया (Margin) के बीच में प्रश्नों का उत्तर लिखें।





①
(c) 6

②
(b) Zero order reaction

③
(a) 0.4

④
(c) Copper pyrite

⑤
(b) dissociation

⑥
(d) a mixture of all these

⑦
(b) C_2H_4

⑧
(d) 7

⑩ 3-Methylpentan-2-one



⑫ Order of reaction

Order of reaction is experimental value which is equal to the sum of power to the concentration term in rate expression.

Let a reaction given below,

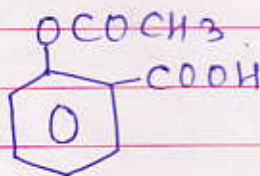


$$\text{Rate} = k [A]^x [B]^y$$

$$\text{Order} = x + y$$

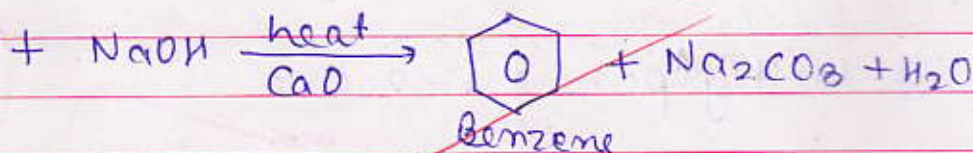
⑬ Barbiturates, e.g. Valium, Serotonin

⑭



Aspirin

⑮





16) Difference between Physisorption and Chemisorption

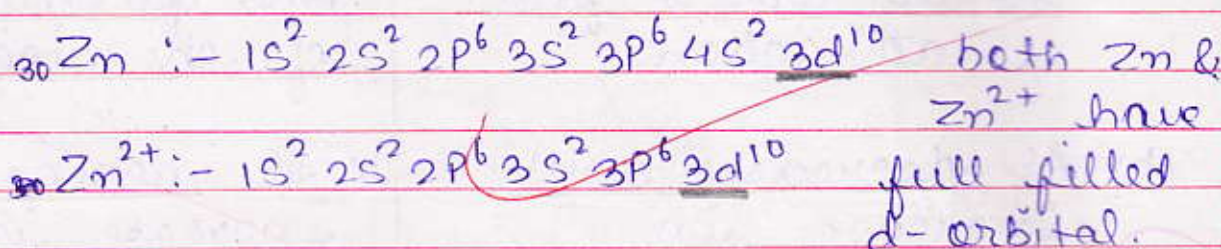
<u>Physisorption</u>	<u>Chemisorption</u>
(a) It occurs due to <u>Van der waal's force of attraction</u> .	(a) It occurs due to <u>the formation of chemical bond</u> .
(b) It <u>decreases with increase in temperature</u> .	(b) It <u>increases with increase in temperature</u> .
(c) It is <u>not specific</u> in nature.	(c) It is <u>highly specific</u> in nature.

19) Transition Element

Transition element are those elements in which the last electron enters in d-orbital of their atom and the atoms have partially filled d-orbital in both ground state and excitation state.
e.g. Sc, Mn, Cr etc.



Since transition elements are those elements in which atoms have partially filled d-orbital and Zinc has full-filled d-orbital in its atom. So, it does not follow the properties shown by other transition elements. Hence, Zn is not transition element.



(18) Difference between roasting & calcination

<u>Roasting</u>	<u>Calcination</u>
(a) It is the process of heating ores <u>in</u> presence of <u>air</u> below its melting point to convert it into its oxide.	(a) It is the process of heating ores <u>in</u> absence or limited supply of <u>air</u> below its melting point to convert it into its oxide.



Roasting

(b) It is used mainly to convert Sulphide ore into their oxide.

eg.



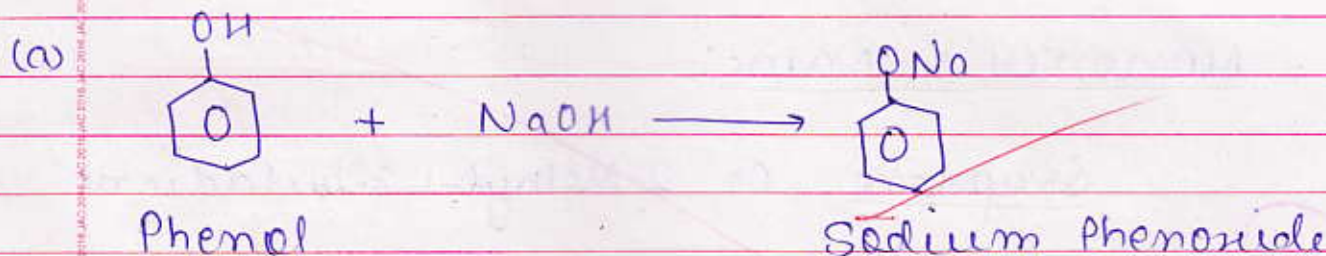
Calcination

(b) It is used mainly to convert carbonate or hydroxide ore into its oxide.

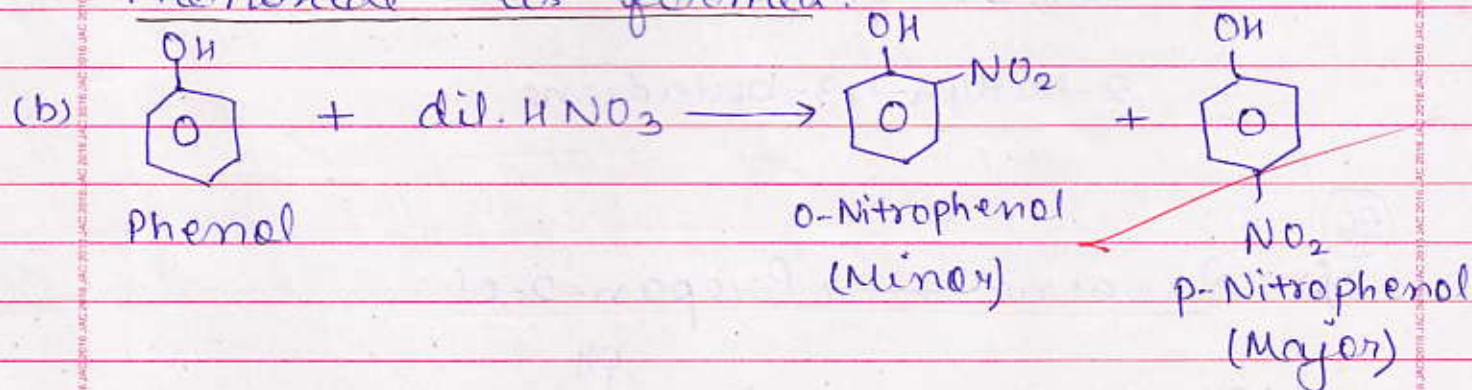
Eg.



(23)



2 When Phenol is treated with Sodium hydroxide (NaOH), Sodium Phenoxide is formed.





When Phenol is treated with dilute Nitric acid, o-Nitrophenol (minor product) and p-Nitrophenol (major product) are formed.

(22)

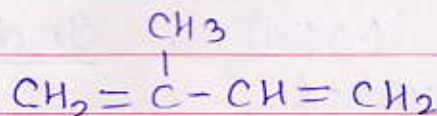
Natural rubber

Natural rubber is a polymer having monomer Isoprene and it is obtained from colloidal sol of rubber latex.

Monomer's Name:-

Isoprene or, 2-Methyl-1,3-butadiene

(23) Monomer's structural formula

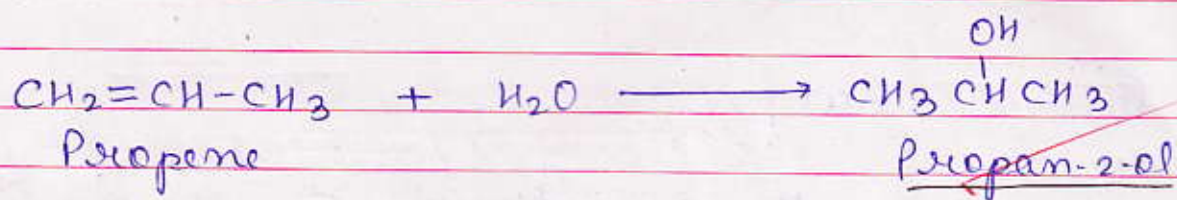


2-Methyl-1,3-butadiene

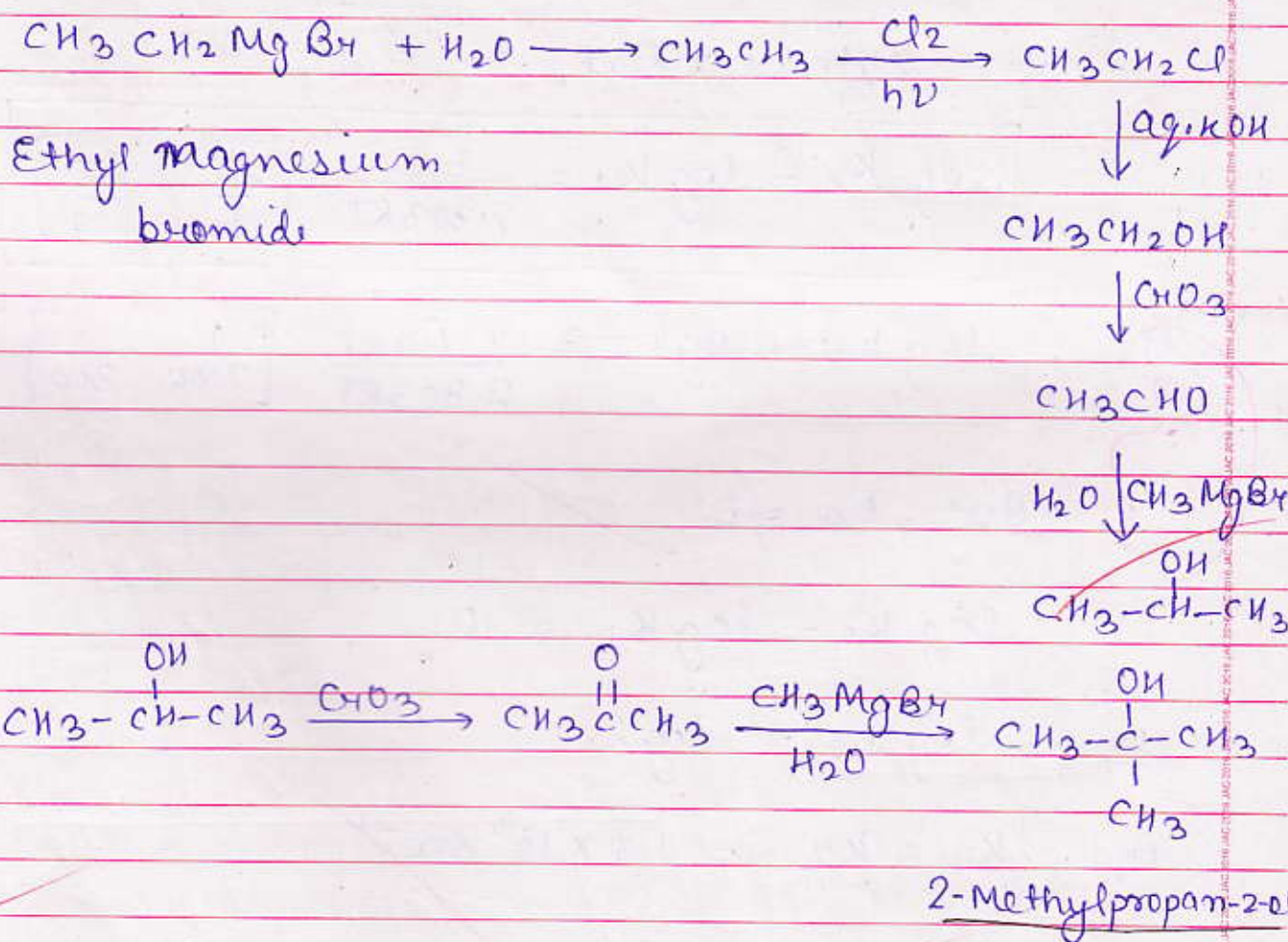
(26)

(i) Propene $\longrightarrow$ Propan-2-ol

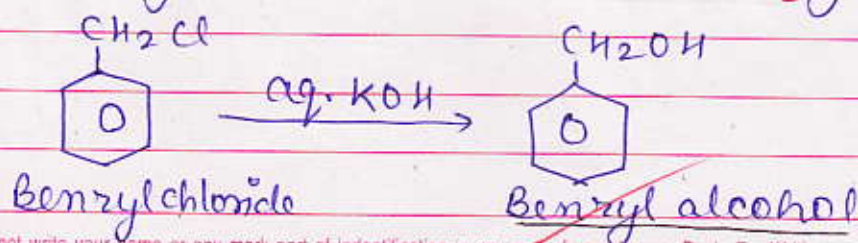




(ii) Ethylmagnesium bromide $\longrightarrow$ 2-Methylpropan-2-ol



(iii) Benzyl chloride $\longrightarrow$ Benzyl alcohol





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Given that,

$$E_a = 0, K_1 = 1.6 \times 10^6 \text{ sec}^{-1}, T_1 = 280 \text{ K}$$

$$K_2 = ?, T_2 = 300 \text{ K}$$

We know that,

$$\log K_2 - \log K_1 = \frac{E_a}{2.303 RT} \left[\frac{1}{T_1} - \frac{1}{T_2} \right]$$

Q

$$\log K_2 - \log K_1 = \frac{E_a}{2.303 RT} \left[\frac{1}{280} - \frac{1}{300} \right]$$

But $E_a = 0$,

$$\therefore \log K_2 - \log K_1 = 0$$

$$\log K_2 = \log K_1$$

$$K_1 = K_2 = 1.6 \times 10^6 \text{ sec}^{-1}$$

$$\therefore K_2 = 1.6 \times 10^6 \text{ sec}^{-1}$$



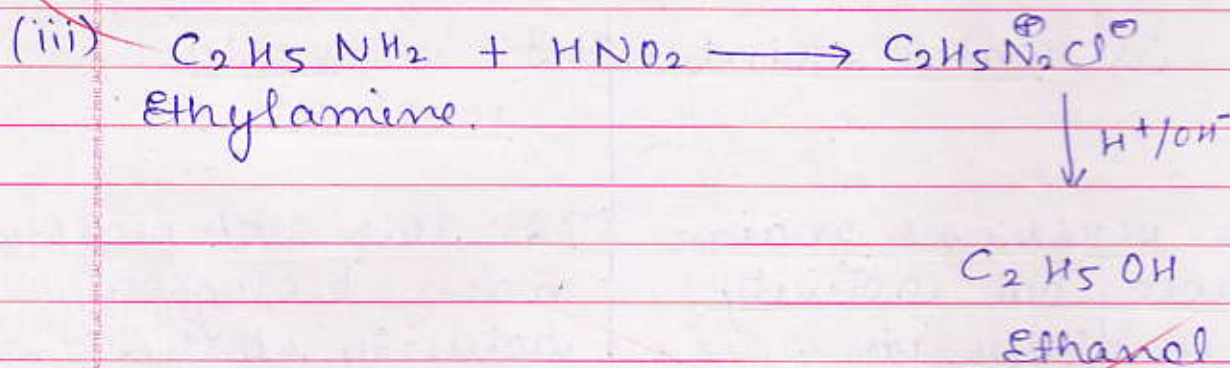
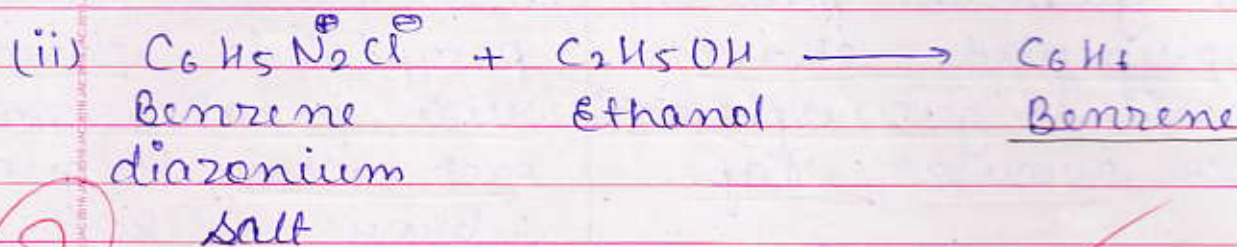
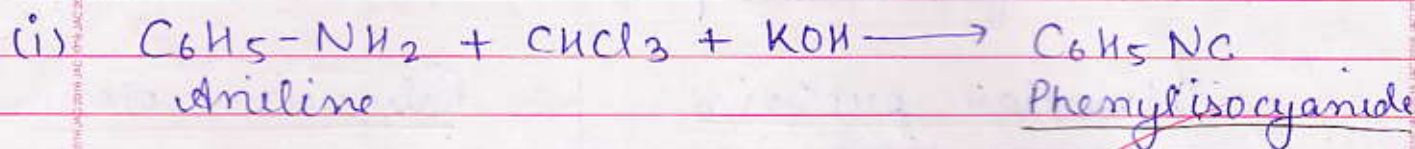
(25) Difference between globular protein and fibrous protein.

<u>Globular protein</u>	<u>Fibrous Protein</u>
(a) In globular protein, <u>polypeptide chain</u> <u>coil</u> to give <u>spherical</u> or <u>circular</u> <u>shape</u> .	(a) In fibrous protein, <u>polypeptide chains</u> <u>run</u> <u>parallel</u> to <u>each</u> <u>other</u> to give <u>fibrous</u> like <u>structure</u> .
(b) It is <u>water</u> <u>soluble</u> .	(b) It is <u>water</u> <u>insoluble</u> .
(c) It <u>performs</u> <u>main</u> <u>biological</u> <u>activity</u> and helps in <u>controlling</u> <u>metabolism</u> .	(c) It does not perform <u>main</u> <u>biological</u> <u>activity</u> but it is a <u>chief</u> <u>structural</u> <u>material</u> of <u>body</u> .
e.g. all enzymes & hormones etc.	e.g. Myosin, collagen etc.

P.T.O.



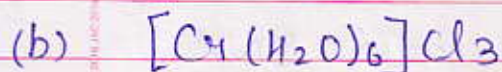
(28)



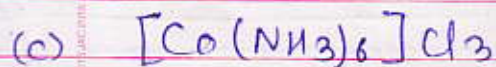
(29)



3 Potassium hexacyanoferrate (II)

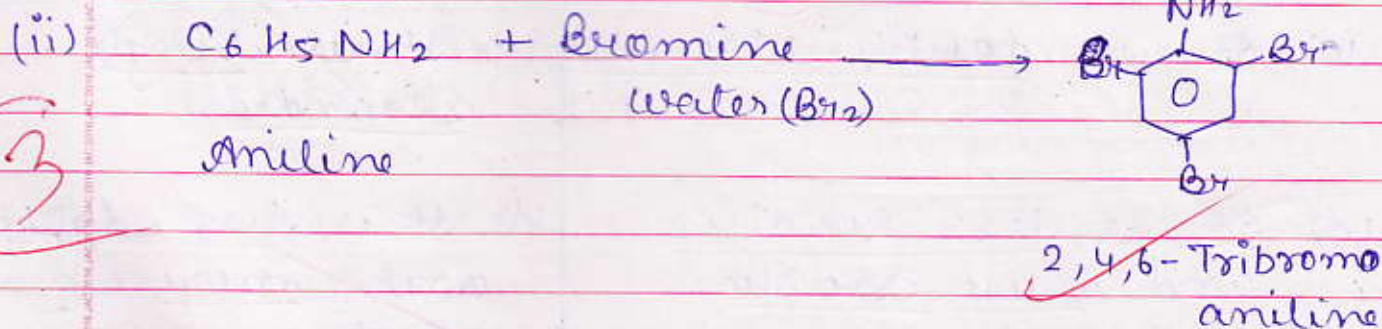
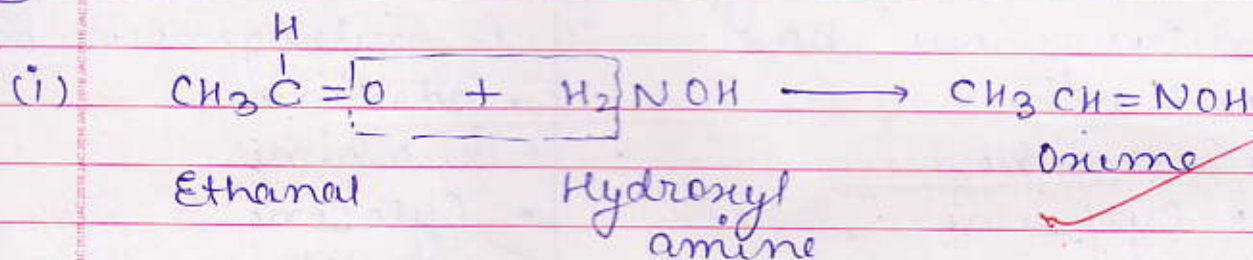


Hexaqua chromium(III) chloride



Hexammine cobalt(III) chloride

(3)



P.T.O.



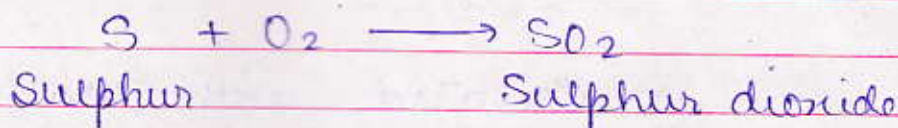
(30) Difference between RNA and DNA

<u>DNA</u> <u>(Deoxyribo nucleic acid)</u>	<u>RNA</u> <u>(Ribonucleic acid)</u>
(a) It contains sugar → <u>Deoxyribose</u> sugar.	(a) It contains <u>ribose</u> sugar.
(b) It contains 4 types of nitrogenous bases. • Adenine. • Guanine • Cytosine • <u>Thiamine</u>	(b) It contains 4 types of nitrogenous bases. • Adenine • Guanine • Cytosine • <u>Uracil</u>
(c) It is <u>double-stranded</u> .	(c) It is <u>single stranded</u> .
(d) It is <u>less reactive</u> and <u>more stable</u> .	(d) It is <u>less stable</u> and <u>more reactive</u> .
(e) It <u>undergoes replication</u> .	(e) It <u>doesn't undergo replication</u> .



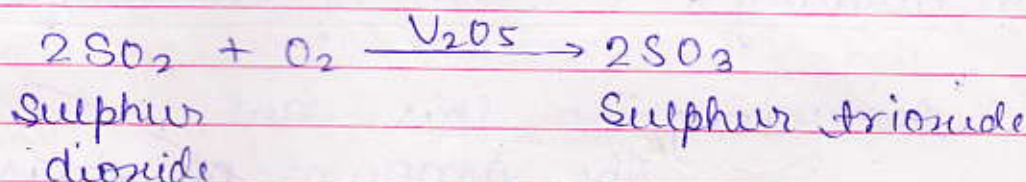
(27) Contact process

Step I



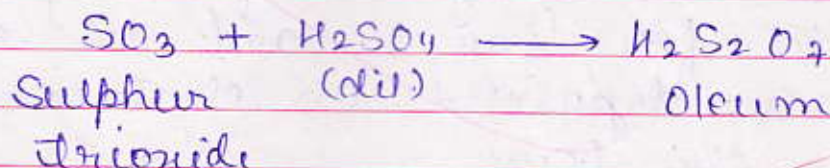
Sulphur is heated with Oxygen gas to form Sulphur dioxide.

Step II



Sulphur dioxide is treated with Oxygen in presence of V_2O_5 to form Sulphur trioxide.

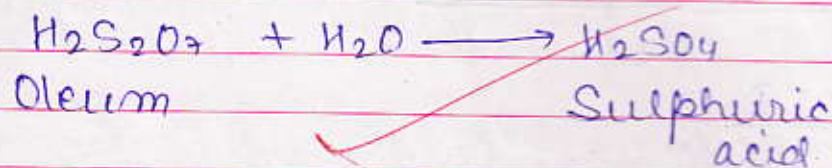
Step III



Sulphur trioxide is adsorbed with dilute sulphuric acid to form Oleum.



Step IV



Oleum is treated with water according to requirement to form required concentration of Sulphuric acid.

(34)

(a) Faraday's 1st law of electrolysis

According to this law,

"The amount of mass deposited at electrode during electrochemical reaction is directly proportional to the amount of charge flowing through the electrode."

Suppose during an electrochemical reaction, Q amount of charge is flowing through electrode for time t and w amount of mass deposited on electrode. Then, from the law,

$$w \propto Q$$

$$w \propto It$$



$$\text{or, } \boxed{W = Z I t}$$

Z = constant of proportionality known as electrochemical equivalent.

Faraday's 2nd law of electrolysis

According to this law,

"When equal amount of current is flowing through two different electrodes for same time, then the ratio of mass deposited at two electrodes is equal to the ratio of their equivalent masses."

$$\boxed{\frac{W_1}{W_2} = \frac{E_1}{E_2}}$$

where W_1 = mass deposited at 1st electrode
 E_1 = equivalent mass of 1st electrode
 W_2 = mass deposited at 2nd electrode
 E_2 = equivalent mass of 2nd electrode



(b) Given that,

$$I = 2A, t = 60 \times 60 \text{ sec.}$$

$$Z = \frac{63}{2 \times 96500}$$

We know that,

$$W = ZIt$$

$$= \frac{63}{2 \times 96500} \times 2 \times 60 \times 60$$

$$W = 2.35 \text{ g}$$

$$\begin{array}{r} 63 \\ 36 \\ \hline 378 \\ 1890 \\ \hline 2268 \end{array} \quad \begin{array}{r} 2035 \\ 1930 \\ \hline 105 \\ \times 3300 \\ 2995 \\ \hline 24850 \end{array}$$

(33)

Given that,

$$t_{1/2} = 100 \text{ min}, [A_0] = 100 \text{ mol/l}$$

$$T = ? , [A] = 10 \text{ mol/l} (100 - 90)$$

We know that,

$$t_{1/2} = \frac{0.693}{k}$$

$$\therefore, k = \frac{0.693}{t_{1/2}} = \frac{0.693}{100} = 6.93 \times 10^{-3} \text{ min}^{-1}$$



again,

$$k = \frac{2.303}{T} \log \frac{[A_0]}{[A]}$$

$$\text{or, } T = \frac{2.303}{k} \log \frac{100}{10}$$

$$= \frac{2.303}{6.93 \times 10^{-3}} \log 10$$

$$= 0.332 \times 10^3$$

$$[\log 10 = 1]$$

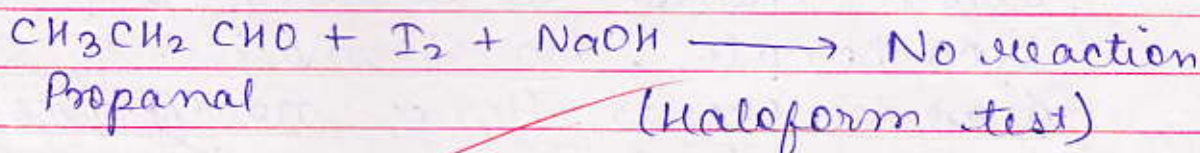
$$T = 3.32 \times 10^2 \text{ min}$$

$$\begin{array}{r} 6930 \overline{) 23030} \quad 332 \\ \underline{20790} \\ 22400 \\ \underline{20790} \\ 216100 \\ \underline{12960} \end{array}$$

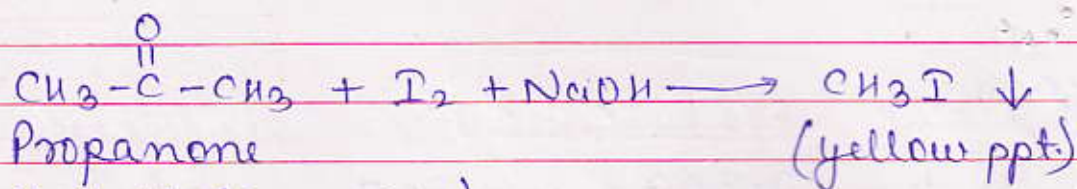
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(i) Distinguish between Propanal & Propanone.

2



When Propanal is treated with Iodine and Sodium hydroxide, no reaction takes place or no formation of yellow precipitate takes place. Thus Propanal do not undergo Haloform test since it doesn't have Methyl ketone group ($-\overset{\text{O}}{\parallel}\text{C}-\text{CH}_3$).

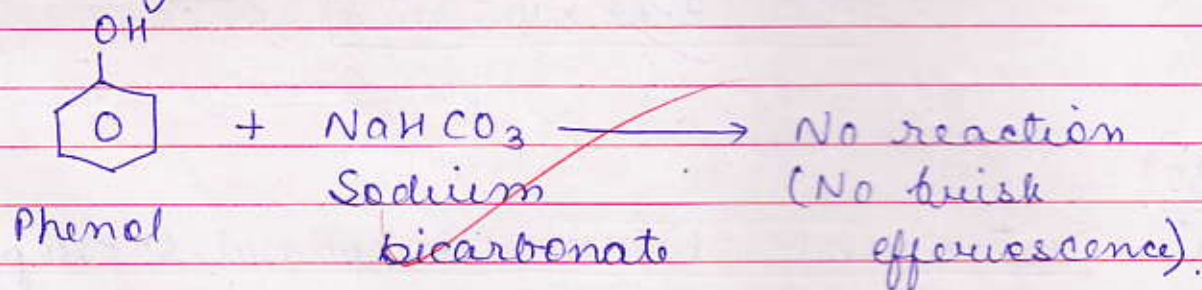


(have Methylketone group)

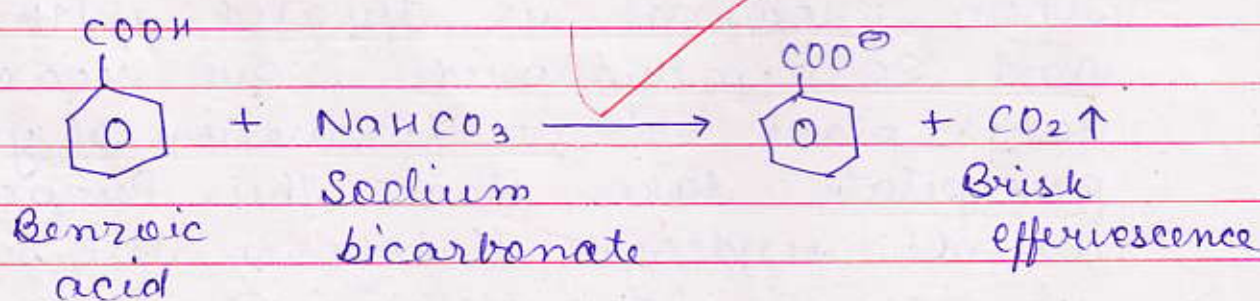
When Propanone is treated with Iodine and Sodium hydroxide, yellow precipitate of Iodoform is formed. Thus Propanone gives Haloform test.

By Haloform test, Propanal and propanone can be distinguished.

(ii) Distinguish between Phenol & Benzoic acid



When Phenol is treated with Sodium bicarbonate, no formation of Carbon dioxide occurs. Hence no effervescence is observed.



(Sodium bicarbonate test)



When Benzoic acid is treated with Sodium bicarbonate, evolution of CO_2 gas takes place. Hence brisk effervescence is observed.

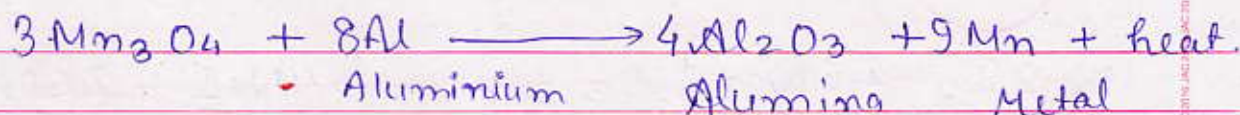
Therefore, by Sodium bicarbonate test, Phenol & Benzoic acid can be distinguished.

(21)

Aluminothermic process

In Aluminothermic process, calcined or roasted ore is taken at Magnesium ribbon which has Aluminium and Barium peroxide (BaO_2) at one end of ribbon.

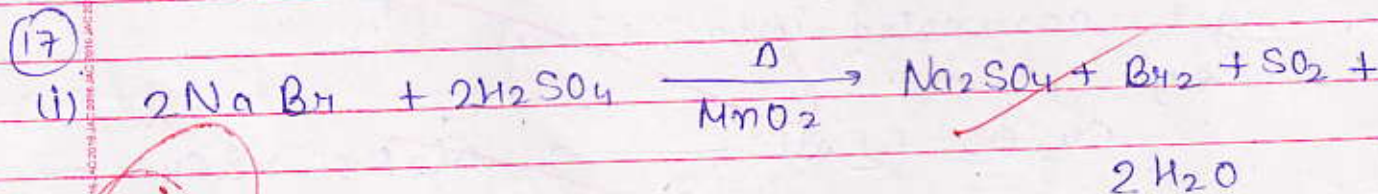
The ribbon is heated along with ore. The temperature becomes very high as the reaction is exothermic (about $2000-3000^\circ\text{C}$). By this process, oxide get converted into metal.
e.g.





(20) Difference between CH_3OH and $\text{C}_2\text{H}_5\text{OH}$

CH_3OH (Methanol)	$\text{C}_2\text{H}_5\text{OH}$ (Ethanol)
(a) It has <u>one carbon</u> .	(a) It has <u>two carbon</u> .
(b) Its <u>very low concentration</u> is also <u>poisonous</u> .	(b) Its <u>high concentration</u> is <u>poisonous</u> .
$\text{CO} + 2\text{H}_2 \xrightarrow{\text{ZnO-CuO}}$ CH_3OH Methanol	$\text{C}_6\text{H}_{12}\text{O}_6$ + Glucose $\downarrow$ fermentation $\xrightarrow{\text{Zymase}}$ $2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2$ Ethanol





(1) Isomer of acetic acid.



~~Eth-1-ene-1,2-diol~~

(2) Parts per million

Parts per million is the ratio of mass of constituent to the total mass of substance multiplied by 10^6 .

(3)

$$\text{ppm} = \frac{\text{Mass of constituent}}{\text{Mass of substance}} \times 10^6$$











Handwritten marks and scribbles in the top right corner.