



No. J/S

042532

इन्टरमीडिएट परीक्षा, 2015

आई० एससी० (I.Sc.)

28 पृष्ठों की उत्तरपुस्तिका

वीक्षक के हस्ताक्षर

केन्द्राधीक्षक का हस्ताक्षर
Nirmala College
Ranchi

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

रोल कोड (Roll Code)	क्रमांक (Roll No.)	पंजीयन संख्या (Registration No.)		विषय (Subject)	पत्र (Paper)	लिपि (Script)	तिथि (Date)				
		No.	वर्ष (Year)								
11066	10160	11066-RS-0165-2013		CHEMISTRY	Comp	ROMAN	25/2/15				
लब्धांक (MARKS OBTAINED)											
Question Number	1	2	3	4	5	6	7	8	9	10	TOTAL
Marks Obtained	1	0	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	2	2	2	1	14
Question Number	21	22	23	24	25	26	27	28	29	30	TOTAL
Marks Obtained	2	2	2	3	3	3	3	2	3	3	26
Question Number	31	32	33	34	35	36	37	38	39	40	TOTAL
Marks Obtained	3	4	4	4							15
Grand Total	(In Words)		Sixty five					(In Figure)		65	

परीक्षार्थी हेतु निर्देश

- परीक्षार्थी ध्यान दें कि केवल एक ही उत्तर-पुस्तिका में पूरे प्रश्नों का उत्तर सीमित करना है। अतिरिक्त उत्तर-पुस्तिका नहीं दी जाएगी।
- 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, पत्र, लिपि तथा तिथि लिखना अनिवार्य है। परन्तु परीक्षार्थी को अपना अथवा अपने कॉलेज का नाम कदापि नहीं लिखना है। परीक्षार्थियों 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।
- 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। परीक्षार्थी 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 कामज 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।
- 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 बगले 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 मोंड देना चाहिए।
- प्रश्न-पत्र पर कोई उत्तर या कोई भी दूसरी बात लिखना वर्जित है।
- प्रश्न-पत्र वितरण के बाद एक घंटे तक कोई भी परीक्षार्थी अपनी उत्तर-पुस्तिका वापस नहीं कर सकते हैं।

परीक्षक का पूर्ण हस्ताक्षर एवं मुहर
(Full Signature of Examiner with Seal)
LeSealjer (Chem.)
Inter Mahila College
Jamtara

प्रधान परीक्षक का पूर्ण हस्ताक्षर एवं मुहर
(Full Signature of Head Examiner with Seal)

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



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1. a) 1

2. b) 1% ~~Sucrose~~

3. b) Two liquids

4. c) Xe

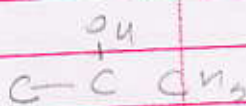
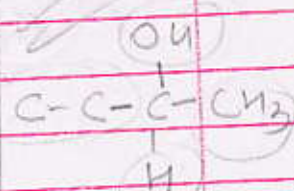
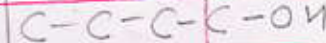
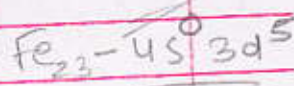
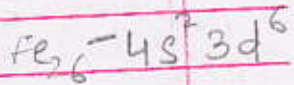
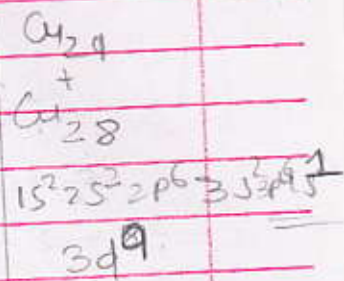
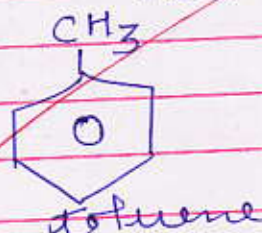
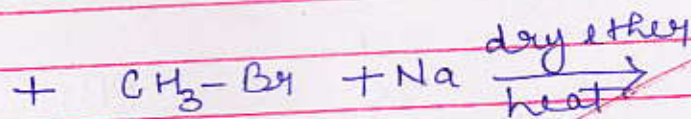
5. d) Fe^{3+}

6. b) 2-butanol

7. a) Alcohols

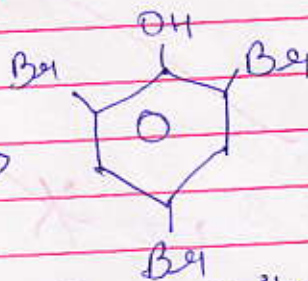
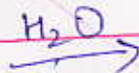
8. a) CH_3-NH_2

9. No, we can't separate the components of an azeotropic mixture by fractional distillation because it boils at constant temperature.



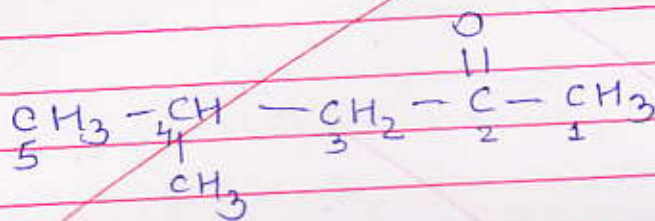


11.

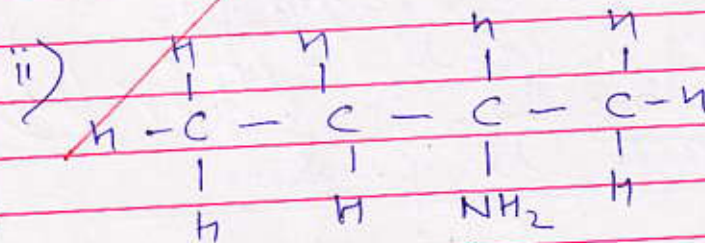
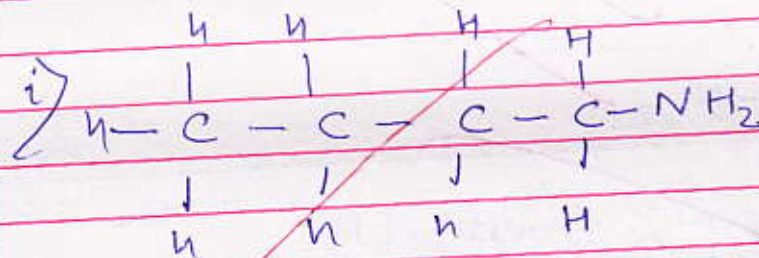


2,4,6-tribromophenol

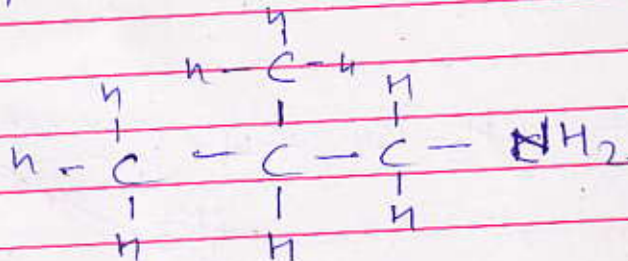
12.

 $\Rightarrow$ 4-methylpentan-2-one

13.



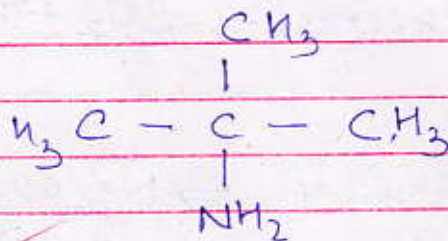
iii)



iv)



iv)



⇒ Total isomers = 4

14. Glucose

15. Paracetamol

16. Kohlrausch's law :- According to this law "the limiting molar conductivity of weak electrolyte is the sum of individual contribution of cations and anions present in the electrolyte."

i.e

$$\lambda_m^\circ = \nu_+ \lambda_{m+}^\circ + \nu_- \lambda_{m-}^\circ$$

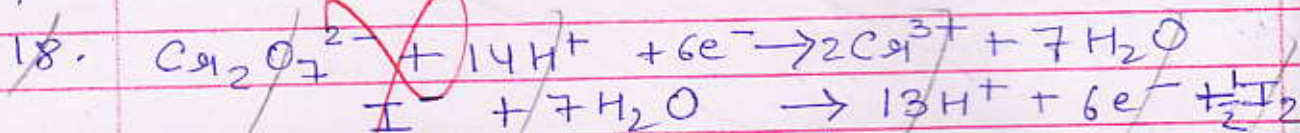
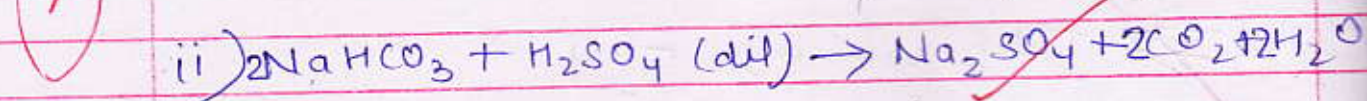
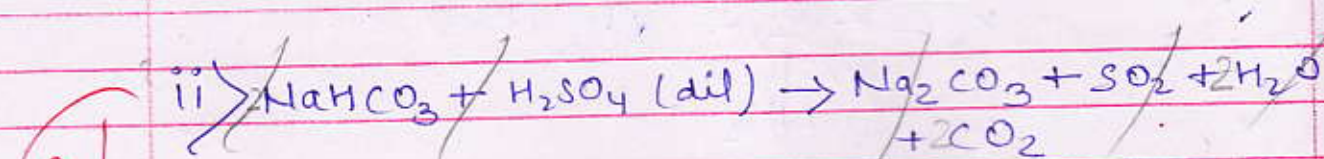
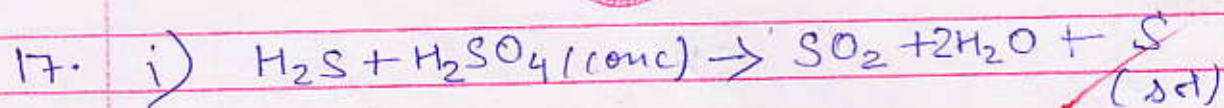
where ν_+ = no. of cations

ν_- = no. of anions

λ_m° = limiting molar conductivity of weak electrolyte

λ_{m+}° = limiting molar conductivity of cation

λ_{m-}° = limiting molar conductivity of anion.



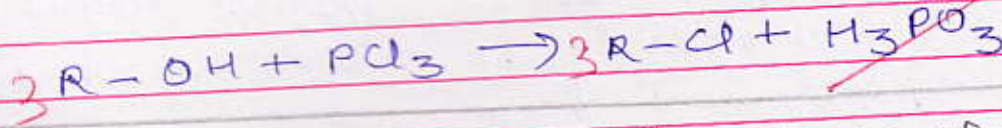
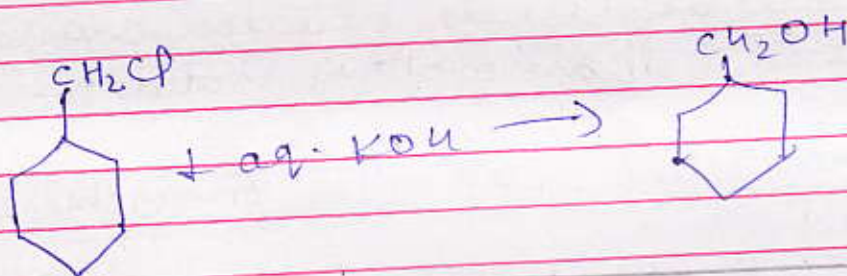
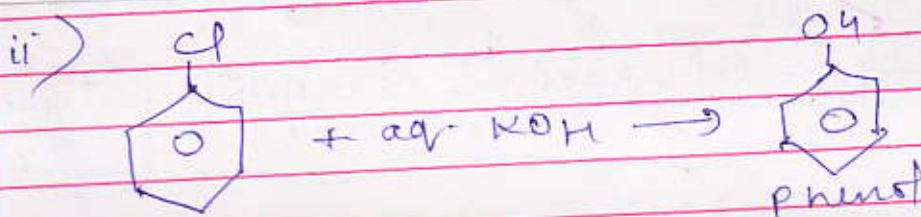
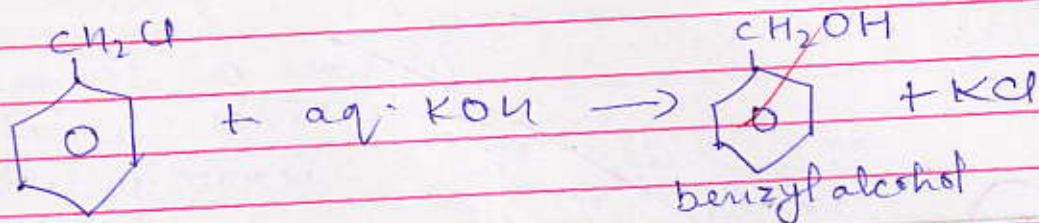
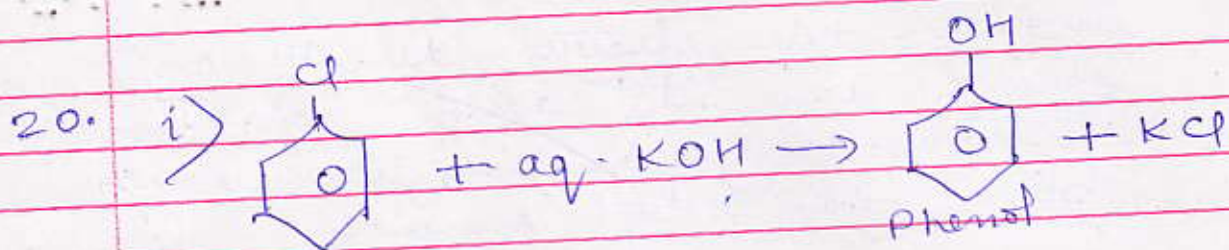
19. Lanthanoid contraction :- The steady decrease in atomic size with the increasing atomic number is called Lanthanoid contraction. This is due to incoming electrons of 4f sub orbital, it couldn't screened outermost 6s orbital.

> Its effect :-

i) Similarities among Lanthanoids

ii) > Relationship between 3rd, 2nd and 1st transition series.

ii) > Basicity differences



22. Aniline is a weaker base than ethyl amine because in aniline the ~~aryl group~~ ~~group~~ is electron withdrawing which decrease the electron density on amine while in ethyl amine the alkyl group is electron donating group which



increase the electron density on amine, and it ^{can} easily donate electrons. Hence, ~~aniline~~ is weaker base than ethyl amine.

23. Antibiotic :- It is a chemical substance which prevents or kill the microorganisms in living tissue.

Foreg:- Ofloxacin, Streptomycin

24. Three differences between crystalline and amorphous solids:-

Crystalline Solid	Amorphous solid
i) In it, the particles (atoms, ions or molecules) possess regular orderly arrangement.	The constituent particles doesn't possess regular orderly arrangement.
ii) It has definite shape.	It is irregular in its shape.
iii) It is anisotropic in nature.	It is isotropy, isotropic in nature.



25. i) Molarity :- Molarity is the number of ~~moles~~ moles dissolved in one litre of solution. It is denoted by M . Its SI unit is mol L^{-1} .

$$M = \frac{\text{no. of moles of solute}}{\text{vol of solution (in Litre)}}$$

3 ii) Molality :- Molality is the number of ~~moles~~ moles dissolved in 1 Kg of solvent. It is denoted by m . Its SI unit is mol Kg^{-1} .

$$m = \frac{\text{no. of moles of solute}}{\text{weight of solvent (in Kg)}}$$

iii) Mole Fraction :- ~~It is~~ It is the ratio of no. number of moles of one component to the number of moles of total component. It is denoted by X . It has no unit.

$$X = \frac{n_A}{n_A + n_B}$$

where n_A and n_B is the number



of moles of component A and component B.

26. Standard e.m.f :- The difference between the potential difference of one half cell containing electrode and electrolyte to the potential difference of another half cell when the concentration of electrolyte is 1 M at STP is called standard e.m.f denoted by E° .

> Let us take a reaction:-



then equilibrium constant

$$K_c = \frac{[\text{Zn}^{2+}][\text{Cu}]}{[\text{Cu}^{2+}][\text{Zn}]}$$

$$= \frac{[\text{Zn}^{2+}]}{[\text{Cu}^{2+}]} \quad \left[\begin{array}{l} \because [\text{Cu}] = 1 \\ [\text{Zn}] = 1 \end{array} \right] \quad \text{--- (1)}$$

In equilibrium, $E_{\text{cell}} = 0$ --- (11)

$$\text{Now, } E_{\text{cell}} = E^\circ_{\text{cell}} - \frac{0.059}{2} \log \frac{[\text{Zn}^{2+}]}{[\text{Cu}^{2+}]}$$



$$\Rightarrow 0 = E_{\text{cell}}^{\circ} - \frac{0.059}{2} \log \left(\frac{Zn^{2+}}{K_c} \right)$$

[From eqⁿ (i) & (ii)]

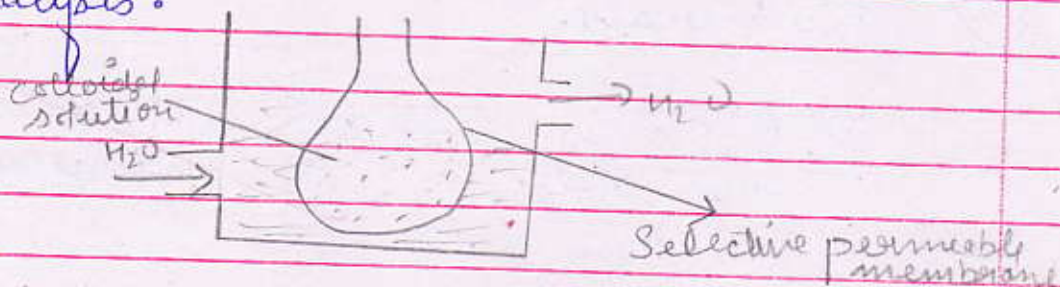
$$\Rightarrow E_{\text{cell}}^{\circ} = \frac{0.059}{2} \log K_c$$

In general form

$$E_{\text{cell}}^{\circ} = \frac{RT}{nF} \ln K_c$$

27. i) Peptization :- The process of ^{dispersing} ^{mixing} intermixing of precipitate with suitable electrolyte is called peptization. As a result a colloidal solution is prepared.

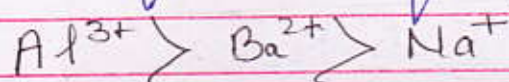
3 ii) Dialysis :- The process of separation of crystalloids from colloidal solution through selective permeable membrane like 'pachment' is called dialysis.



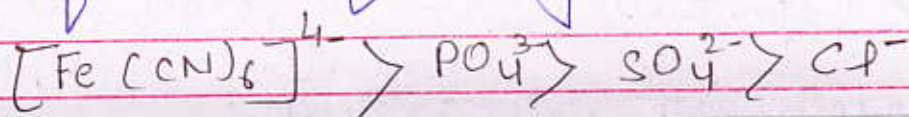


iii) Hardy - Shultz law :- According to this law, greater the valency of ions of electrolyte added, higher is the power of coagulation.

For coagulation of -ve sol, the order of valency of electrolyte :-



For coagulation of +ve sol, the order of power of coagulation is



28) Difference between mineral and ore

Mineral

Ore

i) Naturally occurring substance on Earth's crust in which metals are present are called minerals.

The chemical substances from which metals can be extracted easily and economically are called ore.

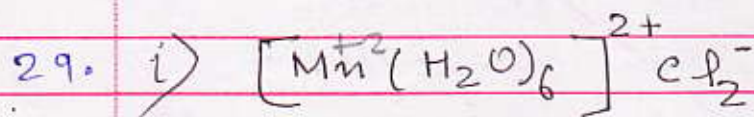
ii) All minerals are not ore.

All ~~ores~~ are minerals.



For eg :- $K_2Cr_2O_7 \cdot 6H_2O$
Carmalite

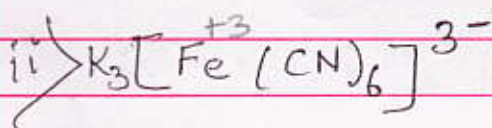
For eg :- Copper pyrite
 $CuFeS_2$



hexaaquamanganese (II) chloride

$$x - 2 = 0$$

$$x = 2$$



hexacyano Potassium hexacyano-
ferrate (III)

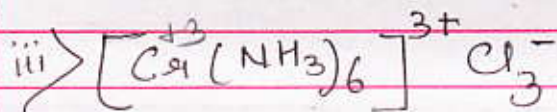
$$3 + x - 6 = 0$$

$$x - 3 = 0$$

$$3 + x - 6 = -3$$

$$x - 3 = -3$$

$$x = 0$$



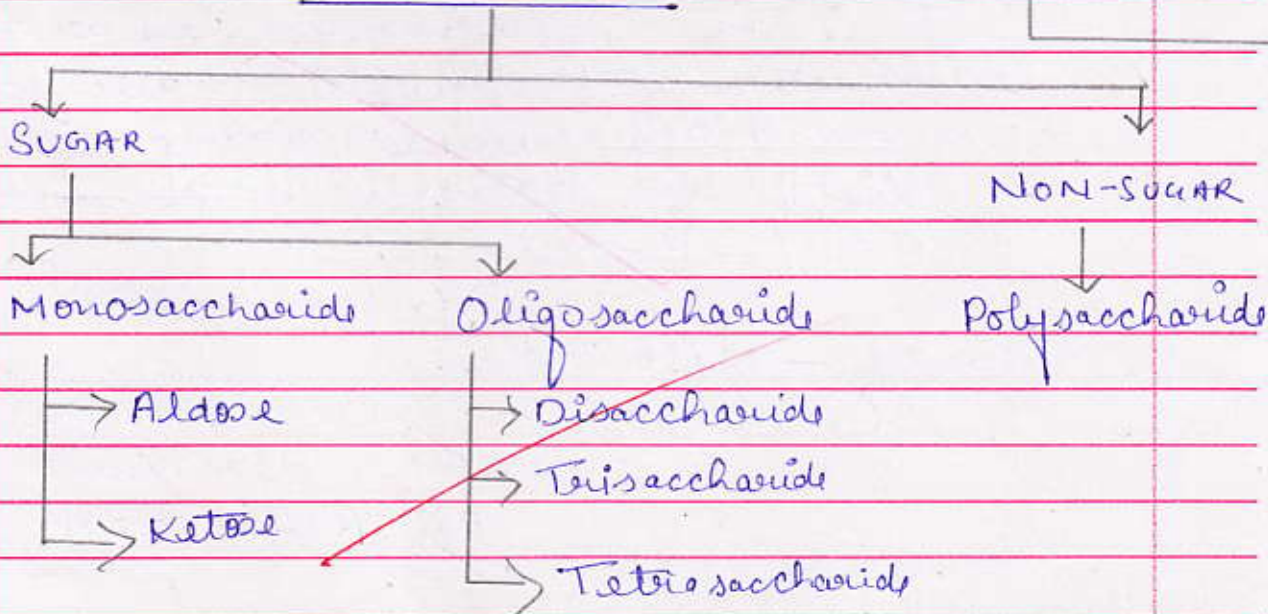
hexaaminochromium (III) chloride

$$3 + 0 = 0$$

$$x + 0 - 3$$

30.

CARBOHYDRATE

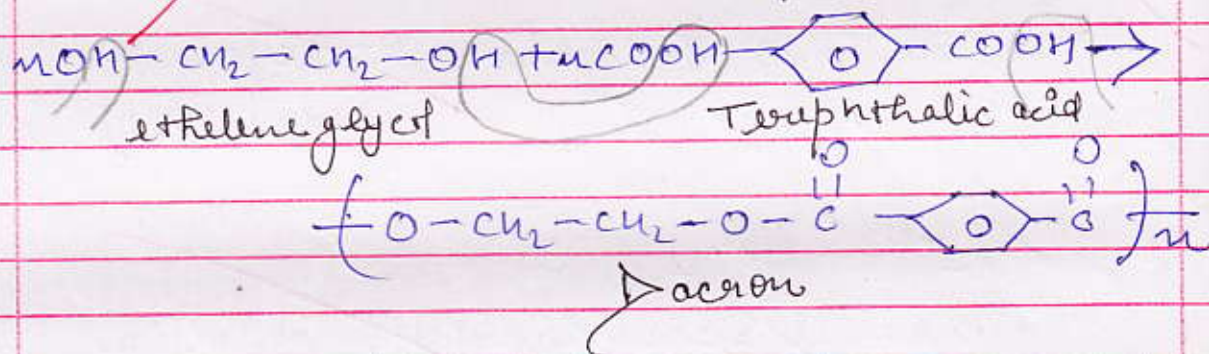




31. i) Polyester :- Polyester is the condensation polymer in which two monomers are joint with the elimination of ~~one~~ (H₂O) water molecule. As a result polymer of ester is formed.

For eg:- Terelene (Dacron)

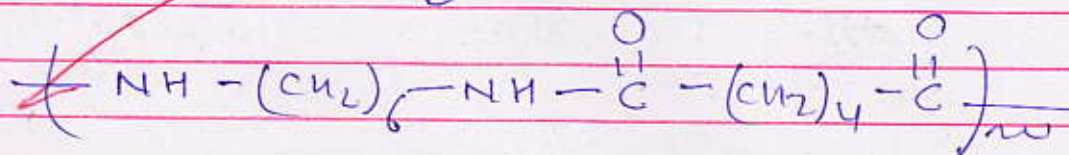
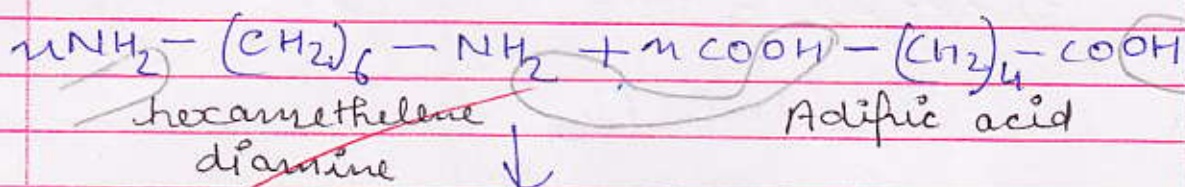
Monomers → i) Ethylene glycol
ii) Terephthalic acid



ii) Polyamide :- It is a condensation polymer formed with the elimination of (H₂O) water molecules. In polyamide 'amido' group is exist in between two monomers i.e. $\left(-\overset{\overset{\text{O}}{\parallel}}{\text{C}}-\text{NH}- \right)$.

For eg:- Nylon, 6-6.

Monomers → i) hexamethylene diamine
ii) Adipic acid.



Nylon 6-6

32. Let us consider a chemical reaction:



$$R = -\frac{d[R]}{dt} = K[R]$$

$$\Rightarrow \frac{d[R]}{[R]} = -K dt$$

Now integrate on both side,

$$\int \frac{d[R]}{[R]} = -\int K dt$$

$$\Rightarrow \log_e [R] = -Kt + C \quad \text{--- (1)}$$

When $t = 0$

then $R = R_0$

$\therefore$ putting these values in eqⁿ (1)



$$\Rightarrow \log [R] = -kt + C$$

$$C = \log_e [R_0]$$

putting the value of C in eqⁿ (1), we get

$$\log_e [R] = -kt + \log_e [R_0]$$

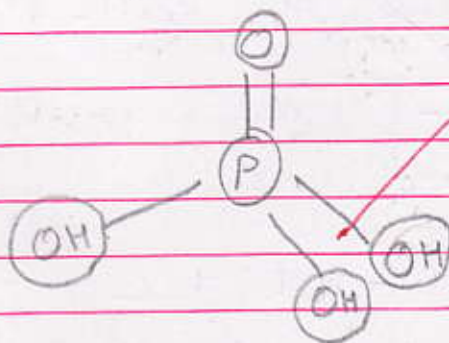
$$\Rightarrow kt = \log_e [R_0] - \log_e [R]$$

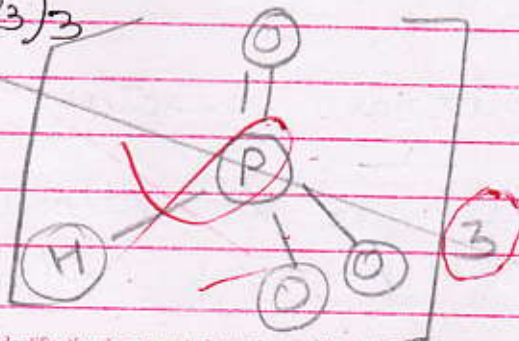
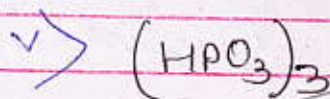
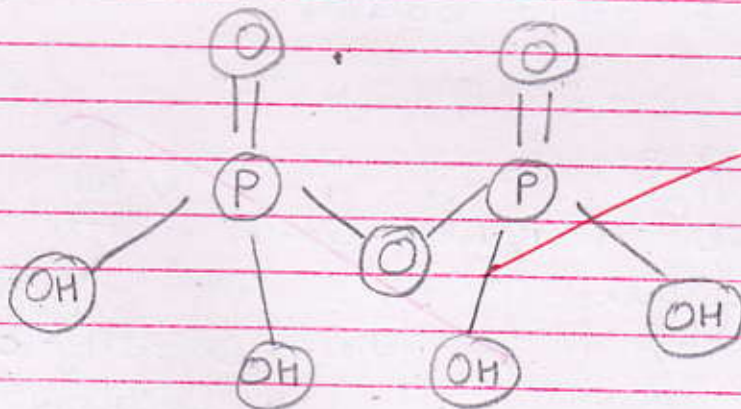
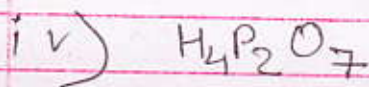
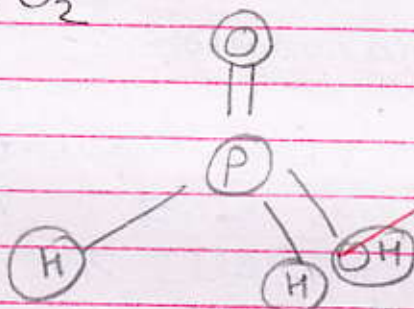
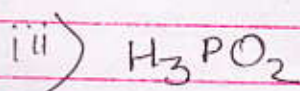
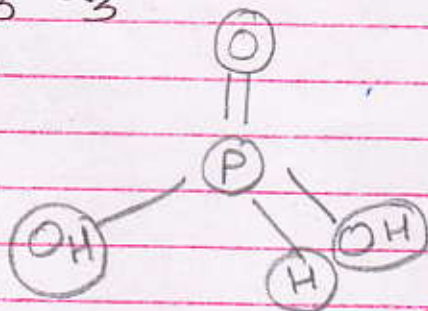
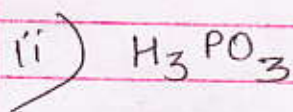
$$\Rightarrow kt = 2.303 \log \frac{[R_0]}{[R]}$$

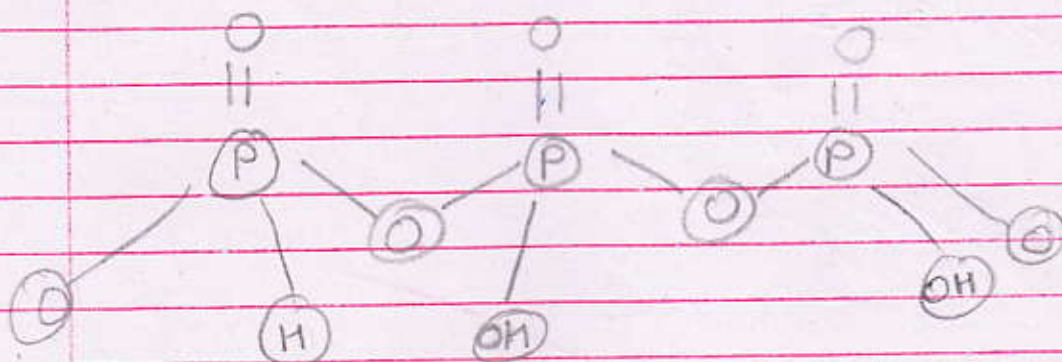
$$\Rightarrow k = \frac{2.303}{t} \log \frac{[R_0]}{[R]}$$

33. i) H_3PO_4

(W)



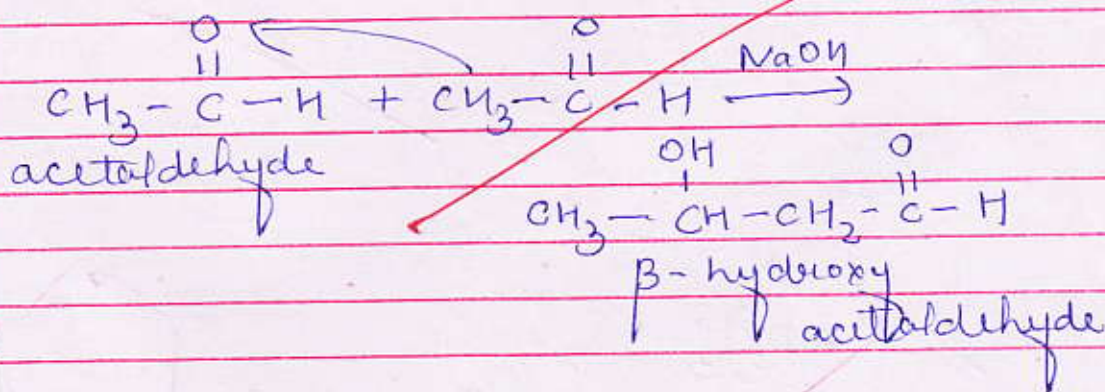




34. i) Aldol condensation :- Two molecules of same aldehyde or ketone having at least one α -H-atom reacts in the presence of alkali to give β -hydroxy aldehyde or β -hydroxy ketone. This reaction is called aldol condensation.

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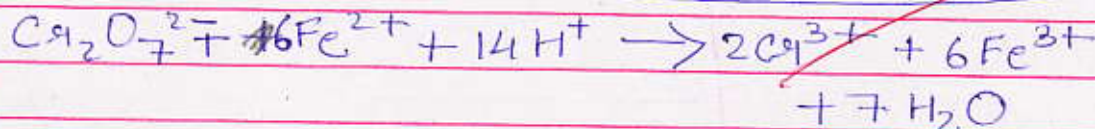
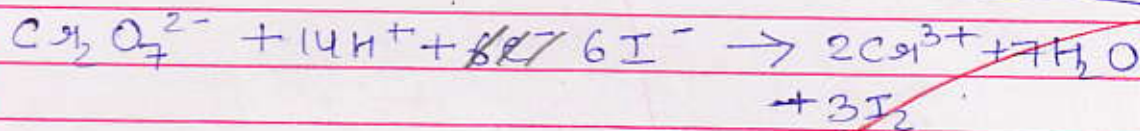
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ii) Cannizzaro reaction :- Two molecules of aldehyde or ketone having no α -H-atom when reacts


$$2 \text{ C}_6\text{H}_5\text{CHO} \xrightarrow{50\% \text{ NaOH}} \text{C}_6\text{H}_5\text{CH}_2\text{OH} + \text{C}_6\text{H}_5\text{COONa}$$

benzaldehyde benzyl alcohol sodium benzoic acid



x x x

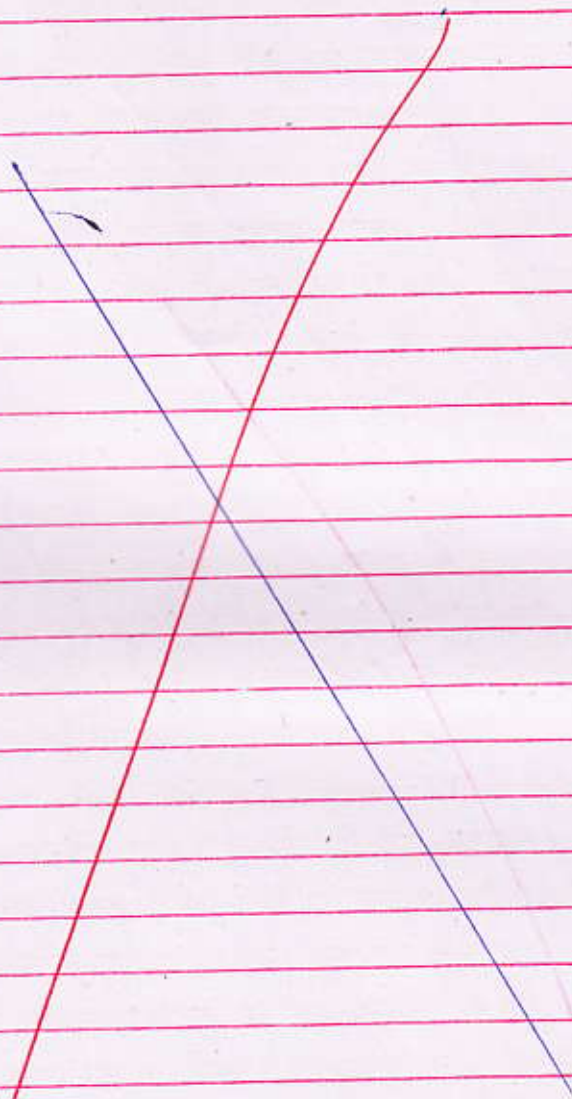
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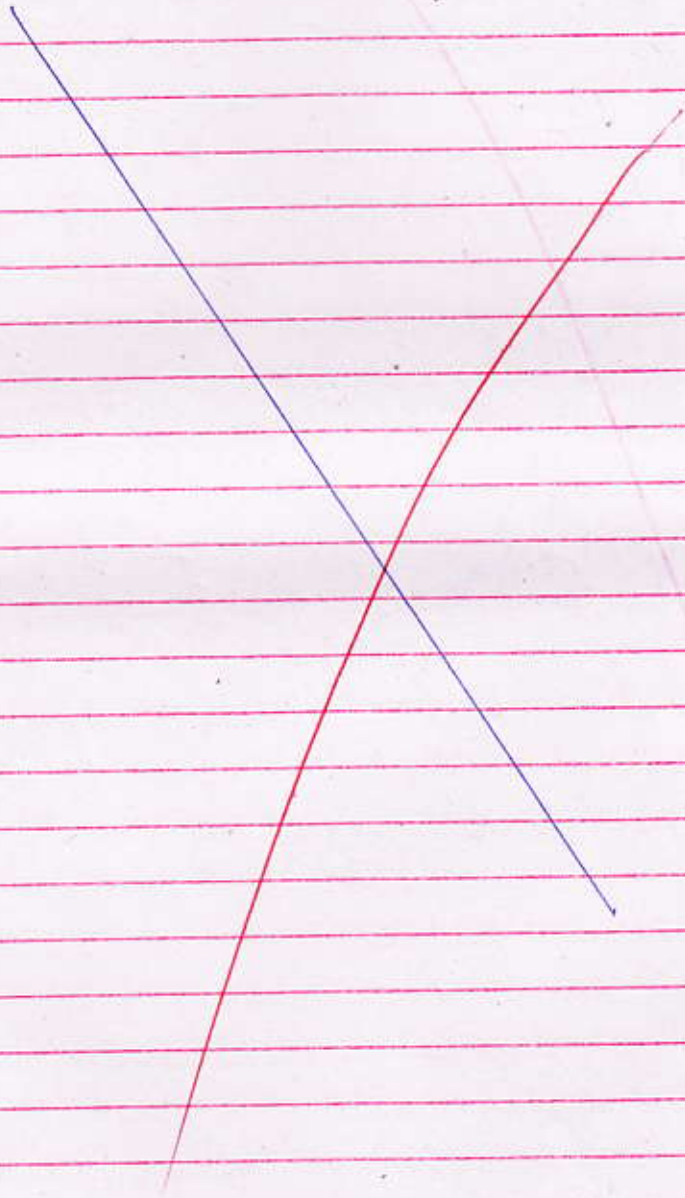




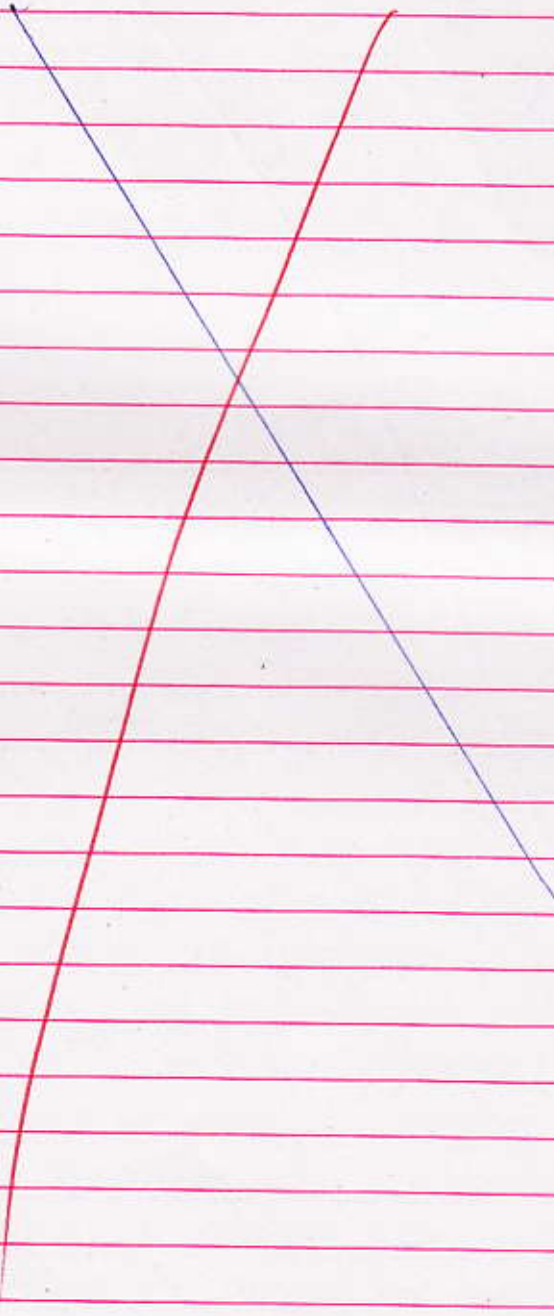




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