कुल पृष्ठ संख्या—32 (कवर पेज सहित)

क्रम संख्या.... 538459

माध्यमिक शिक्षा बोर्ड, राजस्थान, अजमेर

उच्च माध्यमिक परीक्षा

(परीक्षार्थी द्वारा स्वयं भरा जाना चाहिये)

Candidate's Roll No. In English

(In Figures) | | | | | | | |

(In Words).....

.....

परीक्षार्थी का नामांक हिन्दी में

शब्दों में .....

.....

नोट :– परीक्षार्थी उपरोक्त के अतिरिक्त उत्तर पुस्तिका के अन्य किसी भी भाग में अपना नामांक नहीं लिखें।

माध्यम – हिन्दी [ ] अंग्रेजी [✓]

विषय Chemistry

परीक्षा का दिन Friday

दिनांक 10-March 2017

नोट :– परीक्षार्थी के लिए आवश्यक निर्देश इस पृष्ठ के पिछले भाग पर उल्लेखित हैं। जिन्हें सावधानी पूर्वक पढ़ लें व पालना अवश्य करें।

परीक्षक हेतु निर्देश :– (1) परीक्षक को उपरोक्त सारणी अनुसार प्राप्तांक भरना अनिवार्य हैं, अन्यथा नियमानुसार दंडित किया जायेगा।

(2) परीक्षक उत्तर पुस्तिका के अन्दर के पृष्ठों के बायीं ओर निर्धारित कॉलम में लाल इंक से अंक प्रदत करें।

(3) कुल योग भिन्न में प्राप्त होने पर उसे पूर्णांक में ही परिवर्तित कर अंकित करें (उदारणार्थ : 15 ¼ को 16, 17 ½ को 18, 19 ¾ को 20)

परीक्षक के ह

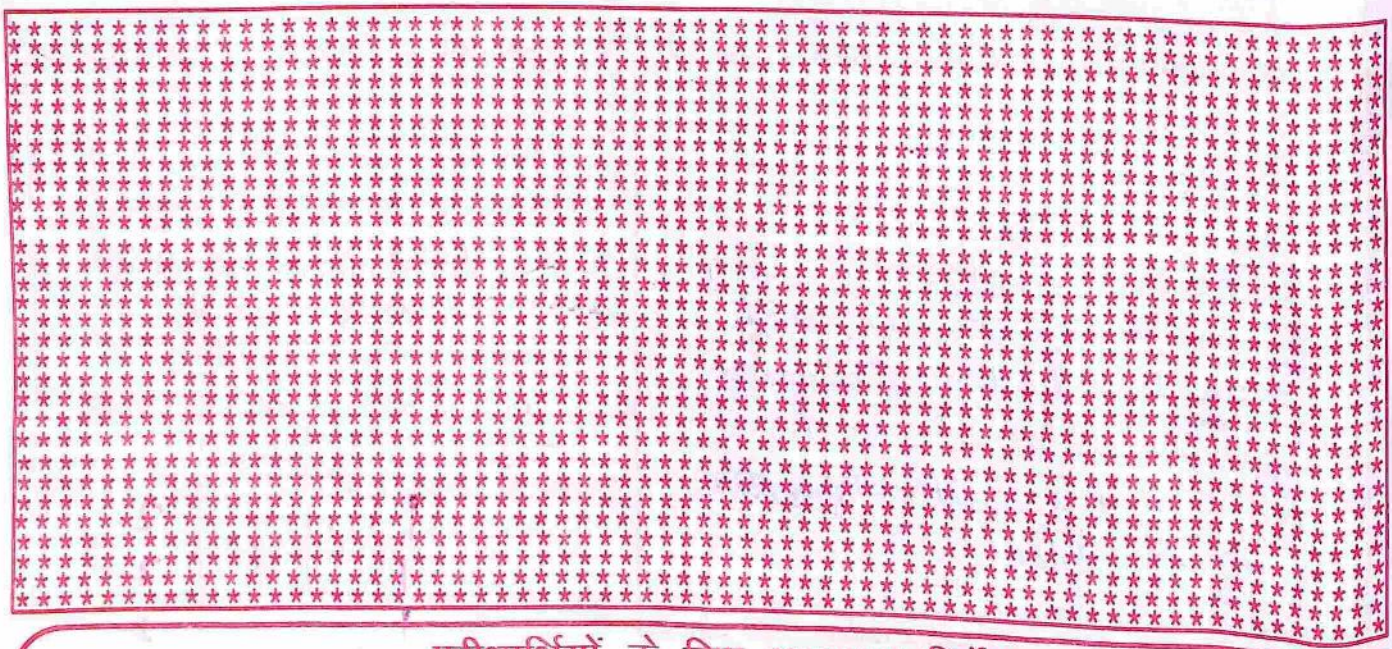
प्रमाणित किया जाता है कि इस उत्तर पुस्तक के निर्माण में 58 जी.एस.एम. क्रीमवो

प्रश्नवार प्राप्तांकों की सारणी
(परीक्षक के उपयोग हेतु)

प्रश्नों की क्रम संख्या	प्राप्तांक	प्रश्नों की क्रम संख्या	प्राप्तांक
1		19	
2		20	
3		21	
4		22	
5		23	
6		24	
7		25	
8		26	
9		27	
10		28	
11		29	
12		30	
13		31	
14		योग	
15		प्राप्त अंकों का कुल योग (Roundoff)	
16		अंकों में	शब्दों में
17			
18			

हस्ताक्षर ..... संकेतांक

व कागज ही उपयोग में लिया गया है। 162/2017



परीक्षार्थियों के लिए आवश्यक निर्देश

1. समस्त प्रश्नों का हल निर्धारित शब्द सीमा में इसी उत्तर पुस्तिका में करना है। विशेष परिस्थिति में अतिरिक्त उत्तर पुस्तिका पृथक से उत्तर पुस्तिका भरी हुई होने पर पर्यवेक्षक एवं वीक्षक की अनुशषां पर ही उपलब्ध कराई जायेगी।
2. प्रश्न–पत्र पर निर्धारित स्थान पर अपना नामांक लिखें।
3. प्रश्न–पत्र हल करने के पश्चात् जिस पृष्ठ पर हल समाप्त होता है, उस पर अन्त में "समाप्त" लिखकर अन्त के सभी रिक्त पृष्ठों को तिरछी लाईन से काटें।
4. निम्न बातों का विशेष ध्यान रखें अन्यथा अनुचित साधनों की रोकथाम अधिनियम के तहत कार्यवाही की जा सकेगी।
   (i) उत्तर पुस्तिका के ऊपर/अन्दर तथा प्रश्नोत्तर के किसी भी भाग में चाही गई सूचना के अलावा अपना नामांक, नाम, पता, फोन नम्बर अथवा पहचान की कोई अन्य प्रकार की सूचना आदि अंकित नहीं करें अन्यथा "अनुचित साधनों के प्रयोग" के अन्तर्गत कार्यवाही की जावेगी।
   (ii) उत्तर पुस्तिका के पृष्ठों को फाड़ें नहीं। उत्तर–पुस्तिका के मुख पृष्ठ पर अंकित संख्या के अनुसार पृष्ठ पूरे होने चाहिये।
   (iii) परीक्षा केन्द्रों पर पुस्तक, लेख, कागज, केलक्यूलेटर, मोबाईल, पेजर आदि किसी भी प्रकार का इलेक्ट्रोनिक उपकरण तथा किसी भी प्रकार का हथियार आदि ले जाना निषेध हैं।
   (iv) वस्त्र, स्केल, ज्योमेट्री बॉक्स पर कुछ न लिखकर लावें। टेबुल के आस–पास कोई अवैध सामग्री नहीं होनी चाहिये, इसकी जांच कर लें।
   (v) अपनी उत्तर पुस्तिका/ग्राफ/मानचित्र आदि परीक्षा भवन से बाहर ले जाना दण्डनीय अपराध है, अतः परीक्षा समाप्ति पर उत्तर पुस्तिका वीक्षक को बिना सौंपे परीक्षा कक्ष नहीं छोड़ें।
5. उत्तरों को क्रमानुसार एक ही स्थान पर लिखें। प्रश्न क्रमांक भी सही अंकित करें, अन्यथा दण्ड स्वरूप परीक्षक को 1 अंक कम करने का अधिकार है। बीच में उत्तर पुस्तिका के पृष्ठ रिक्त न छोड़ें। गणित विषय के लिए रफ कार्य उत्तर पुस्तिका के अंतिम पृष्ठों पर करें तथा तिरछी रेखा से काटें।
6. जहाँ तक हो सके प्रश्न के सभी भाग के उत्तर, उत्तर पुस्तिका में एक ही स्थान पर अंकित करें।
7. भाषा विषयों को छोड़कर शेष सभी विषयों के प्रश्न–पत्र हिन्दी–अंग्रेजी दोनों भाषा में मुद्रित हैं। किसी भी प्रकार की त्रुटि/अन्तर/विरोधाभास होने पर हिन्दी भाषा के प्रश्न को ही सही माना जाये।

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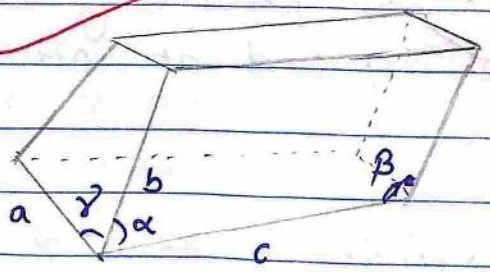
1. In tridinic crystal –

(i) $a \neq b \neq c$, i.e. all dimesions of side are unequal.

(ii) $\alpha \neq \beta \neq \gamma \neq 90^\circ$, i.e. all angles between any two sides are not equal to each other. further they are not equal to 90° as well.



2. Kohlrausch law of independent migration –

According to this law conductivity due to an ion is independent of presence of other ions.

for example:- If molar conductivity of Na^+ is $\lambda^\circ_{Na^+}$ and of Cl^- is $\lambda^\circ_{Cl^-}$.

then molar conductivity of NaCl in a solution will be = λ°_{NaCl}

$$\lambda^\circ_{NaCl} = \lambda^\circ_{Na^+} + \lambda^\circ_{Cl^-}$$

This law indicates that ions migrate freely and impart conductivity to solution.

परीक्षक द्वारा | प्रश्न संख्या | परीक्षार्थी उत्तर

3. At cathode, in a daniell cell reduction take place as shown -

Cathode (Reduction) -

$$Cu^{++}_{(aq)} + 2e^- \longrightarrow Cu_{(s)}$$

these e^- are provide by zinc at anode. Copper is deposited at cathode.

4. unit of velocity constant $K = Mol^{-1} sec^{-1} L^1$

this can be yieed as follow -

$$Rate = K . [A]^2$$

$$\therefore K = \frac{Rate}{[A]^2} = \frac{Mol\ L^2}{L \cdot S\ Mol^2} = Mol^{-1} sec^{-1} L^1.$$

5. We know that,

$$K = \frac{ln2}{T_{1/2}}$$

Where K = rate constant, $T_{1/2}$ = half life

$ln2 = 0.693$

$$\therefore K = \frac{0.693}{6.93} = \frac{1}{10} = 0.1\ sec^{-1}$$

6. Transition element form interstitial compounds such as $Fe_{0.95}O$ because small atoms such as H, C, N, etc. get

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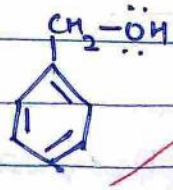
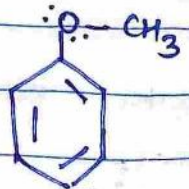
trapped inside them.
Due to their variable oxidation states and small size, metallic nature they form interstitial compounds.

7. Alkyl alcohol: Hydroxyl group is attached to alkyl group.
General formula – R–OH
Example: CH_3–OH (Methanol), C_2H_5–OH (ethanol)

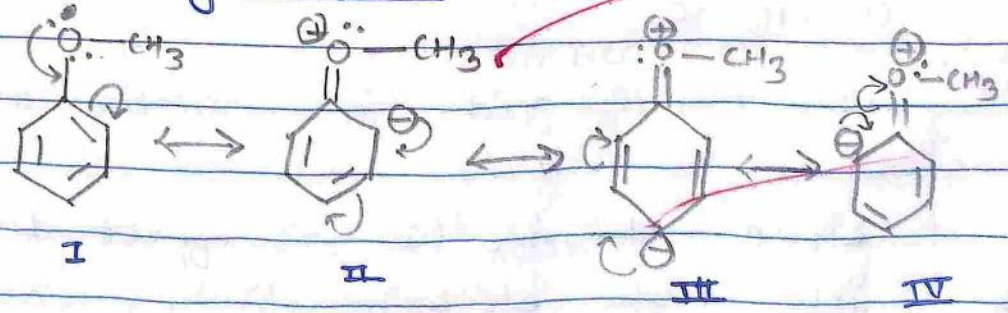
Benzyl alcohol – Hydroxyl group is attached to carbon directly linked with benzene ring.
General formula – Ar–CH_2OH
Example :-



8. Anisole :-



Resonating structures –



Oxygen provide lone pair for conjugation with phenyl ring.

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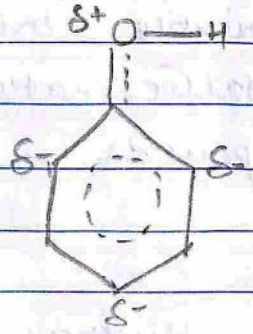
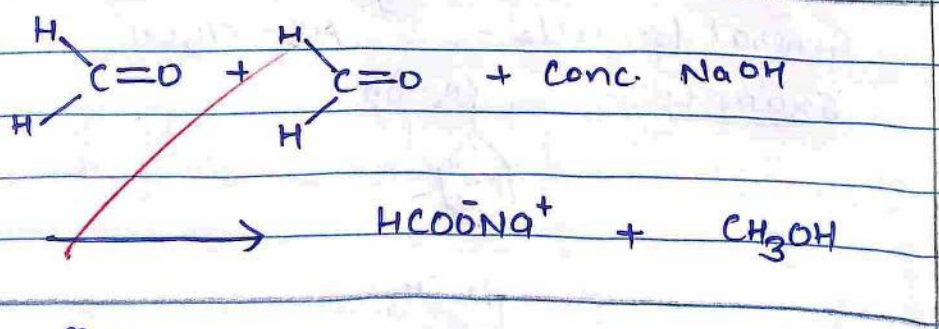
Resonance Hybrid -

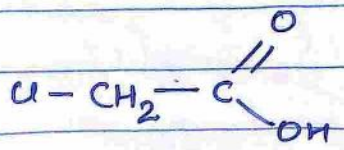


9. Canizzaro Reaction- Aldehyde or ketone which do not have α-Hydrogen attached show self reduction and oxidation in presence of concentrated NaOH.

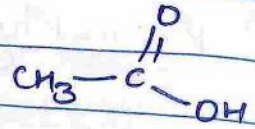


$H^{\ominus}$ ion shift takes place here.

10.



Chloro acetic acid



acetic acid

Since chlorine has -I effect due to its high electronegativity, Therefore it stabilise the -ve charge on acetate ion when it loose Hydronium

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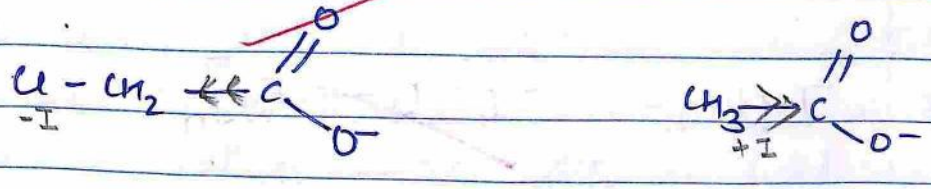
Pon.

On the other hand +I effect of CH_3- increase charge on acetate ion thus destabilising ion.

Due to stability of conjugate base, chloroacetic acid is more acidic than acetic acid.



11.

(A) Benzene diazonium sulphate.

(B) p-hydroxyphenyldiazobenzene.
it is orange coloured dye.

12.

(A) Valium - It is a sleep producing drug which comes under barbiturates, a type of tranquilizer.

tranquilizers are of two type -

(1) Antidepressant :- Ex. Iproniazid, phenelezine.

(2) Barbiturate :- Ex:- Valium, Seconal, Vesonal.

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12 (B) Cimetidine- It is used as an antacid. It inhibits action of histamine, hence come under type Antihistamine. decrease acidity in stomach.

Antacids are of two type-

(1) Alkaline solutions such as Milk of magnesia.

(2) Anti histamine such as Ranetidine (zantac) and cimetidine.

13. Teflon- $-\left[CF_2-CF_2\right]_n-$

used as oil, gas seal, gasket and non-stick surface.

PVC = Poly Vinyl chloride $-\left[C-\underset{Cl}{\overset{H}{C}}\right]_n-$

used to make pipes, insulation wires, etc.

Section-B

14.

(a) In isotropy, physical properties such as refractive index, etc. are same in all directions.

But in anisotropy these properties vary in different directions.

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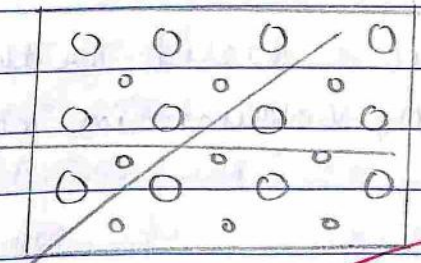
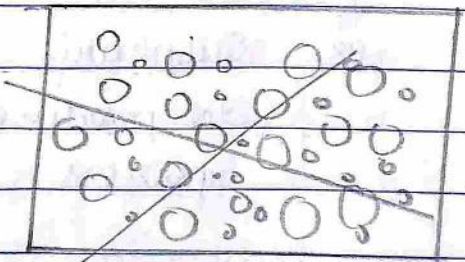


Anisotropic
(Example- quartz)
Molecules are arranged in order.



Isotropic
Ex - quartz glass.
Molecules are irregular arranged.

(B) 'X' is metal because it is highly conducting.
Ex:- Sodium, Iron, etc.

'Y' is non-metal because its conductivity is neglibly small.
Ex- Sulphur, Phosphorus, etc.

15.

(A) Ammonia reacts with oxygen in presence of platium catalyst placed ower wire mesh. This reaction is used in preparation of nitric acid.

$$4NH_3 + 5O_2 \xrightarrow{Pt\ Pd\ gauge} 4NO + 6H_2O$$

Ammonia atmosphere — Nitrogen(II) monoxide

[PTO]

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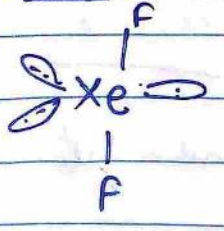
15.
(B) Sulphuric acid is reacted with SO_3 to produce $H_2S_2O_7$ (Oleum) in contact process.

$$H_2SO_4^{(l)} + SO_3^{(g)} \longrightarrow H_2S_2O_7\ (l)$$

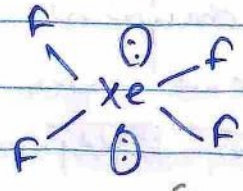
Sulphuric acid — Sulphur trioxide — Oleum

16.
(A) XeF_2 – sp^3d Hybridisation.



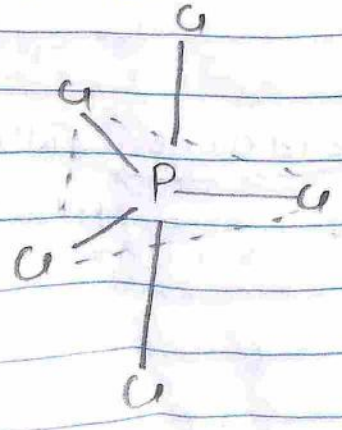
(Linear shape).
Trigonal bipyramidal geometry.

XeF_4 – sp^3d^2 Hybridisation.



(Square planar shape)
Square bipyramidal geometry.

(B)



In PCl_5 (sp^3d) Hybridisation, two chlorine are at axial position and three chlorine are at equatorial plane.

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Equatorial chlorine are seperated by 120° from each other hence feel less repulsion as compared to axial chlorine which are 90° to equatorial plane.
To reduce this repulsion they increase their bondlength.

∴ Bondlength : axial > equatorial
Bond stability: axial < equatorial.

As a result axial chlorine are easily lost due to greater bond length.

$PCl_5 \xrightarrow{\Delta} PCl_3 + Cl_2 \uparrow$

17.

(a) Alcohol prepared for industrial use is made unfit for consumption by mixing copper sulphate (blue colour) and pyridine (foul smelling) to it. As a result, alcohol become poisnous and it cannot be misused. This process is called denatural of alcohol.

$Alcohol\ (C_2H_5OH) \xrightarrow{CuSO_4,\ Pyridine}$ denatured Alcohol (blue colour, foul smell)

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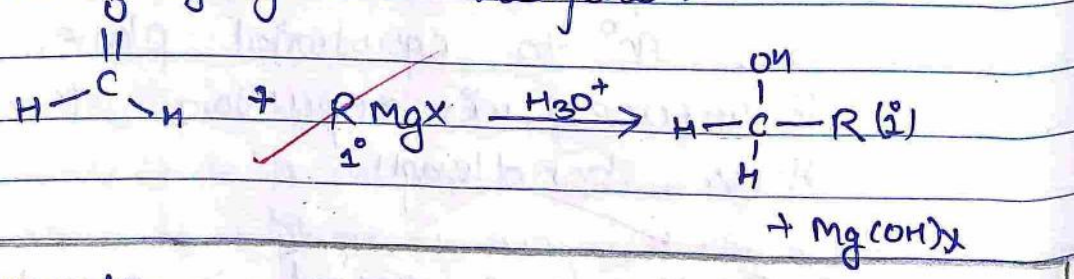
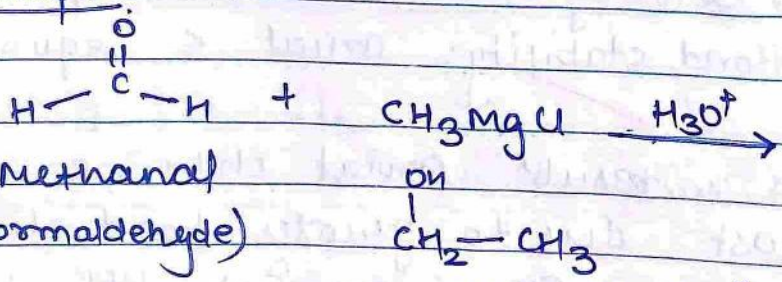
17.
(B) Primary alcohol can be prepared of desired chain by reacting formaldehyde with grignard reagent.



Example-



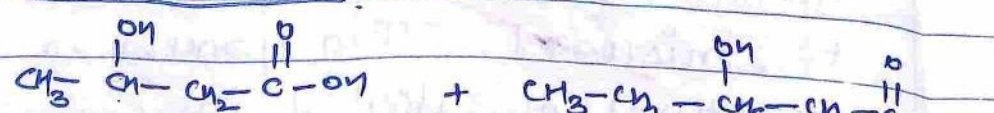
Methanal (formaldehyde)

ethanol (1° alcohol) or primary alcohol

18.
(a) following are two examples of bio-degradable polymer -

(1) PHBV - Poly β Hydroxy butyrate co- β Hydroxy valerate.

Monomer unit:



β-Hydroxy butyric acid β-Hydroxy valeric acid.

(2) Nylon (2,6): It is also a biodegradable polymer which is degraded by bacteria.

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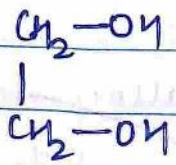
(B) Terylene / Dacron-

Monomer units are-

(1) Terphthalic acid.

(2) Ethylene glycol



19

(A) following are two difference between soap and detergent-

(1) Soap do not give foam with hard water whereas detergent form foam with hardwater.

Soap usually give precipitate with hard water having impurities of $CaCl_2$, $MgCl_2$ etc.

(2) Soap are biodegradable but detergent have long heavily branched chain that can not be easily degraded by bacteria.

Soap have sodium or pottasium salt of fattyacid detergent have sulphate group with fattyacid.

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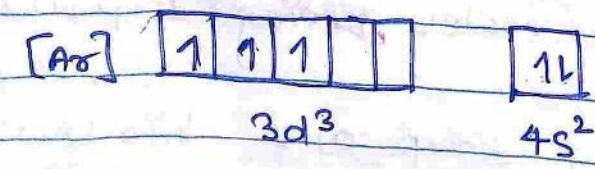
19.
(B) **Saccharine** :- It is used as artificial sweetner.
Many people are diabetic and need to control calorie intake. They consume Saccharine in place of sugar because it pass through urine without any change.

20.
(A) **Mischmetal** :- It is an alloy formed by mixing 95% lanthanoids, 5% iron and traces of S, C, Ca and Al.
following two metals can be used in maximum composition because they are lanthanoids -
(1) Samarium (Sm)
(2) Gadolinium (Gd).

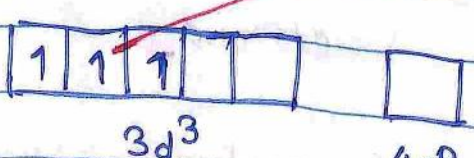
(B) Vanadium = $_{23}V$

$_{23}V$ ground state



on removing two electrons from ground state (4s), we get V^{+2}

V^{+2}



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V^{+2} has ~~two~~ three unpaired electron.

∴ Spin only magnetic moment μ of it is –

$$\mu = \sqrt{n(n+2)}$$

where n = no. of unpaired $e^- = 3$

$$\mu = \sqrt{3(3+2)} = \sqrt{3 \times 5} = \sqrt{15}$$

$$\boxed{\mu = 3.92 \text{ BM}}$$

21.

(a) Mond process –

Step 1 – Current of carbon monoxide gas is passed over Nickel to form tetracarbonyl nickel.

$$\boxed{Ni + 4CO \xrightarrow{350-400K} Ni(CO)_4}$$

Step 2 :- $Ni(CO)_4$ is unstable at high temperature. It is decomposed to obtain Nickle in pure form.

$$\boxed{Ni(CO)_4 \xrightarrow{400-450K} Ni_{pure} + 4CO \uparrow}$$

(P.T.O.)

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21.

(B)

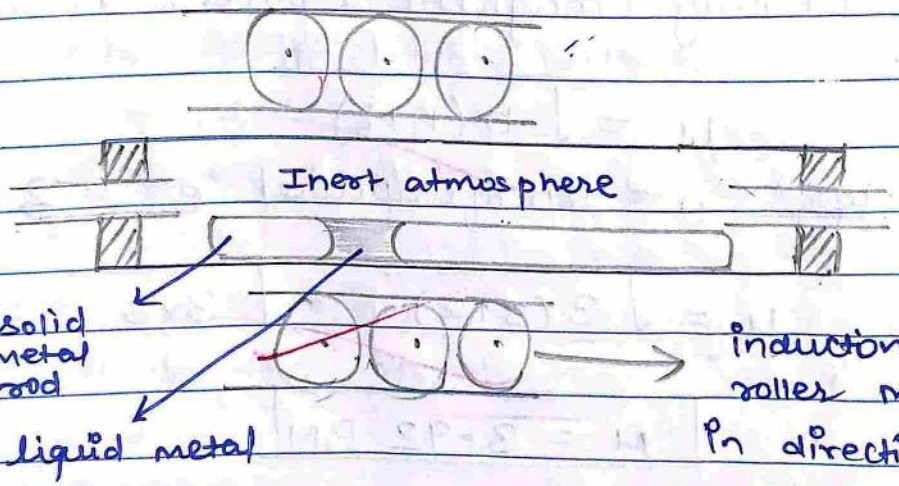

Fig: Diagram of zone refining process.

It is used to obtain semiconductor of very high purity.

22.

(A) Zinc is used in sacrificial electrode for the prevention of corrosion of iron metal.

These metals are covered over iron electrochemically.

This metals form protective coating by reacting with atmospheric CO_2 and O_2 to form oxide layer or carbonate layers.

They sacrifice themselve for prevention and hence called sacrificial electrode.

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(B) By Kohlrausch law of independent migration -

$$\Lambda_m^\circ (CH_3COONa) = \Lambda_m^\circ (CH_3COOH) + \Lambda_m^\circ (NaCl) - \Lambda_m^\circ (HCl)$$

Putting values as given,

$$\Lambda_m^\circ (CH_3COONa) = (390 + 110 - 100)\ S\ cm^2\ mole^{-1}$$

$$\boxed{\Lambda_m^\circ (CH_3COONa) = 400\ S\ cm^2\ mole^{-1}}$$

23.

(a) 'X' ⇒ Activation energy or potential energy barrier. (E_a)

'Y' ⇒ Enthalpy of reaction (ΔH).

(B) Activation Energy - Energy needed per molecule of reactant to form activated complex (Transition state) is called activation energy.

It is denoted by E_a. Product formation take place only when reactant has energy greater than or equal to this energy.

24

(A) Disease due to Vitamin A - It causes night blindness due to hardening of cornea (Xerophyta).

Disease due to Vitamin B - It causes Beri-Beri deficiency of B_{12} causes anemia.

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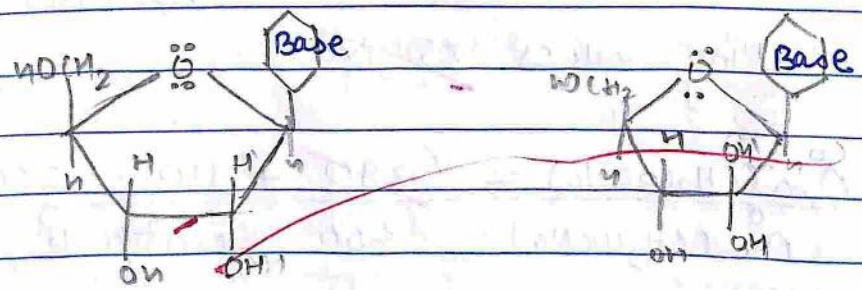
(B) D.N.A – Deoxyribo nucliec Acid has one oxygen less than RNA (Ribo nucleic acid).



Deoxyribonucliec acid (DNA) — Ribonucliec acid (RNA)

Section C –

25.

(A)(i) Anoexia

(ii) Due to low partial pressure of oxygen at high altitude, oxygen is less dissolved in blood tissue (Henry law). Therefore mind cannot get oxygen to work and muscle also lack oxygen. This leads to Anoexia.

(B) Mol. wt of Ethanoic Acid = 24+32+4 = 60 gm

∴ moles of ethanoic acid = $\frac{30}{60}$ = 0.5 mole

weight of solvent in kg = $\frac{100}{1000}$ kg = 0.1 kg

∴ Molality = $\frac{\text{moles of solute}}{\text{mass of solvent (in kg)}}$

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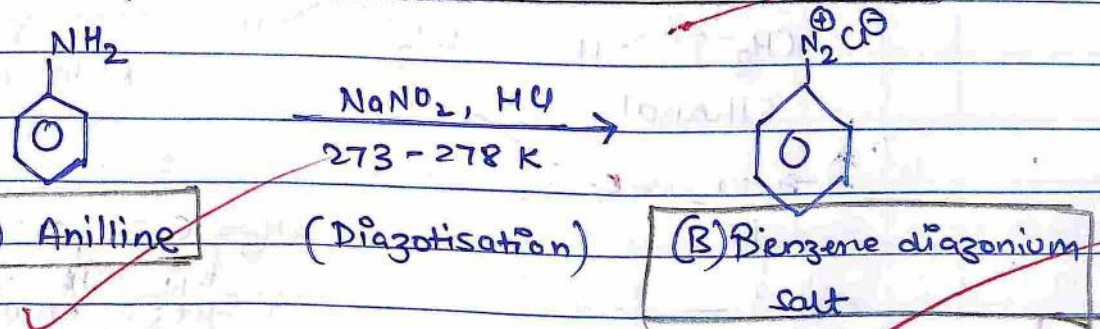
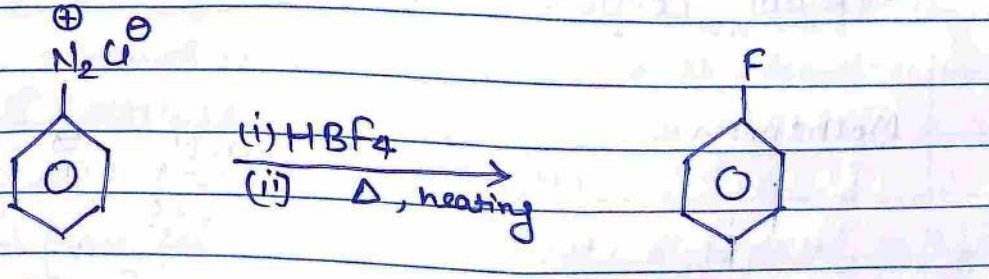
$$m = \frac{0.5}{0.1} = 5 \text{ molal solution}$$

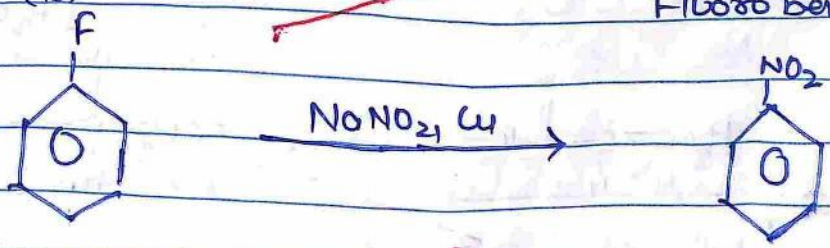
26.



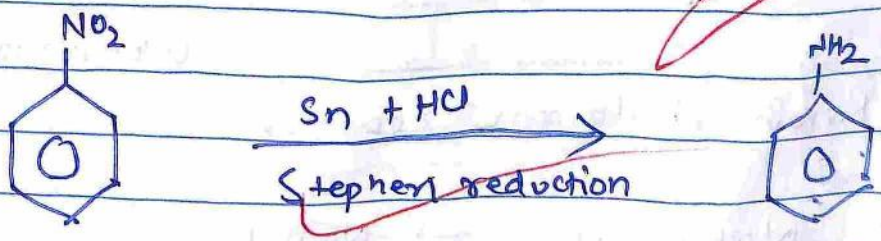
(A) Aniline (Diazotisation) (B) Benzene diazonium salt



(B) Fluoro benzene



Fluorobenzene (C) Nitro benzene



(C) Nitrobenzene (A) Aniline

(P.T.O.)

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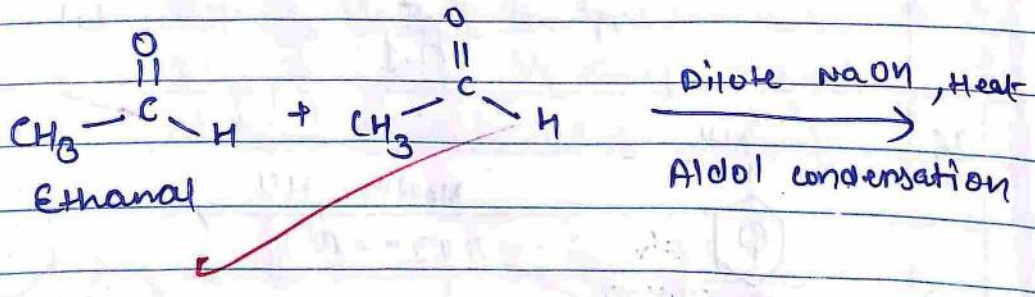
27.

(A)

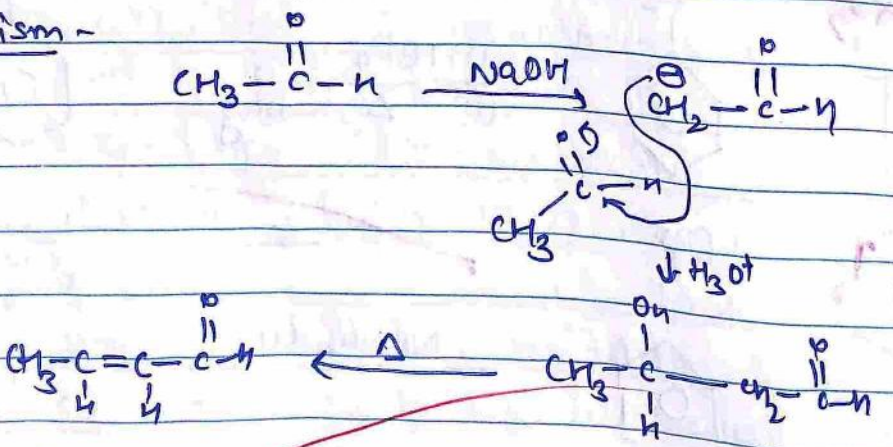


$CH_3-CH=CH-CHO$

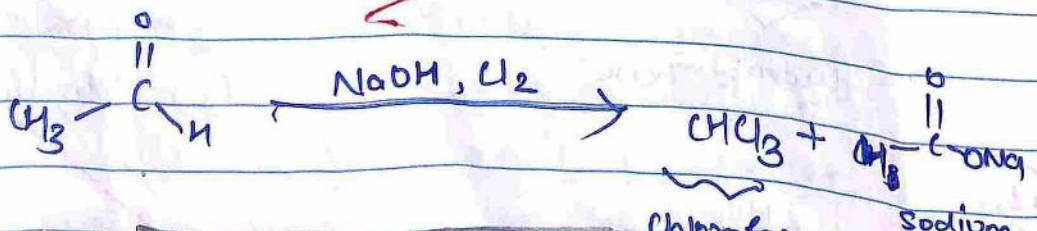
(But-2-enal)

Aldol condensation is used.

Mechanism -



(B)



Rxn is **Haloform reaction.**

* $NaOH + I_2 \longrightarrow NaOI$.

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Section D

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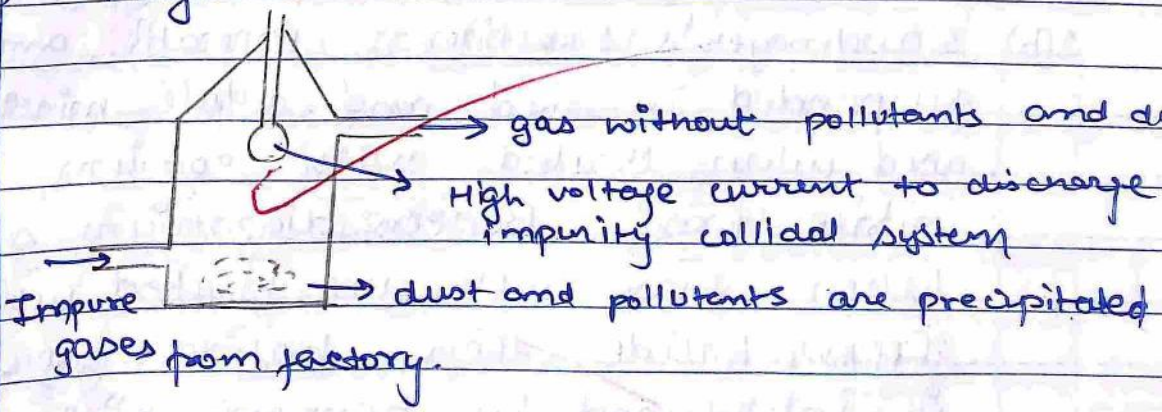
(1)(a) Cottrell precipitator.

(b) Diagram -



2(a) Coagulating value - The millimole of electrolyte required to coagulate a colloid in two hours is called is coagulating value.

(b) Coagulating value is reverse of coagulation power. A electrolyte with higher coagulating power will need less amount hence less coagulating value.

Coagulating value order :- $PO_4^{3-} < SO_4^{2-} < Cl^{-1}$

29.

1.(a) Swarts reaction - It is a halogen exchange reaction in which alkyl Bromide or alkyl chloride are treated with metal fluorides such as Hg_2F_2, AgF, SbF_3, etc. Alkyl fluoride is the product formed. (PTO)

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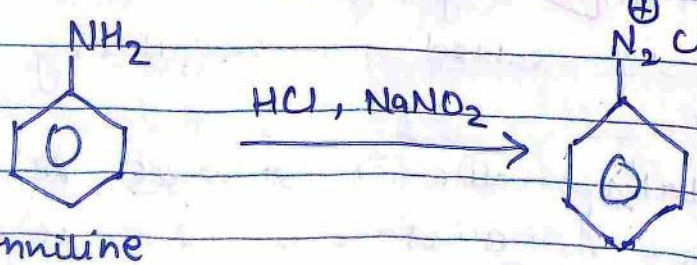
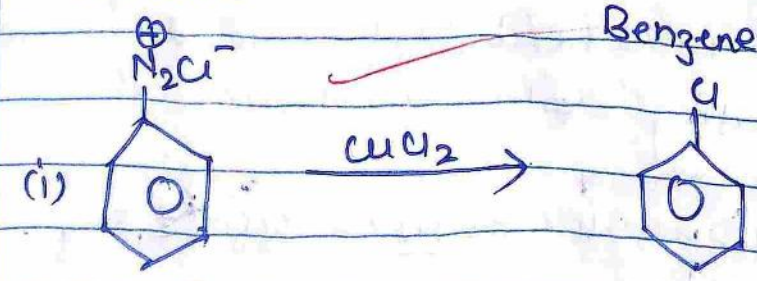
$CH_3-CH_2-Cl \xrightarrow{AgF} CH_3-CH_2-F$

Chloroethane → Fluoroethane.

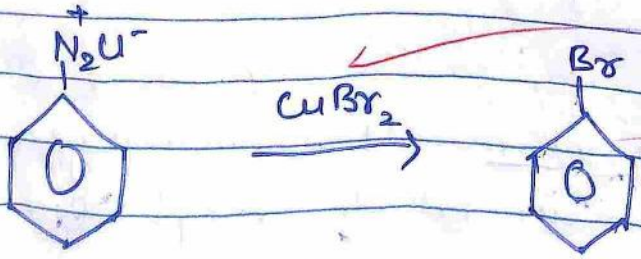
1(b) Sandmeyer's reaction – Aromatic amine suspended in cold and dilute mineral acid when treated with sodium nitrite form Benzene diazonium salts. When these salts are treated with Copper halide then halide group is introduced in benzene ring. However only copper chloride and bromide are used.



Aniline → Benzene diazonium salt



(i) Chlorobenzene



(ii) Bromobenzene.

Sandemeyer gives better yield than Gattermann reaction.

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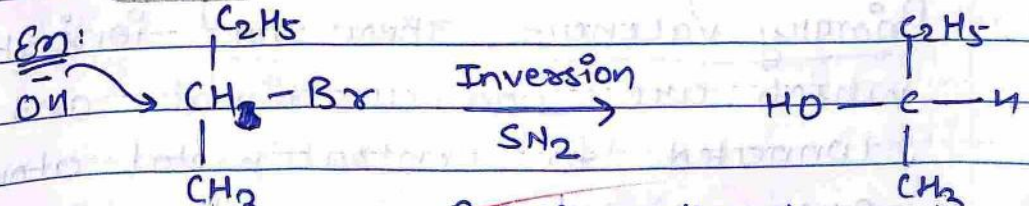
(i) SN_2 : Substitution nucleophillic via molecularity two.

(ii) SN_1 : Subetitution nucleophillic via molecularity one.

2(b) two difference between SN_1 and SN_2 are-

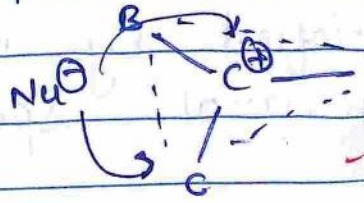
(1) Inversion of configuration takes place in SN_2 while racemisation occur in SN_1.

Ex:



R to S configuration or S to R configuration.

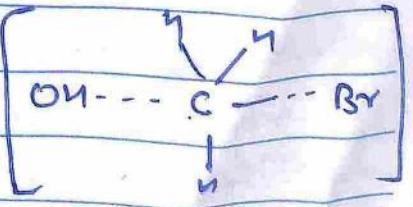
In SN_1, attack is possible from two side in planar structure.



→ Racemisation occur

(2) SN_2 goes through transition state but SN_1 goes through carbocation formation.

Ex: $OH^{\ominus} + CH_3Br \xrightarrow{SN_2}$



Transition stat

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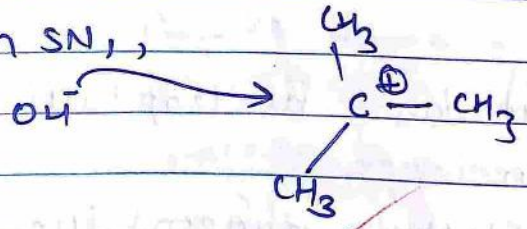
In SN_1,



Carbocation Intermediate.

30.

(i) According to Werner's theory -

Primary valency- These are ionisable valencies which are non-directional and are connected to central metal atom. These are satisfied by negative ions.

Secondary valency- These are non-ionisable valency attached to central metal ion and are directional.
These are satisfied by negative as well as neutral species.

(ii) Primary Valency of Co - 3 (three)

Secondary valency of Co - 6 (six ligands)

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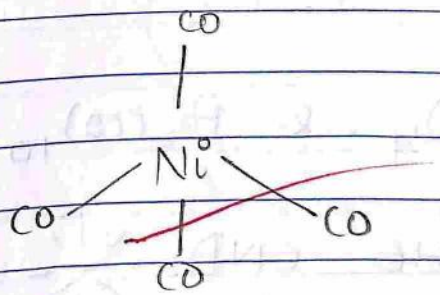
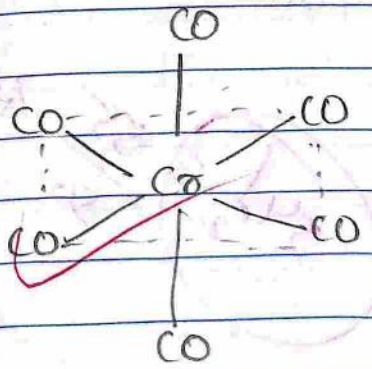
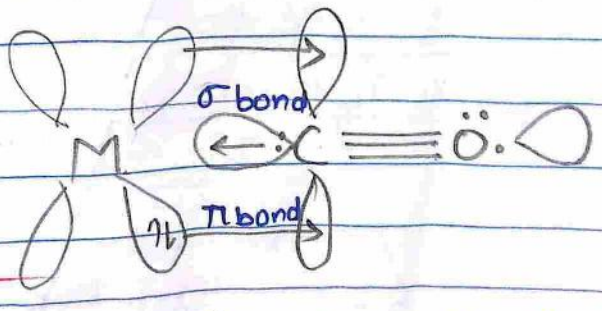
(iii) $Ni^{\circ}(CO)_4$ exist as tetrahedral –



$Cr(CO)_6$ exist as octahedral –



(iv) Synergic bonding between carbonyl complex –



Carbonyl carbon give a lone pair to metal in d orbital. Metal in reverse give lone pair to π^* orbital of carbon thus forming π bond.
It has both σ and π bonds. Thus Synergic bondings are strong.

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It is shown in metal carbonyls for example-

$Ni(CO)_4$ & $Fe_2(CO)_{10}$.

THE END

THANK YOU