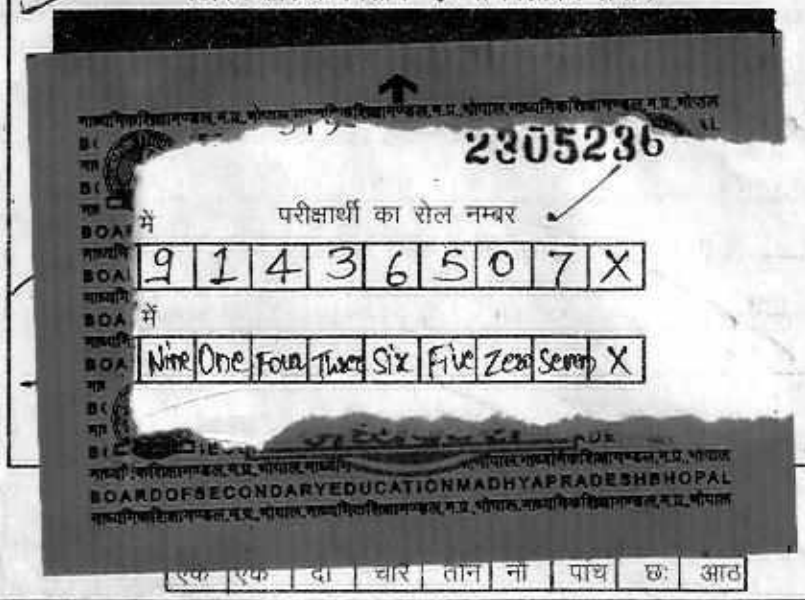
माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल वर्ष–2019

परीक्षार्थी द्वारा भरा जावे ↓

परीक्षा का विषय	विषय कोड	परीक्षा का माध्यम
Chemistry	220	English

स्टीकर तीर के निशान ↓ से मिलाकर लगायें



परीक्षार्थी का रोल नम्बर

में									
	9	1	4	3	6	5	0	7	X
में	Nine	One	Four	Three	Six	Five	Zero	Seven	X

एक | एक | दो | चार | तीन | नौ | पांच | छः | आठ

परीक्षार्थी द्वारा भरा जावे →

क :– पूरक उत्तर पुस्तिकाओं की संख्या अंकों में 01 शब्दों में one

ख :– परीक्षार्थी का कक्ष क्रमांक 03

ग :– परीक्षा का दिनांक 28 | 03 | 2019

परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा

हायर सेकेण्डरी प[illegible] केन्द्र क्रमांक–142094

केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष एवं पर्यवेक्षक द्वारा भरा जावे →

पर्यवेक्षक का नाम एवं हस्ताक्षर	केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष के हस्ताक्षर
Ayali	[illegible] Tanwaiya

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे ↓

प्रमाणित किया जाता है कि मूल्यांकन के समय पूरक उत्तर पुस्तिकाओं की संख्या उपरोक्तानुसार सही पाई होलो क्राफ्ट स्टीकर क्षतिग्रस्त नहीं पाया गया तथा अन्दर के पृष्ठों के अनुरूप मुख्य पृष्ठ पर अंकों की प्रविष्टी एवं अकों का योग सही है।

निर्धारित मुद्रा : नाम, पदनाम, मोबाईल नम्बर, परीक्षक क्रमांक एवं पदांकित संस्था के नाम की मुद्रा लगाएं।

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे →

उप मुख्य परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा	परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा
Smt [illegible] Mo.No. Ex. N G.S.D. [illegible] narsinghpur	R.K. KOURAV G.H.S.S. Sukhaidhan

केवल परीक्षक द्वारा भरा जावे।

प्रश्न क्रमांक के सम्मुख प्राप्तांकों की प्रविष्टी करें।

प्रश्न क्रमांक	पृष्ठ क्रमांक	प्रा
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कुल प्राप्तांक शब्दों में | कुल प्राप्तांक अंकों में

योग पूर्व पृष्ठ | पृष्ठ 2 के अंक 10 | कुल अंक

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Question-1

Choose the correct answers

Ans (i) (a) 8

Ans (ii) (b) adsorbate

Ans (iii) (c) Calcination

Ans (iv) (a) 1° amine

Ans (v) (b) Lactose

Question-2

Fillup

Ans (i) Presence of free ions (Cations & Anions)

Ans (ii) Copper (Cu)

Ans (iii) P_4

Ans (iv) Two

Ans (v) Vinyl cyanide

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Question - 3

	"A"		"B"
(i)	Schottky defect	–	(f) NaCl
(ii)	I number	–	(e) lyophilic colloid
(iii)	leaching powder	–	(d) $CaOCl_2$
(iv)	natural rubber	–	(c) Isoprene
(v)	bakelite	–	(b) Thermosetting polymer

Question - 4

Ans(i) The radius ratio for tetrahedral void is 0.225.

Ans(ii) Arrhenius equation is $K = Ae^{-Ea/RT}$

Ans(iii) Mond's process is used for refining of nickel.

Ans(iv) Helium gas is filled in balloons for meteorological experiments.

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Ans(V) The salts of transition metals are generally coloured due to the excitation of unpaired electrons present in the transition metal atom.

Question-6 (OR)

(i) When a beam of light passes through a colloidal sol, it gets scattered by the colloidal particles and hence the path of light is illuminated. This effect is known as Tyndall effect. As the colloidal particles absorb and reemit light hence the are illuminated.

When electric current is passed through the sol then the colloidal particles moving toward the opposite poles or opposite charge according to the charge they possess. Hence the charged colloidal particle becomes neutral and agglutinate.

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Question - 7 (OR)

IUPAC names

$K_2[Zn(OH)_4]$

Potassium tetra hydroxo Zincate(-)

$[Ag(NH_3)_2][Ag(CN)_2]$

Diammine silver(I) dicyano silver(II)

Question-8

Write definition

(1) Mole fraction

Mole fraction of solute is equal to the ratio of no number of moles of the solute and sum of number of moles of solute and solvent

Similarly mole fraction of solvent is equal to the ratio of number of moles of the solvent and the sum of number of moles of solute

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and solve.

Let number of moles of solute = n
number of moles of solvent = N

Mole fraction of solute $x_1 = \frac{n}{n+N}$

Mole fraction of solvent $x_2 = \frac{N}{n+N}$

B(ii) S Γ **Molality** :-

Molality of a solution is defined as the number of moles of the solute dissolved in 1kg (1000g) of the solvent.

It is denoted by m

$$\text{Molality } (m) = \frac{\text{Mass of solute} \times 1000}{\text{Molecular mass of solute} \times \text{Weight of solvent in gram}}$$

⇒ It is independent of temperature.

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(iii) Molarity -

Molarity of a solution is defined as the number of moles of the solute dissolved in 1 litre of the solution.

It is denoted by M

$$\text{Molarity (M)} = \frac{\text{Mass of solute} \times 1000}{\text{Molecular mass of solute} \times \text{Volume of Solution in ml}}$$

⇒ It depends upon temperature of solution.

Question-9

Complete the reaction

$$RCN + 4H \xrightarrow{LiAlH_4} \underset{1^\circ \text{ Amine.}}{RCH_2NH_2}$$

$$RCONH_2 + Br_2 + 4KOH \longrightarrow R\text{-}NH_2 + 2KBr + K_2CO_3 + 2H_2O$$

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(iii) $RNO_2 + 6H \xrightarrow{Sn/HCl} RNH_2 + 2H_2O$

1° Amine

Question - 10

Zwitter ion -

An amino acid consists of both acidic carboxylic (-COOH) group and basic amino ($-NH_2$) group. These two group interact with each other and affect the activity of amino acid molecule. They form a polar ion which is known as Zwitter ion.

$$NH_2-\underset{\underset{R}{|}}{CH}-COOH \rightleftharpoons NH_3^+-\underset{\underset{R}{|}}{CH}-COO^-$$

α-Amino acid Zwitter ion.

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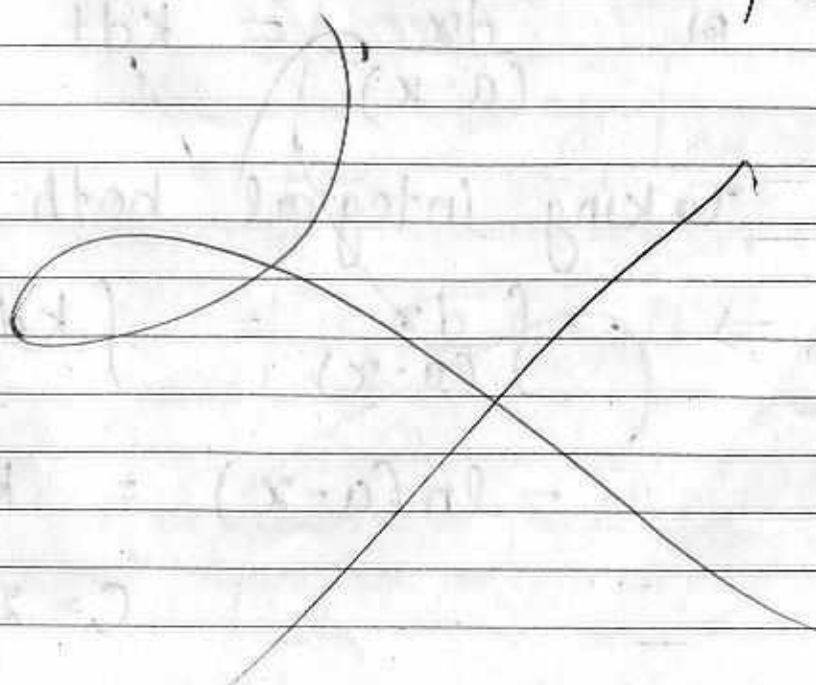
Protein denaturat :-

When an electrolyte or acidic / basic solution is mixed in protein or the protein is heated, it gets coagulated to form a precipitate. This process is called denaturation of process.

The bioactivity of protein gets destroyed due to denaturation. It does not affect the primary structure of protein but the secondary and tertiary structure changes.

Example → protein gets coagulated on boiling the egg in water and form a precipitate.



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Question -11 (OR)

Consider a first order reaction

$$A \longrightarrow \text{Product}$$

Reactant

a	0
$(a-x)$	x

Rate of reaction $\frac{dx}{dt} \propto [A]^1$

$$\frac{dx}{dt} = K[A]$$

$$\Rightarrow \frac{dx}{dt} = K(a-x)$$

or $$\frac{dx}{(a-x)} = K\,dt$$

Taking integral both sides

$$\Rightarrow \int \frac{dx}{(a-x)} = \int K\,dt$$

$$-\ln(a-x) = Kt + C \quad \text{---(1)}$$

C = Integration constant

$\Rightarrow$ At $t=0$, $x=0$

$\Rightarrow -\ln(a-0) = K\times 0 + C$

$\Rightarrow -\ln a = C \quad \longleftarrow (ii)$

From eq (i) & (ii)

$$-\ln(a-x) = Kt - \ln a$$

$$\ln a - \ln(a-x) = Kt$$

$$\log_e\left[\frac{a}{(a-x)}\right] = Kt$$

$$K = \frac{1}{t}\log_e\left[\frac{a}{(a-x)}\right]$$

$$\Rightarrow \boxed{K = \frac{2.303}{t}\log_{10}\left[\frac{a}{(a-x)}\right]}$$

At time $t = t_{1/2}$ (half life time)

$$x = \frac{a}{2}$$

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So $$K = \frac{2.303}{t_{1/2}} \log_{10}\left[\frac{a}{a - \frac{a}{2}}\right]$$

$$K = \frac{2.303}{t_{1/2}} \log_{10} 2$$

$$K = \frac{2.303 \times 0.3010}{t_{1/2}}$$

$$\Rightarrow K = \frac{0.693}{t_{1/2}}$$

$$\Rightarrow \boxed{t_{1/2} = \frac{0.693}{K}}$$ K = Rate Constant

Hence half life period of a first order reaction does not depend on the initial concentration of reactants.

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Question - 12

Oxidative properties of $KMnO_4$ in acidic medium

(1) $2KMnO_4 + 3H_2SO_4 \longrightarrow K_2SO_4 + 2MnSO_4 + 3H_2O + 5[O]$

Nascent oxygen

(2) ~~$2KMnO_4 + 3H_2SO_4$~~

(2) Reaction with oxalic acid →

It oxidises oxalic acid into CO_2 & H_2O

$2KMnO_4 + 3H_2SO_4 + 5(COOH)_2 \longrightarrow K_2SO_4 + 2MnSO_4 + 8H_2O + 10CO_2$

(3) Reaction with HCl to liberate chlorine

$KMnO_4$ reacts with HCl to give chlorine which oxidises the substances.

$2KMnO_4 + 16HCl \longrightarrow 2KCl + 2MnCl_2 + 8H_2O + 5Cl_2\uparrow$

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(4) Reaction with HCl to give nascent oxygen

It also reacts with HCl to give nascent oxygen which oxidises other substance.

$$2KMnO_4 + 6HCl \longrightarrow 2KCl + 2MnCl_2 + 3H_2O + 5[O]$$

[O] Nascent oxygen

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Question - 13 (अथवा)

Nucleophilic substitution reaction in alkyl halide takes place by two mechanism according to the type of alkyl halide and reaction conditions. →

(1) S_N1 Mechanism

(2) S_N2 Mechanism

In these reaction, a stronger nucleophile replaces a weaker nucleophile.

(1) S_N1 Reaction

In this type of mechanism, reaction takes place in two steps. First carbocation is formed and then the nucleophile gets linked to it.

The rate of reaction is dependent only upon the concentration of alkyl halide.

Hence, it is a unimolecular reaction.

Mechanism -

$$R-X \xrightarrow[\text{Slow}]{\text{Step-I}} R^{\oplus} + X^{\ominus}$$

Alkyl halide — Carbocation

$$R^{\oplus} + Nu^{\ominus} \xrightarrow[\text{Fast}]{\text{Step II}} R-Nu$$

Nucleophile — Substitution product

Rate of reaction $= K[R-X]$

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(2) S_N2 Reaction

In this type of mechanism, reaction takes place in one step only. Both the attachment of nucleophile and detachment of halogen takes place simultaneously.

transition state or complex is formed in which both nucleophile and halogen ion are attached to the alkyl radical.

The rate of reaction is proportional to ~~both the~~ concentration of both alkyl halide and nucleophile. Hence it is a bimolecular reaction

Mechanism:-

$$Nu^{\ominus} + R-X \xrightarrow{\text{Slow}} \left[Nu^{\ominus} \cdots R^{\oplus} \cdots X^{\ominus}\right]$$

Nucleophile Alkyl halide

Transition state

$$\downarrow \text{Fast}$$

$$R-Nu + X^{\ominus}$$

Substitution product

Question-14

Alcohol	Phenol
1) They are -OH derivatives of aliphatic and alicyclic hydrocarbons.	1) They are -OH derivatives of aromatic hydrocarbons.
2) Alcohols are neutral in nature.	2) Phenols are acidic in nature.
3) They are inert towards litmus.	3) They turn blue litmus red.
4) They react with ceric ammonium nitrate to give red colour.	4) They react with ceric ammonium nitrate to give violet colour.
5) They do not react with $FeCl_3$	5) They react with $FeCl_3$ to give violet colour.
6) They do not give bromine water test.	6) They give bromine water test and form precipitate.
7) They give esterification test with ethyl alcohol acetic acid.	7) They do not give esterification test with acetic acid.

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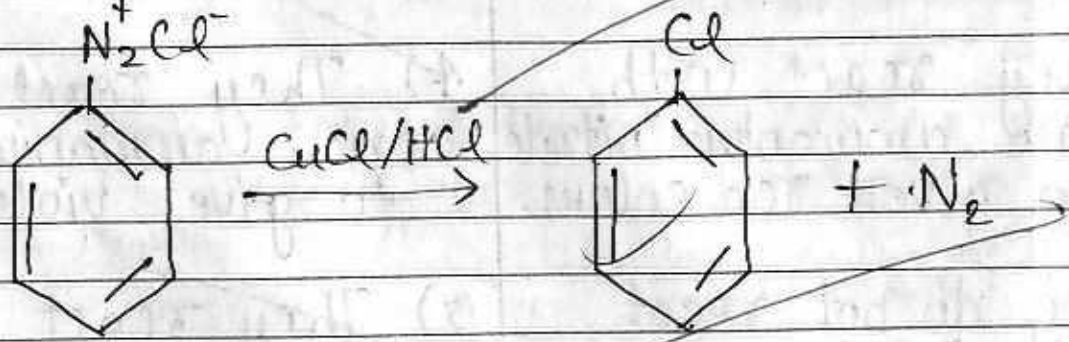
8) It does not give Liebermann nitroso test	8) It gives Liebermann nitroso test

Question - 15 (OR)

(i) **Sandmeyer Reaction -**

Benzene diazonium chloride reacts with CuCl/HCl to form chlorobenzene, it is called Sandmeyer's reaction.



Benzene diazonium Chloride

Chloro benzene

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(ii) **Stephens reaction -**

Reae Alkyl cyanides react with Sn/HCl to form complex which on reaction with H_2O gives ~~ale~~ aldehydes.

$$R\text{-}CN \xrightarrow{Sn/HCl} R\text{-}CH{=}NH.HCl \xrightarrow{H_2O} R\text{-}CHO + NH_4Cl$$

Alkyl Cyanide. Aldehyde

(iii) **Hoffmann Bromamide reaction -**

Acetamide reacts with bromine and alcoholic KOH to give primary amines, it is called Hoffmann bromamide reaction.

$$R\text{-}CONH_2 + Br_2 + 4KOH \longrightarrow R\text{-}NH_2 + 2KBr + K_2CO_3 + 2H_2O$$

Amide 1° Amine

Ex-

$$CH_3CONH_2 + Br_2 + 4KOH \longrightarrow CH_3NH_2 + 2KBr + K_2CO_3 + 2H_2O$$

Acetamide Methyl amine

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(iv) **Haloform reaction –**

Organic compound containing CH_3CO- or $CH_3CH(OH)-$ group attached to carbon or hydrogen, react with iodine and NaOH to form iodoform, it is called haloform reaction.

Ethyl alcohal reacts with iodine and NaOH solution to give iodoform.

$$C_2H_5OH + 4I_2 + 6NaOH \longrightarrow \underset{\text{Iodoform}}{CHI_3} + 5NaI + HCOONa + 5H_2O$$

Ethyl alcohal

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Qu ...D-16 (OR)

(a) Cell constant -

Cell constant is the ratio of length of electrodes of a cell and area of cross-section of electrodes.

It is ~~denote~~ denoted by 'G'

Cell constant $G = \frac{\text{length of electrode}}{\text{Area of electrode}}$

$$\boxed{G = \frac{l}{A}}$$

⇒ It's unit is cm^{-1} or m^{-1}.

. Relation b/w Specific conductivity and cell constant

We Know, Specific conductivity is the reciprocal of specific resistance.

So Specific conductivity (K) $= \frac{1}{\text{Specific } (\rho) \text{ resistance}}$

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$$K = \frac{1}{\rho}$$

$$\Rightarrow K = \frac{1}{R\left(\frac{A}{l}\right)} \quad \left[\because \rho = R\left(\frac{A}{l}\right)\right]$$

$$\Rightarrow K = \frac{1}{R} \times \left(\frac{l}{A}\right)$$

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But Conductance $C = \frac{1}{R}$

Cell constant $G = \frac{l}{A}$

Hence

$$\boxed{K = C G}$$

or $\boxed{G = \frac{K}{C}}$ $\boxed{G \propto K}$

Hence cell constant is the ratio of specific conductivity and conductance of the cell.

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(b) Given, Resistance $R = 1500\ \Omega$

Specific Conductance $K = 0.146 \times 10^{-3}\ S\,cm^{-1}$

We know that,

Cell constant (G) = Resitance / Specific resitance

$\Rightarrow G = R\rho$

$$\boxed{G = \frac{R}{\rho}} \quad \leftarrow (1)$$

but $\rho = \frac{1}{K} = \frac{1}{0.146 \times 10^{-3}}$

$$\rho = 6.83 \times 10^{3}\ \Omega\ Ohm.cm \quad \text{---} (11)$$

Hence

$$G = \frac{R}{\rho} = \frac{1500}{6.83 \times 10^{3}}$$

$$G = \frac{2.19}{10}$$

Cell Constant $\boxed{G = 0.219\ cm^{-1}}$

माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल 4 पृष्ठीय

परीक्षार्थी द्वारा भरा जावे ↓

परीक्षा का विषय	विषय कोड	परीक्षा का माध्यम	परीक्षा का दिनांक
Chemistry	2 2 0	English	28 / 03 / 2019

स्टीकर तीर ↓ निशान ↓ से मिलाकर लगायें

परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा

हायर सेकेण्डरी परीक्षा
केन्द्र क्रमांक–142094

पर्यवेक्षक का नाम एवं हस्ताक्षर

केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष के हस्ताक्षर

परीक्षार्थी द्वारा भरा जावे →

मुख्य

Question - 11 (OR)

Haber's process –

Haber's process is the industrial method for the manufacture of ammonia.

In this process, ammonia is prepared by the reaction, nitrogen from atmosphere and hydrogen from water gas in the ratio of volume 1 : 3.

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पृष्ठ के अंकों का योग

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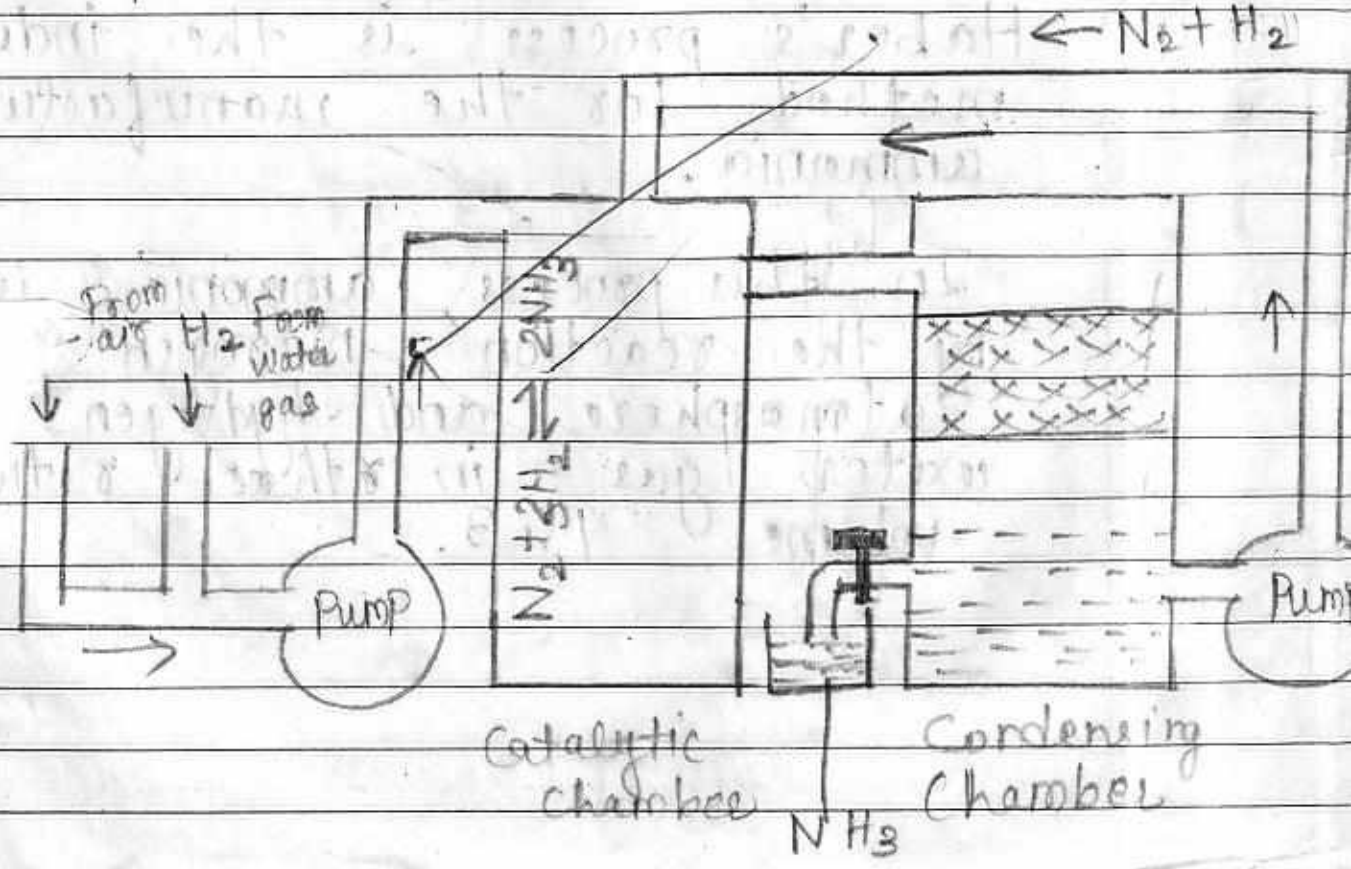
Chemical equation –

$$N_2 + 3H_2 \underset{500°C,\ 200atm}{\overset{[Fe],\ Mo}{\rightleftharpoons}} 2NH_3 + 22.4K$$

1 volume 3 volume 2 volume

Production is of NH_3 is an exothermic process and the volume of product is reducing hence production of ammonia is favoured at high pressure and low temperature.

But reaction is slow at low temperature hence Fe is used as catalyst and Molybdenum (Mo) as catalytic promoter in the reaction.



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Question 18

(a) Food preservatives

(1) Sodium benzoate → C_6H_5COONa

Benzoic acid → C_6H_5COOH

(3) Citric acid → $C_6H_8O_6$

2

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(b)

	Active components	Usage
(i) Amla	Vitamic-C, antioxidants, salts and minerals	It is used to cure scurvy, to improve eyesight, for strong teeth and improve digestion.
(ii) Tulsi	Antioxidants, minerals,	It is used in cough and cold, fever, in sneezing & wheezing and in natural cosmetics.

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(iii) Neem	~~Anti~~ Antioxidants, natural blood purifying agents Natural insecticidal agents.	It is used in natural beauty products as air purifier in medicines in insect repellents, in toothpastes, creams, etc. insecticides, etc.

Question – 5 (OR)

Given, $P = 0.987$ bar

$K_H = 76.48$ bar

$P = K_H m$

$m = \frac{P}{K_H} = \frac{0.987}{76.48}$

$m = 1.22 \times 10^{-2}$

$= 12.2 \times 10^{-3}$

$m =$

$m = 12.2$ milli moles

~~$m = 12.2$ moles~~