Sipo

1

a. methyl orange is used as a indicator because titration is between strong acid and weak basic salt.

b. $Na_2CO_3 + H_2SO_4 \longrightarrow Na_2SO_4 + H_2O + CO_2$

106 g 98 g

Sol:

106 g of Na_2CO_3 react with 98 g of H_2SO_4

3.3 g of Na_2CO_3 react with $\frac{98}{106} \times 3.3$ g of H_2SO_4

H_2SO_4

$\Rightarrow$ 4.9 g of H_2SO_4

now

for H_2SO_4

$w = ?$

$N = 0.1\ N$

$E = 49$

$V = 0.4\ l$

we know,

$w = NEV$

$= 0.1 \times 49 \times 0.4$

$= 1.96$ g

$\therefore$ (4.9 - 1.96) 2.94 g of H_2SO_4 is further required to neutralize the solution.

OR

1a,

Rate law equation for first order reaction.

The reaction whose rate depend on the first power of concentration of reactant is called first order reaction.

Consider a general first order reaction.

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

At time		
$t=0$	a mol l^{-1}	0 mol l^{-1}
$t=t$	$(a-x)$ mol l^{-1}	x mol l^{-1}

where,
a = Initial conc of reactant
x = amount of product formed after time t.

Rate law eqn is.

$$R = k_1 [A]^1$$

$$\frac{-d[A]}{dt} = k_1 [A_1]$$

where, k_1 = Rate Constant for first order rxn

$$\frac{-d(a-x)}{dt} = k_1 (a-x)$$

$$\frac{-da}{dt} + \frac{dx}{dt} = k_1 (a-x)$$

$$\frac{dx}{dt} = k_1 (a-x) \quad --(II)$$

This eqn is differential rate law equation for first order rxn

on arranging (II) we get

$$\frac{dx}{(a-x)} = k_1 \, dt$$

on integrating

$$\int \frac{dx}{a-x} = \int k_1 \, dt$$

$$-\ln(a-x) = k_1 t + I \quad --- (III)$$

Constant
$\int I$ = Integration

when $t=0$, then $x=0$

$\Rightarrow I = -\ln a$

Putting $I = -\ln a$ in (III).

$$\ln a - \ln(a-x) = k_1 t$$

$$\ln \left(\frac{a}{a-x}\right) = k_1 t$$

$$k_1 = \frac{1}{t} \ln \left(\frac{a}{a-x}\right)$$

$$k_1 = \frac{2.303}{t} \log \left(\frac{a}{a-x}\right)$$

1b

Soln

Given

$T_{1/2} = 3$ hr

let the initial no of particle be n.

no of particle after 87.5% of reaction = (100% − 87.5%) of n
= 12.5% of n

we know

$\frac{N}{N_0} = \left(\frac{1}{2}\right)^n$

$\Rightarrow \frac{12.5\% \text{ of } n}{n} = \left(\frac{1}{2}\right)^{t/T_{1/2}}$

$\Rightarrow \frac{12.5}{100} = \left(\frac{1}{2}\right)^{t/3}$

$\Rightarrow \frac{1}{8} = \left(\frac{1}{2}\right)^{t/3}$

$\Rightarrow \left(\frac{1}{2}\right)^3 = \left(\frac{1}{2}\right)^{t/3}$

Comparing powers

$3 = t/3$

$\therefore t = 9$ hr.

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2 a. Hess law of summation state that the enthalpy of a reaction is same weather the reaction is complet in single step or in multiple steps.

b. Soln

Given

ΔH of formation of benzene = 55 kJmol^{-1}

ΔH of formation of water = −395 kJmol^{-1}

ΔH of formation of CO_2 = −285 kJmol^{-1}

ΔH of combustion of C_6H_6 ? (ΔH_{net})

$C_6H_6 + 15/2 O_2 \longrightarrow 6CO_2 + 3H_2O$

$\Delta H_{net} = \sum \Delta H$ of Product $- \sum \Delta H$ of reactant

$= [6 \times (-285) + 3 \times (-395)] - [55 + 0]$

$= -2950$

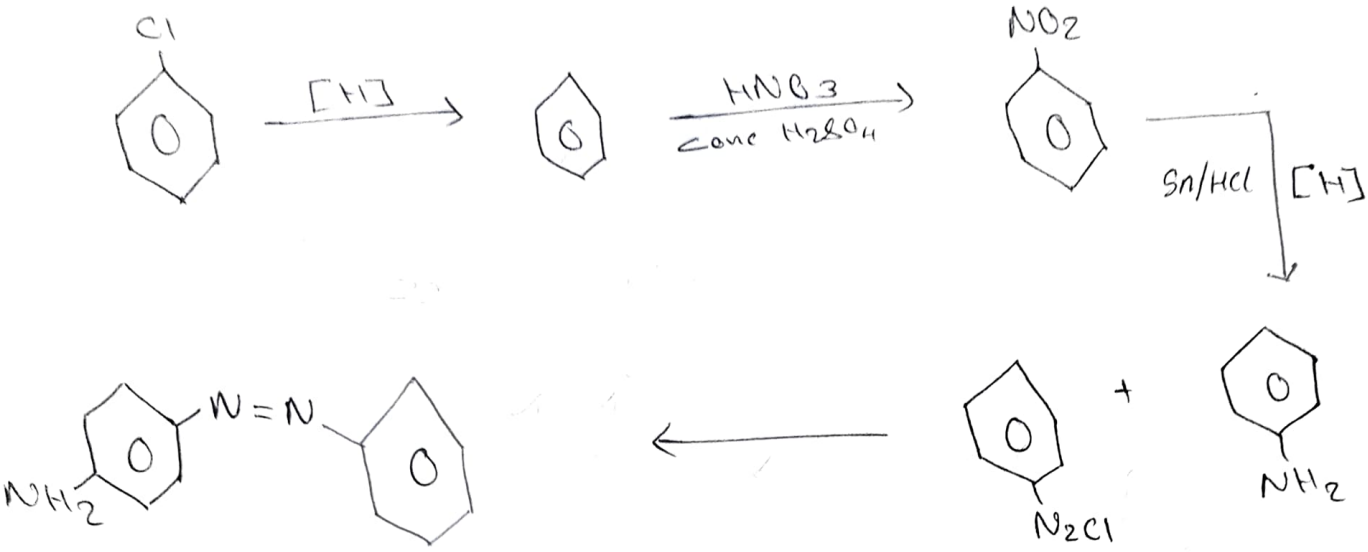
3

a. Ans Transition elements are also called d-block elements because their valance electron are in d-orbitals.

b. Ans These elements show variable oxidation state because their valance electron are in two different orbital, (n-1)d and ns. The energy level between these two orbital is very less so both energy level can used for bond formation.

c ans

Qno 5



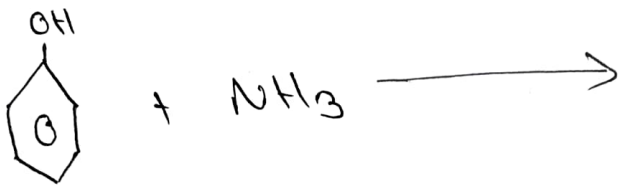
Qno 6

$C_2H_3Cl \xrightarrow{KOH} C_2H_3OH \xrightarrow{Cu} CH_3-\overset{\overset{O}{\|}}{C}-OH \xrightarrow{[Ag(NH_3)_2]^+CH^-} CH_3COO^+ \xrightarrow{PCl_3} CH_3COOCl$

OR

Qno 6

a)

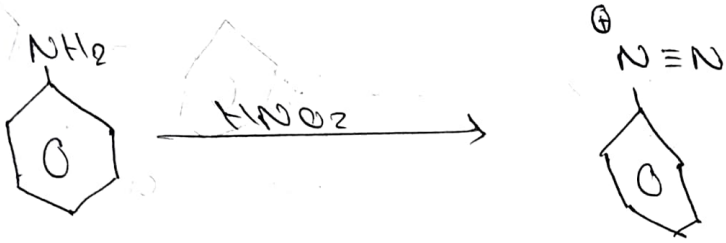
i) 

ii) 

b

In aromatic amines the $-NH_2$ group is attached with ~~benzene~~ $-C_6H_5$ (Phenyl) group which is an electron-withdrawing group so availability of lone pair of electrons on N decrease. There fore aliphatic amines are more basic then aromatic amines.

c



Ans 8

a) Flow sheet diagram of Portland Cement production

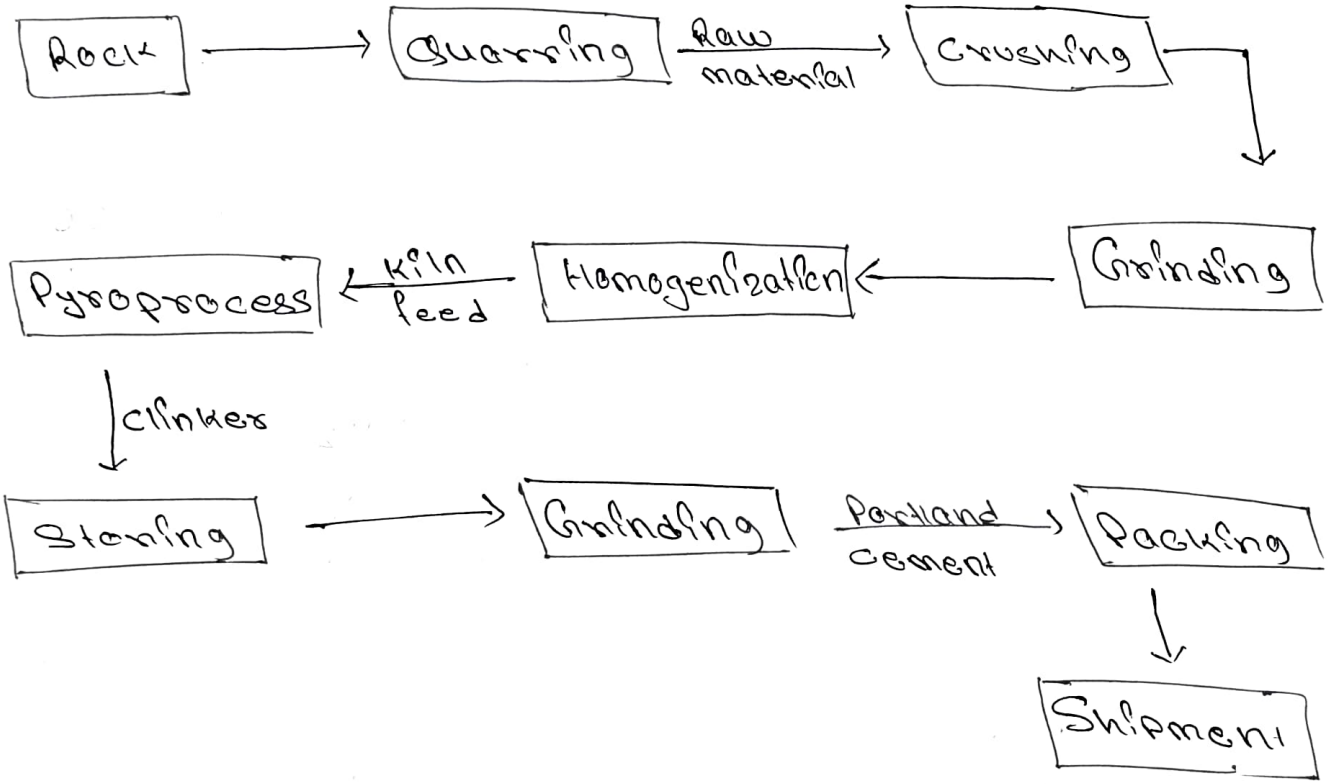


fig: flow sheet diagram of Portland Cement

b Difference between OPC and PPC

OPC	PPC
→ It is manufactured by grinding the mixture of CaO with other raw materials like gypsum, calcareous and argillaceous to a Powder	→ The variant of OPC pozzolana material like: fly ash, volcanic ash are added to OPC to form PPC.
→ It is more expensive than PPC	→ It is ~~not~~ cheaper than OPC
→ Less durable in agressive weather	→ more durable in agressive weather
→ It has shorter setting time than PPC	→ It has longer setting time than OPC
→ It is less resistance against alkali like, chlorine ion, Sulphate ion	→ It is more resistance against alkali like chlorine ion, Sulphate ion.
→ It has higher strength then PPC in initial stage	→ It has better strength in long term.

Qno 9b

Soln

Given.

"NaOH" $\longrightarrow Na^+ + OH^-$

Volume = ? (V)

mass = ? (W)

$pH = 12$

$pOH = 14 - 12$

$= 2$

we know

pOH of NaOH $= -\log[OH^-]$

$\Rightarrow 2 = -\log[OH^-]$

$\Rightarrow [OH^-] = \text{Anti}\log(-2)$

$= 0.01$

Since NaOH completely ionize, concentration of $[OH^-]$ ion will be same as the initial conc of NaOH.

i.e $M = 0.01\ M$

Normality $= 0.01\ N$

From.

$$W = \frac{NEV}{1000} = \frac{0.01 \times 40 \times 1000}{1000}$$

$= 0.4\ g$

$\therefore$ 0.4 g of NaOH should be dissolve in 1 l of solution to prepare solution having pH 12

OR

9a. Given.

$Cu \longrightarrow Cu^{++} + 2e^-$ $\quad E^\circ_{Cu^{++}/Cu} = +0.34\,V$

$Ag^+ + e^- \longrightarrow Ag$ $\quad E^\circ_{Ag^+/Ag} = +0.80\,V$

i) Cell notation :-

$Cu/Cu^{++}_{(1M)} // Ag^+_{(1M)}/Ag$

ii) Cell potential at 25°C and 1 atm

E°_{cell} = SRP of cathode - SRP of anode

$= E^\circ_{Ag^+/Ag} - E^\circ_{Cu^{++}/Cu}$

$= 0.80\,V - 0.34\,V$

$= 0.46\,V$

iii) (not sure)

$\Delta G^\circ = -nF E^\circ_{cell}$

$= -(2\,mole) \times (96500\,C\,mol^{-1}) \times 0.46V$

$= -88780\,C$

$V = -88780\,J$

$= -88.78\,kJ$

∴ free energy change is $-88.78\,kJ$

iv) ans No, because copper is more reactive than silver thus it replace silver and formed product (Ag)

$Cu_2 + 2AgNO_3 \longrightarrow Cu(NO_3)_2 + 2Ag$

b

i) In acidic medium

$$\underset{n=3}{Mn^{+7}} + 5e^- \longrightarrow Mn^{+2} \quad \Big\} n = 5$$

equivalent mass $= \frac{M}{n}$

$= \frac{158}{5}$

$= 31.6$

In alkaline medium

$Mn^{+7} + e^- \longrightarrow Mn^{+6}$

$n = 1$

Eq. mass $= \frac{158}{n}$

$= 158$

---

ii) These solution whose concentration is known by mixing certain amount of weight in certain volume.

Essential characteristic for Primary standard solution are:-

i) It shouldn't react with air or change its composition on storing.

ii) It should be non toxic.

10.a)

$CH_3-\overset{O}{\overset{\|}{C}}-H \xrightarrow[[Ag(NH_3)_2]^+]{\text{Tollen's test}} CH_3-\overset{O}{\overset{\|}{C}}-O^-Ag^+ + Ag\downarrow$ (Silver mirror) (1)

$Q-\overset{O}{\overset{\|}{C}}-Q \xrightarrow{\text{Tollen's Test}}$ No Reaction

$CH_3-\overset{O}{\overset{\|}{C}}-H$ $\xrightarrow[CuSO_4/OH^-]{\text{Felling test}}$ $R-COO^- + Cu_2O\downarrow$ (brick Red)

$R-\overset{O}{\overset{\|}{C}}-R$ $\xrightarrow{\text{Felling test}}$ no Reaction.

10b

C_4H_8O

A) $CH_3-CH_2-CH_2-CHO$

B) $CH_3-\overset{O}{\overset{\|}{C}}-CH_2-CH_3$

C) $CH_3-\overset{CH_3}{\overset{|}{C}H}-CHO$

$\Rightarrow$ $CH_3-\overset{O}{\overset{\|}{C}}-CH_2-CH_3$ give iodoform test

$CH_3-\overset{O}{\overset{\|}{C}}-CH_2-CH_3 \xrightarrow[NaOH]{I_2} CHI_3 + CH_3-CH_2-\overset{O}{\overset{\|}{C}}-ONa$

10c

11 b

$CH_3-CH_2-Cl \xrightarrow{aq.\ NaOH} CH_3-CH_2-OH$

(ethyl chloride)

$CH_3-CH_2-OH \xrightarrow{[O]\ K_2Cr_2O_7} CH_3-\overset{O}{\overset{\|}{C}}-OH$

(ethanoic acid)

OR

11 a

(i) Primary alchol with molecular wt 46 is ethanol

CH_3-CH_2-OH

(ii) $CH_3-CH_2-OH \xrightarrow[NaOH]{I_2} CHI_3\downarrow + HCOONa$

(yellow ppt)

(iii) $CH_3-CH_2-OH + OH-\overset{O}{\overset{\|}{C}}-CH_3 \xrightarrow{Conc.\ H_2SO_4} C_2H_5-O-\overset{O}{\overset{\|}{C}}-CH_3$

(iv) $CH_3-CH_2-OH + OH-CH_2-CH_3 \xrightarrow{conc.\ H_2SO_4} C_2H_5-O-C_2H_5$

(v) given alchol can be distinguish from methanol by Iodoform test

$CH_3-CH_2-OH \xrightarrow[NaOH]{I_2} CHI_3\downarrow + HCOONa$

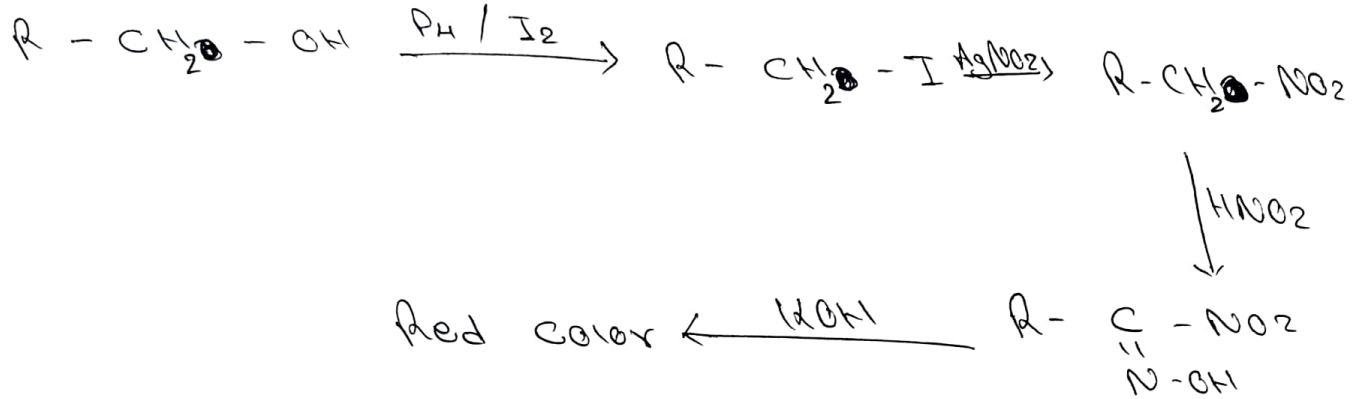
(yellow ppt)

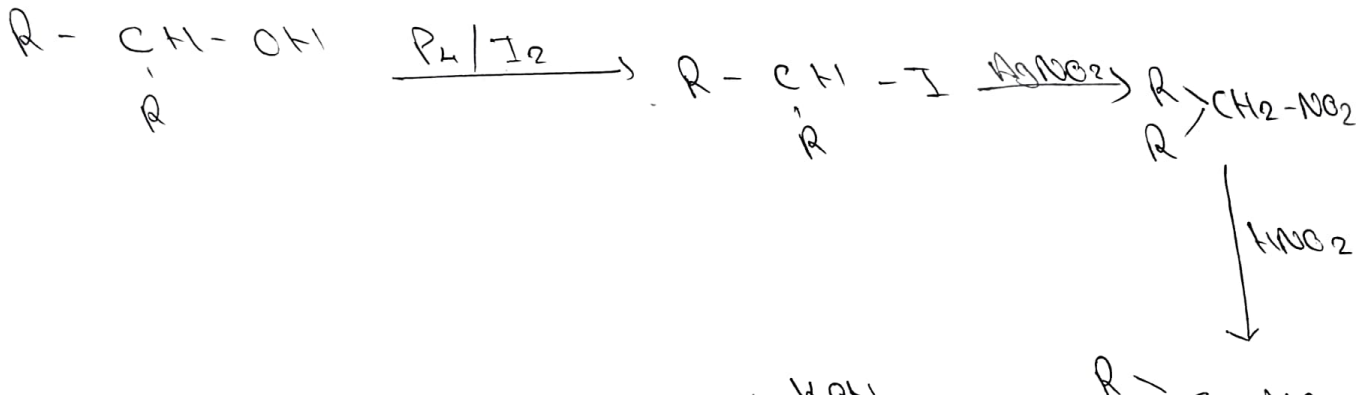
$CH_3-OH \xrightarrow[NaOH]{I_2}$ no rxn

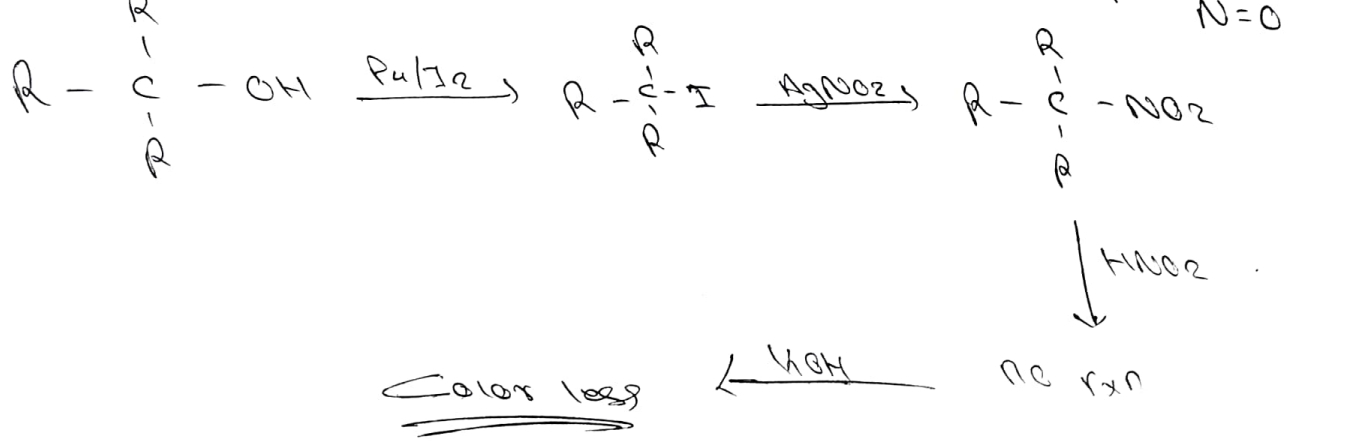
(methanol)

11 b

Primary, Secondary and tertiary alchol can be ~~identify~~ identify by Victor's mayer method as Primary alchole gives Red color Secondary alchol blue color and tertiary alchol will remain colorless.







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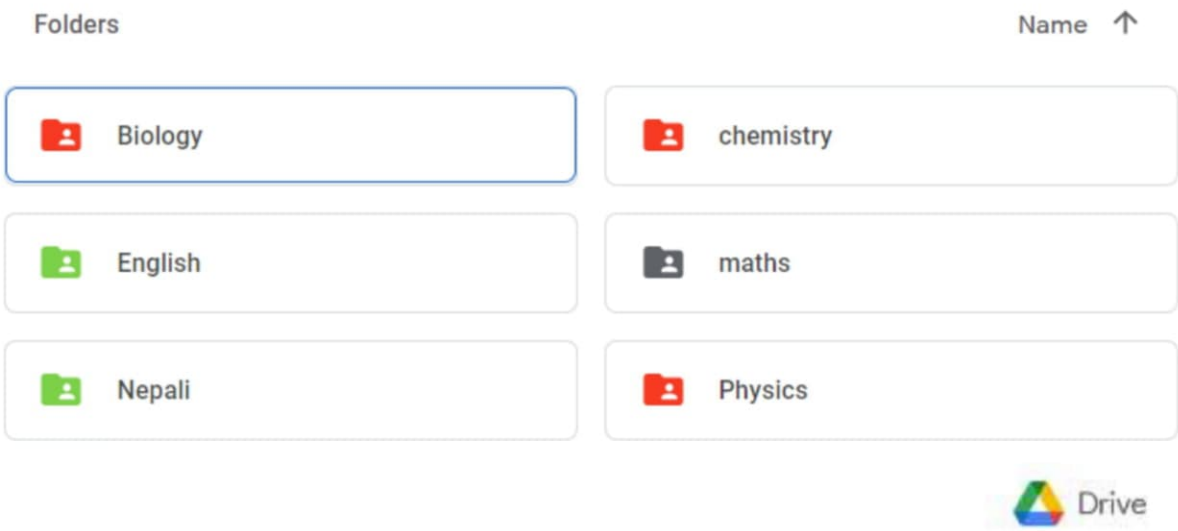
(Bipo)

Class 12 complete notes and paper collection.



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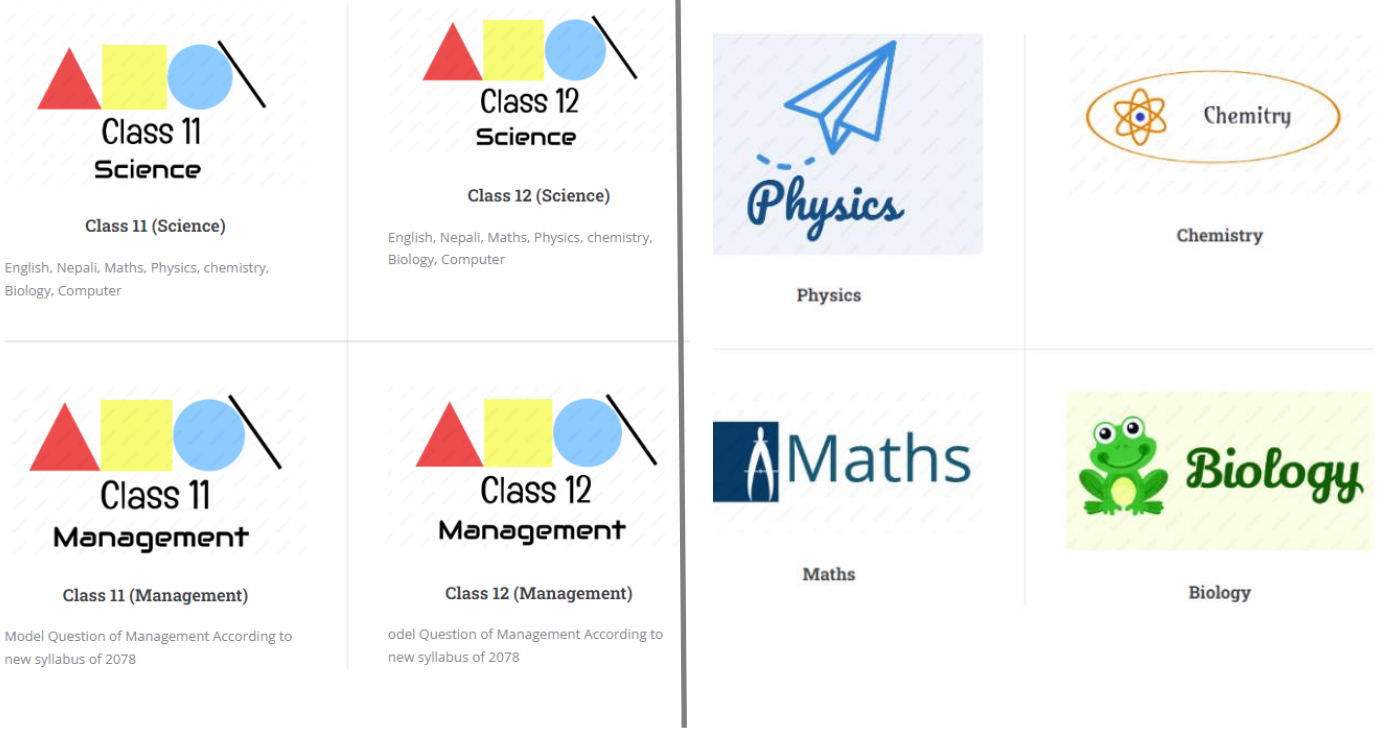
BIPO's notes

Class 12 complete notes and paper collection and solutions.



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