

केन्द्रीय माध्यमिक शिक्षा बोर्ड, दिल्ली
संनियर स्कूल सर्टिफिकेट परीक्षा (कक्षा बारहवीं)
परीक्षार्थी प्रवेश-पत्र के अनुसार भरे

प्रश्न Subject :

CHEMISTRY

विषय कोड Subject Code :

043

परीक्षा का दिन एवं तिथि

Day & Date of the Examination :

THURSDAY 12/3/15

उत्तर देने का माध्यम

Medium of answering the paper :

ENGLISH

प्रश्न पत्र के ऊपर लिखें

कोड वी टाईप :

Write code No. as written on the top of the question paper :

Code Number
5611/2/D

Set Number
① ● ③ ④

अतिरिक्त उत्तर-पुस्तिका (अ) की संख्या

No. of supplementary answer-book(s) used

Nil

विकलांग व्यक्ति :

Person with Disabilities :

हाँ / नहीं
Yes / No

NO

यदि शारीरिक अक्षमता से प्रभावित हो तो स्वकीय तर्फ से ✓ का चिह्नान लगाने।
If physically challenged, tick the category

☐ B ☐ D ☐ H ☐ S ☐ C ☐ A

B = दृष्टिहीन, D = मूक व बोध, H = शारीरिक रूप से विकलांग, S = स्मृतिक
C = हिस्सेविकस, A = अतिरिक्त
B = Visually Impaired, D = Hearing Impaired, H = Physically Challenged
S = Spastic, C = Dyslexic, A = Autistic

क्या लेखन — लिपिक उपलब्ध कराया गया : हाँ / नहीं

Yes / No

NO

यदि मुद्रिहीन है तो उपयोग में लाए गए

सॉफ्टवेयर का नाम :
If Visually challenged, name of software used :

—

*एक वाले में एक और तिरों। नाम के प्रत्येक भाग के बीच एक खाना रिक्त छोड़ दें। यदि वहीभागी क नाम 24 बरतों से अधिक है, तो केवल नाम के प्रथम 24 अक्षर ही लिखें।

Each letter be written in one box and one box be left blank between each part of the name. In case Candidate's Name exceeds 24 letters, write first 24 letters.

2003960

कार्यालय उपयोग के लिए
Space for office use

043 / 04521

1. $\text{CH}_3\text{-CH}_2\text{-Br}$ will undergo $\text{S}_\text{N}2$ reaction faster.

This is because -

$\text{CH}_3\text{CH}_2\text{Br}$ is 1° halide while $\text{CH}_3\text{-}\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}\text{-CH}_3$ is a 3° halide

- Due to less steric hindrance.
- Nucleophile will attack more easily.

2. BaCl_2 is more effective in coagulating negatively charged sol. since Ba^{2+} valence $= +2$

K⁺ valence $= +1$

According to Hardy Schulze Rule, greater the valence of coagulating ion, greater is its coagulating power.

3.

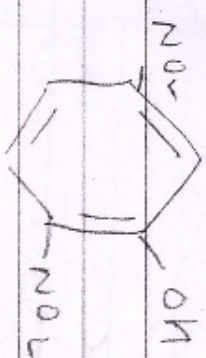
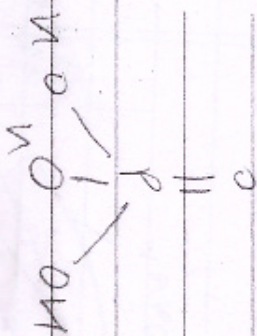
Let no of Y atoms = N

$\therefore$ no of X atoms = $\frac{2}{3}N$ ($\frac{1}{3}$ rd of Tetrahedral voids)

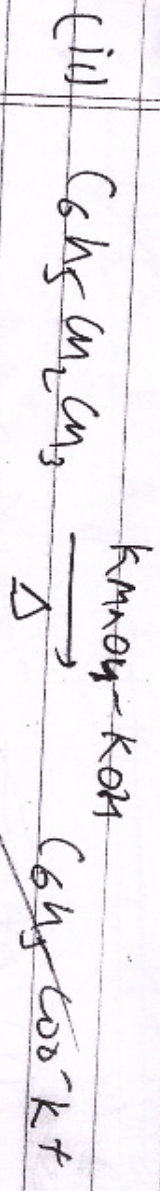
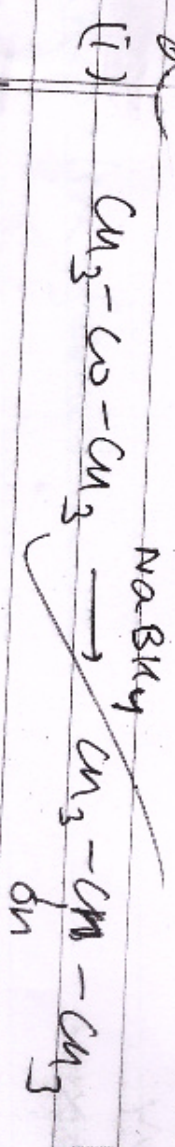
$\therefore$ ~~X_2Y_3 is formula.~~

Since there are 3-OH

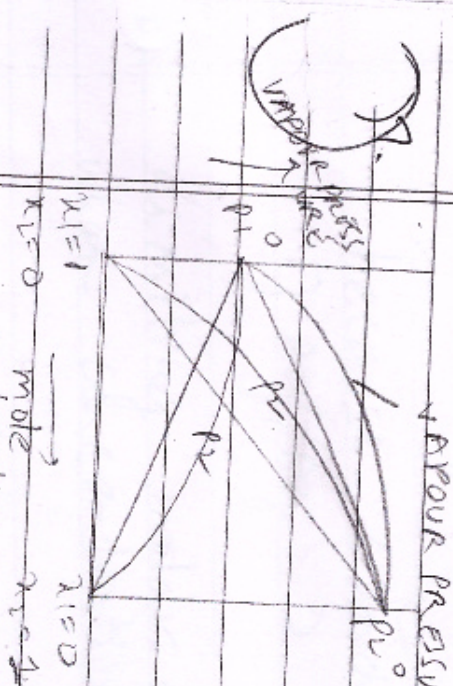
bonds $\therefore$ basicity = 3.



2,5-dinitro phenol



VAPOUR PRESSURE OF SOLUTION



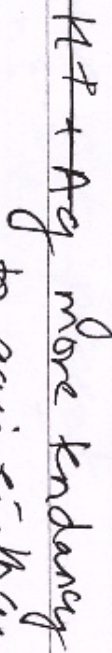
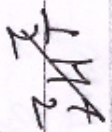
Positive deviation means that solution is non-ideal i.e. does not obey Raoult's law over entire range of concⁿ because -

1. Solvent-solute (solute-solvent) interactions are weaker than solvent-solvent interactions.

eg solution of ethanol and acetone

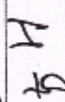
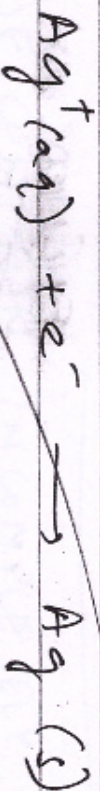
$\Delta M_{\text{mix}} > 0$ for positive deviation

c) Reaction feasible. -



Ag⁺ has

more tendency to gain e⁻. than



because standard reduction electrode potential -
of $Ag^+/Ag > H^+/H_2$ ∴ it is more feasible.

b) limiting molar conductivity is molar conductivity when concentration approaches zero.

conductivity is conductance of unit volume solution with decrease in concentration there is decrease in no of ions that carry current in unit volume solution. ∴ conductivity decreases with decrease in concentration.

9)

Transition element are the d-block elements where electrons are filled in penultimate shell $(n-1)$. here are present in group 3-12. $(n-1)d^{1-10} ns^{1-2}$

THESE CONTAIN INCOMPLETELY FILLED d-orbitals in GROUND STATE OR ANY ONE OF THE OXIDATION STATES

1. These form complex compounds due to a small size

5 high ionic charge

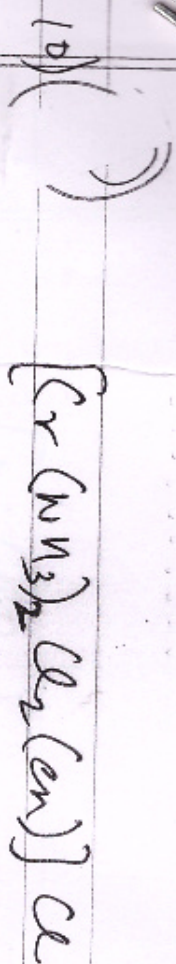
C. availability of d-orbitals

2. Act as ~~DATA~~ LISTS as

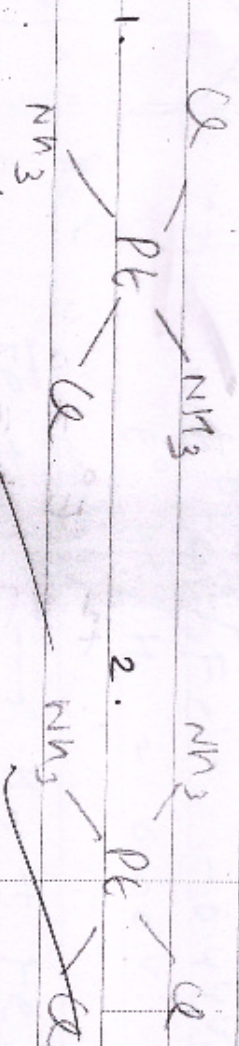
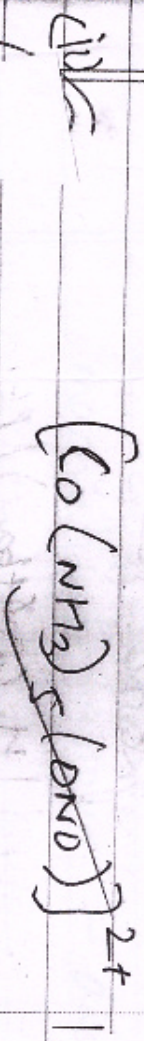
1. adopt multiple oxidation states

2. availability of $(n-1)d$ & ns

orbital to form intermediates with reactants.



(ii) Diamminedichlorido(ethylenediamine)chromium(III) chloride



trans isomer

cis isomer

(iv) It would be

trigonal

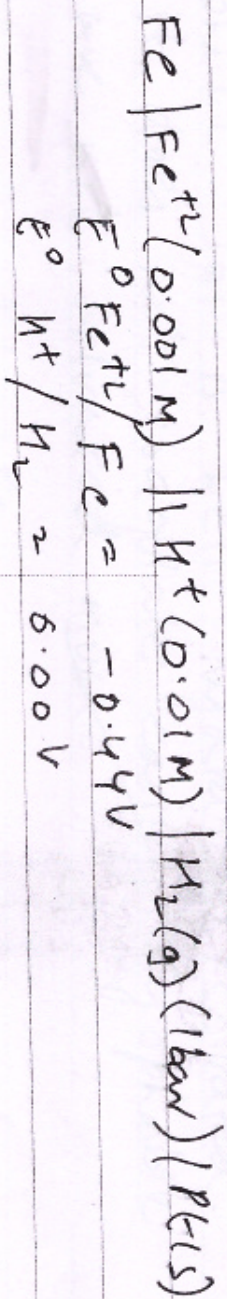
since $DO < P$

(iii) $[Ni(CO)_4]$ $\downarrow$

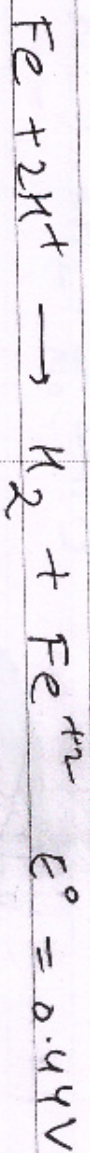
hybridization - sp^3 (tetrahedral)

magnetic behaviour - diamagnetic.

(iv)



Rx^n



Nernst eqⁿ

$$E = E^{\circ} - \frac{0.059}{n} \log Q$$

$n = 2$

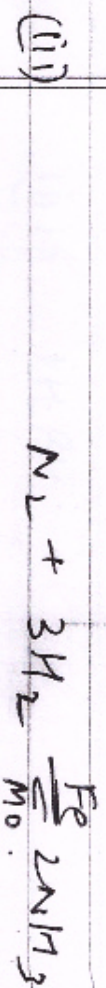
$$E = 0.44 - \frac{0.059}{2} \log \frac{[Fe^{2+}]}{[H^+]^2}$$

$$E = 0.44 - \frac{0.059}{2} \log \frac{10^{-3}}{10^{-4}}$$

$$E = 0.4105V$$

(13) (i) Hides which are positively charged are coagulated/neutralized by tannins which are negatively charged. Due to neutralization of two colloids, leather gets hardened.

(ii) Hydrophilic sol is well hydrated/solvated. Thus it does not coagulate easily. Hydrophobic sols are not solvated much.

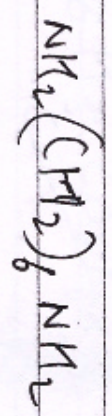


Fe acts as catalyst. ~~So inhibits the~~ activity of Fe^{+} . Thus needs to be removed.

(iv)

Nylon-6,6

Monomers

~~Hexamethylene~~

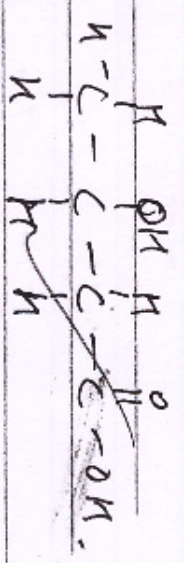
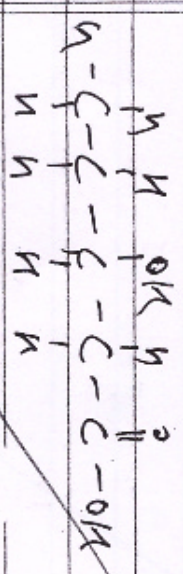
DIAMINE

~~ADIPIC~~

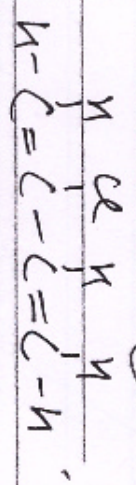
ACID

(ii)

PHBV

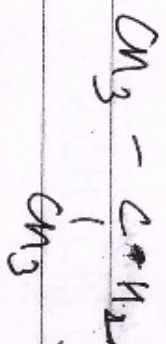
~~3-HYDROXY~~~~BUTYRIC ACID~~~~3-HYDROXY~~~~PENTANOIC ACID~~

(iii)

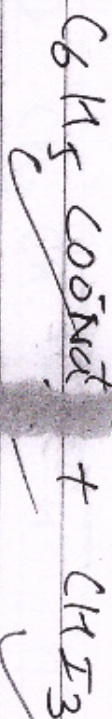
~~Chloroprene~~~~2-chloro-1,3-butadiene~~

(15)

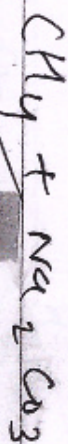
(i)

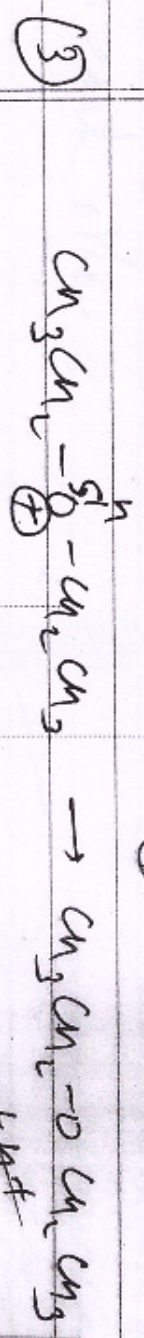
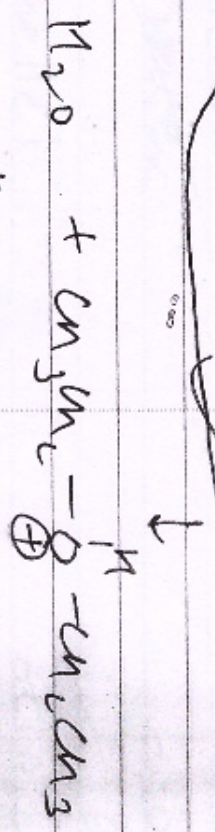
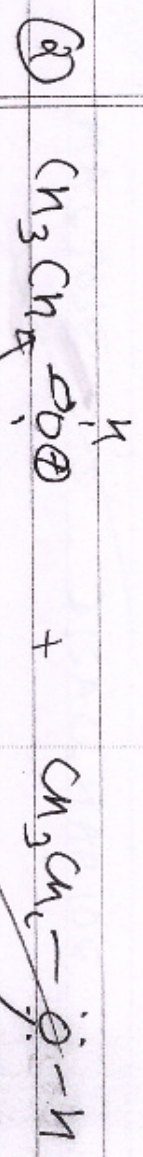
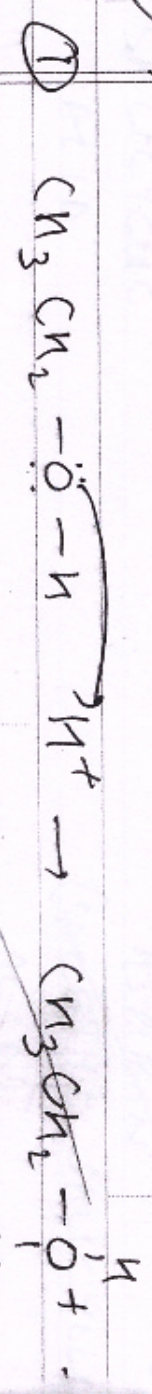
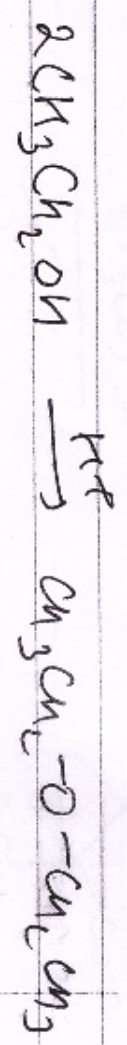


(ii)

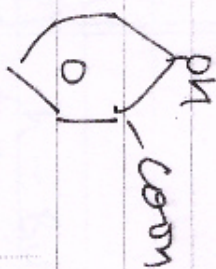


(1b)



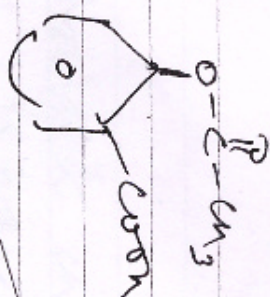


b)



SALICYLIC

ACID

~~ACETIC ANHYDRIDE~~
~~(CH₃CO)₂O~~

~~ASPIRIN~~
~~(ACETYL SALICYLIC~~
~~ACID)~~

17)

(i)

MALTOS

IS DISACCHARIDE.

(ii)

FIBROUS PROTEIN

- Insoluble in water

- Arranged parallel to each other.

GLOBULAR PROTEIN

- Soluble in water.

- coiled in spherical shape.

eg - Insulin, Albumin.

eg - Keratin, Myosin

(iii)

Vitamin - D

(2) a)

n-Butyl bromide is a straight chain whereas t-Butyl bromide is branched. The intermolecular forces in both are

DIPOLE-DIPOLE (van Der Waals).

van Der Waals forces are stronger when chain is straight than branched.

∴ boiling pt n-Butyl bromide > t-Butyl bromide.
n-Butyl bromide has greater surface area.

b)

(racemates)
A mixture with 2 enantiomers (d & l) has zero optical activity because rotation due to one isomer cancels rotation due to other. ∴ racemate mixture is optically inactive.

c) NO₂ shows -I and -R effect. Halogens are o-p directing. In nucleophilic substitution, anion appears at o & p position. Thus by -I & resonance, NO₂ stabilizes anion & increases reactivity.

$$\Delta T_f = i K_f m$$

$$m_{\text{Benzoic acid}} = 3.9g$$

$$\Delta T_f = 1.62 K, K_f = 4.9 K kg mol^{-1}$$

$$m_{\text{Benzene}} = 49g$$

$$m_{\text{sol}} = \frac{3.9}{122}$$

$$\therefore 1.62 = 4.9 \times i \times \frac{3.9 \times 1000}{122 \times 49}$$

$$\frac{1.62 \times 122}{3.9 \times 100} = i$$

$$0.5067 \approx 0.50 = i$$

Solute is associated

$$\therefore i < 1$$

20) (i)

Zn is refined by electrolytic refining.

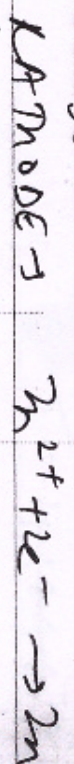
Here impure metal is taken as anode. pure metal as cathode.

An electrolytic solution of common ion is taken. also less basic

metals add to anode such as eg - Pt, Au, Ag

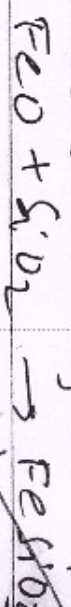
In this manner impure metal is dissolved in solution while pure metal is

deposited at cathode.



(ii)

SiO_2 is used as flux i.e.



It is used to produce slag (infusible mass of FeO) thus helps to remove impurities.

(ii) wrought iron / malleable iron is pure form of commercial iron.

21) $d = \frac{2 \times M}{N_A \times a^3}$

$M = 279 \text{ g/mol}$

$a = 4.05 \times 10^{-8} \text{ cm}$

$d = 2.79 \text{ g/cm}^3$

$N_A = 6.02 \times 10^{23}$

$2 = \frac{d \times N_A \times a^3}{M} = \frac{2.79 \times 6.02 \times 10^{23} \times (4.05 \times 10^{-8})^3}{279}$

$2 = 4.1846 \times 3.985$

$2 \approx 4 \therefore \text{it is fcc}$

body centred
(face centred
unit cell)

22)

(i)

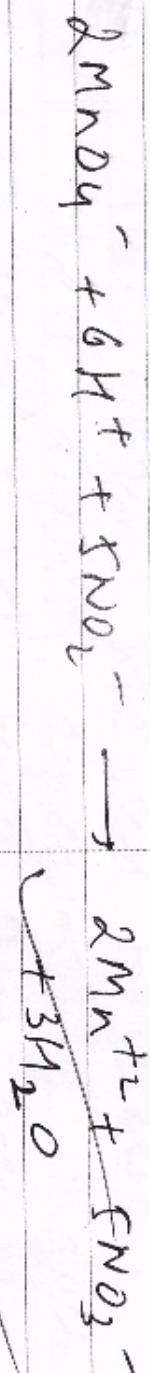
Screening effect of $5f$ orbitals $<$ $4f$ orbitals.
This is because azimuthal contraction is greater i.e. from element to element due to poor shielding of $5f$ orbitals.

(ii)

Transition metals form coloured compounds because of large no of electrons -
They undergo $d-d$ transition as they absorb light and emit complementary colour.

Also they contain large no of d electrons which are unpaired and undergo transition under effect of ligand.

b)



23) (i) Mr Roy displays awareness, care, helpful nature, responsible behaviour

(ii) I would spread awareness by

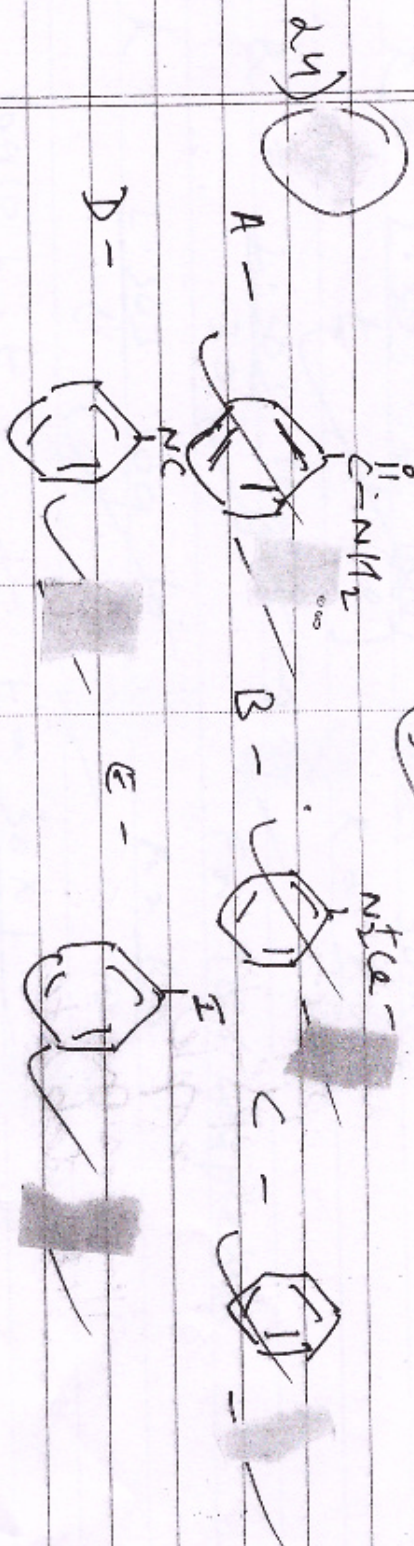
- putting up posters, notices
- tell people importance of remaining fit.
- Make people aware of problems like diabetes, hypertension.
- hold debates, on this issue.

(iii)

Tranquilizers are used to relieve stress, anxiety, depression by inducing a sense of well being. They are neurologically active drugs. Major component of sleeping pills. eg - IPRONIAZIDE

(iv)

Aspartame is unstable at high/boiling temperature. Thus use of aspartame is limited to cold foods & drinks.



25) a)

$$\text{Rate} = k[A][B]^2$$

(i) If concentration of B is doubled, rate is increased by 4 times.

(ii) overall order will be

$$\text{Rate} = k[A]^0[B]^2$$

$\therefore$ order = 2

b)

$$k = \frac{2.303}{t} \log \left(\frac{R_0}{R} \right)$$

$$t = 30 \text{ min}$$

$$k = \frac{R_0}{L}$$

$$k = \frac{2.303}{30} \log 2 = 5$$

For 90% completion

$$k = \frac{2.303}{t} \log 10$$

$$k = \frac{R_0}{10}$$

$$\frac{\log 10}{\log 2} = \frac{t}{30}$$

$$t = \frac{30 \times 1}{0.3010}$$

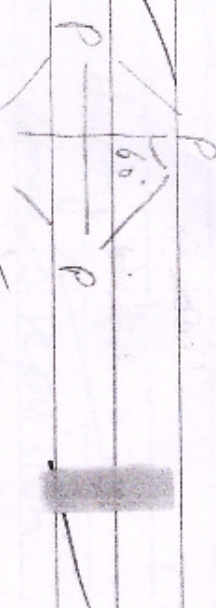
$t = 99.6$ minutes for 90% completion.

26)

(ii)

White Phosphorous is more reactive.

It consists of tetrahedral discrete units with angular strain $= 60^\circ$. Thus it is very reactive.



(ii) Supersonic jet aeroplanes are responsible for depletion of ozone layer.

$\text{NO} + \text{O}_3 \rightarrow \text{NO}_2 + \text{O}_2$
 i.e. nitrogen oxides released
 convert $\text{O}_3 \rightarrow \text{O}_2$ $\therefore$ reduced
 O_3 content.

(iii) F_2 has lower bond dissociation bond enthalpy than Cl_2 because.

1. small size
2. high electronegativity
3. but inter electronic repulsion.

(iv) He is used in filling balloons for meteorological observations.

