A

Cuddalore - Dt

COMMON HALF YEARLY EXAMINATION - 2022

Standard - XII

CHEMISTRY

Reg No

Time: 3.00 hrs. *Marks: 70*

PART - I

I. Choose and write the correct answer: **15×1=15**

1. The incorrect statement among the following in
   a) Nickel in refined by Mond's process
   b) Titanium is refined by Van - Arkel process
   c) Zinc blende in concentrated by froth floatation
   d) In the metallurgy of gold, the metal is reached with dilute sodium chloride solution
2. In organic benzene is
   a) borax b) borazole c) boric acid d) diborane
3. Which one of the following attack glass?
   a) HF b) HCl c) HBr d) HI
4. Which one has maximum number of unpaired electrons?
   a) d^1 b) d^5 c) d^9 d) d^{10}
5. The Geometry of dsp^2 hybridisation is
   a) limar b) square planar c) trigonal bi pyramidal d) tetrahedral
6. The Crystals which are good Conductors of heat and electricity are
   a) Molecular crystals b) ionic Crystals
   c) metallic Crystals d) all of these
7. Ea of a reaction is zero the value of rate constant in
   a) O b) A c) Fa d) Ea/2
8. Ionic product > K_{sp} the solution is
   a) Saturated b) UnSaturated c) Super Saturated d) equilibrium
9. Which one of the following Statement in Correct?
   a) Oxidation occurs at cathode b) Reduction Occurs at anode
   c) Electrons migrate from anode to cathode
   d) Electrons migrate from Cathode to anode
10. Which one of the following is correctly matched?
    a) Emulsion - smoke b) Gel - butter c) Foam - Mist d) Whipped Cream - Sol
11. Which of the following compound can be used as anti freeze in automobile radiators?
    a) Methanol b) Ethanol c) Neo Pentyl alchol d) ethane - 1,2 diol
12. The acid which reduces Tollens reagent in
    a) benzoic acid b) Salicyclic acid c) acetic acid d) formic acid
13. Which is called oil of mirbane?
    a) Nitromethane b) Aniline c0 Methyl sulicylate d) Nitro benzene
14. The number of SP^2 and Sp^3 hybridised carbon in glucose are respectively
    a) 1 and 4 b) 4 and 12 c) 5 and 1 d) 1 and 5
15. The polymer use in making blankets (artificial wool) is
    a) PAN b) Orlon c) PET d) both a and b

PART - II

II. Answer any six questions. (Q.no.19 is compulsory) **6×2=12**

16. Which type of ores can be concentrated by froth flotation method? Give two examples for such ones.
17. Write the properties of interhalogen compounds (any four)
18. Explain Coordination isomerism with an example.

19. The rate constant of first order reaction is $1.54 \times 10^{-3} s^{-1}$. Find its half life period.
20. What are the various process to prevent corrosion?
21. Write the tests for phenol.
22. What are called epimers? Give two examples?
23. Explain Popoff's rule.
24. How is nylon 66 prepared?

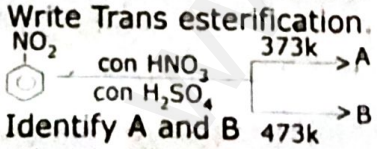
PART - III

III. Answer any six questions. (Q.No.31 is compulsory): **6×3=18**

25. Write the uses of silicones
26. $[Ti(H_2O)_6]^{+3}$ is coloured Where as $[SC(H_2O)_6]^{+3}$ is colorless - Why?
27. Write a note on Frenkel defect.
28. Derive the relationship between PH and POH .
29. What are called Catalytic poisons? Give two examples.
30. How do you prepare the following : a) Picric acid b) TNG
31. $CH_3COCl + H_2 \xrightarrow[BaSO_4]{Pd} A \xrightarrow{NaOH} B \xrightarrow{\Delta} C$. Identify A,B and C.
32. What are the differences between Hormones and vitamins?
33. Give one example for
    a) tranquiliser b) antihistamin c) artificial sweetening agent

PART - IV

IV. Answer all the Questions. **5×5=25**

34. a) Explain electromagnetic separation **(3)**
    b) Define gangue and slag **(1+1)** **(OR)**
    a) Write the uses of borax. **(2)**
    b) Write the action of dil and conc. NaOH on Cl_2. **(3)**
35. a) Trnasition metals form complexes - Why? **(2)**
    b) Compare the properties of lanthanoids and actinoids **(3)** **(OR)**
    Using VB theory explain the following: a) $[Ni(CN)_4]^{2-}$ b) $[Fe(CN)_6]^{3-}$
36. a) Calculate the number of atoms per unit cell in BCC. **(2)**
    b) What are called molecular crystals? Give example. **(3)** **(OR)**
    a) Derive integrated rate law for zero order reaction. **(3)**
    b) What are the various methods used for coagulation? **(2)**
37. How is the following prepared from Phenol?
    a) Phenolphthalein b) Salicylic acid c) benzene **(2 + 2 + 1)** **(OR)**
    a) Discuss the mechanism of Cannizaro's reaction.
    b) Write Trans esterification. **(3 + 2)**
38. a) 

    Identify A and B
    b) What is Libermann nitroso test? **(2+3)** **(OR)**
    a) Give any six differences between DNA and RNA.
    b) What are called antacids? Give an example.

Common Half yearly Examination - 2022

Std - XII

Chemistry

Answer Key

Part - I

Q No	Option	Answer	Q No	Option	Answer
1	d	In the metallurgy of gold, the metal is leached with dilute sodium chloride solution	8	c	Supersaturated
2	b	borazole	9	c	Electrons migrate from anode to cathode
3	a	HF	10	b	gel - butter
4	b	d5	11	d	ethane-1,2-diol
5	b	square planar	12	d	formic acid
6	c	metallic crystals	13	d	nitrobenzene
7	b	A	14	d	1 and 5
			15	d	both a and b

Part - II

16 Froth floation process - sulphide ores

eg - Galena, zinc blende
(PbS) (ZnS)

17 properties of interhalogen compds

i) central atom - larger

ii) formed b/w two (or) not more than two halogens

iii) F → can't acts as central atom

iv) undergo auto ionisation

v) strong oxidizing agents

18 The interchange of one (or) more ligands b/w cationic and anionic coordination entities in different isomers.

eg - ① $[Co(NH_3)_6][Cr(CN)_6]$ and $[Cr(NH_3)_6][Co(CN)_6]$

② $[Pt(NH_3)_4][PdCl_4]$ and $[Pd(NH_3)_4][PtCl_4]$

19. Given rate constant

$K = 1.54 \times 10^{-3} s^{-1}$

$t_{1/2} = ?$

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

$$= \frac{0.693}{1.54 \times 10^{-3} s^{-1}}$$

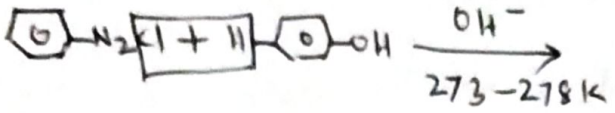
$$t_{1/2} = 450 \text{ sec}$$

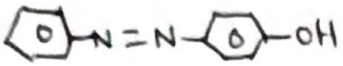
20. Methods of preventing corrosion

1) by painting
2) Galvanizing
3) cathodic protection
4) Passivation
5) Alloy formation

21 Test for phenol

i) coupling reaction





p-hydroxy azobenzene
(red orange dye)

ii) phenol gives violet (or) purple color with neutral $FeCl_3$.

iii) phenol reacts with NaOH to give Sodium phenoxide.

22 Epimers

Sugars differing in configuration at an asymmetric centre is known as epimers.

eg- 1) Sorbitol and mannitol
2) D-glucose and D-mannose.

23 Popoff's rule :

During oxidation of an unsymmetrical Ketone, a (C–CO) bond is cleaved in such a way that the Keto group stays with the smaller alkyl group

eg: $CH_3-CH_2-CH_2-\underset{O}{\underset{\|}{C}}-CH_3 \xrightarrow[(O)]{\text{Conc } HNO_3}$

pentan-2-one

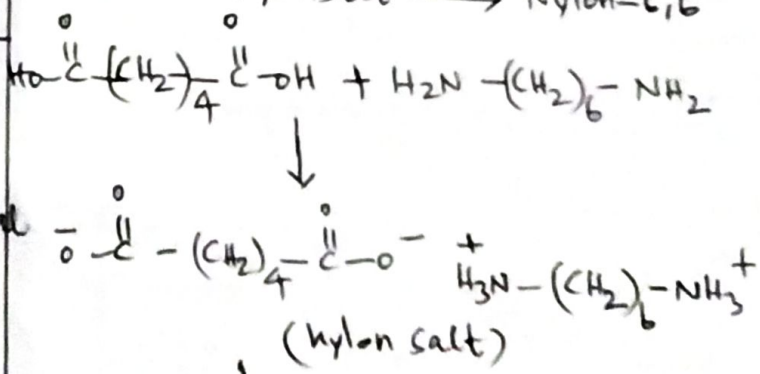
CH_3-CH_2-COOH + CH_3COOH

propanoic acid, ethanoic acid

24 Adipic acid + hexamethylene diamine

↓ Δ

Nylon salt $\xrightarrow{\Delta}$ Nylon-6,6



↓ Δ

Nylon-66

25 Uses of Silicones

→ low temperature lubrication, vaccum pump and high temperature oil bath

→ making water proofing clothes

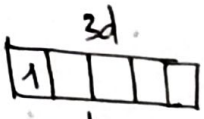
→ insulating material in electrical motor

→ mixed with paints and enamels to make them resistant towards high temp, sunlight, dampness.

26 $[Ti(H_2O)_6]^{3+}$ – coloured

$Ti - 3d^2 4s^2$

$Ti^{3+} \rightarrow 3d^1 4s^0$



It has only one unpaired e^-

$[Sc(H_2O)_6]^{3+}$ – colourless

$Sc - 3d^1 4s^2$

$Sc^{3+} \rightarrow 3d^0 4s^0$

→ No unpaired e^-, colourless

27 Frenkel defect

→ arises due to dislocation of ions from its crystal lattice.

→ missing ion occupies at interstitial position

→ Size of anion and cation are different

→ It does not affect the density of the crystal

eg: AgBr

28 Relation b/w pH and pOH

$pH = -\log_{10}[H_3O^+]$

$pOH = -\log_{10}[OH^-]$

$pH + pOH = \left(-\log_{10}[H_3O^+]\right) + \left(-\log_{10}[OH^-]\right)$

$= -\left(\log_{10}[H_3O^+] + \log_{10}[OH^-]\right)$

$= -\log_{10}[H_3O^+][OH^-]$

$= -\log_{10} K_w$

$= -\log_{10} 10^{-14}$

$= -\times -\log_{10} 10 \times 14$

$= 14 \times \log_{10} 10$

$\boxed{pH + pOH = 14}$

29 Catalytic poison:

Substance decrease the activity of the catalyst

eg: In Haber process,

1. $N_2 + 3H_2 \longrightarrow 2NH_3$

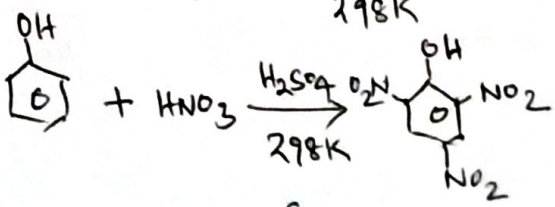
Catalyst: Fe, poison: H_2S

2. In $2SO_2 + O_2 \rightarrow 2SO_3$

Catalyst: pt, poison: As_2O_3

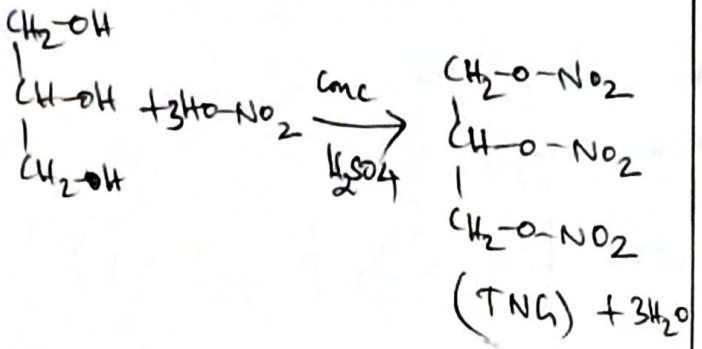
30 Picric acid

phenol + nitric acid (conc) $\xrightarrow[298K]{\text{conc } H_2SO_4}$ Picric acid



(2,4,6-trinitro phenol)

TNG



(31) $CH_3COCl + H_2 \xrightarrow[BaSO_4]{Pd}$ ~~CH_3CHO acetyl chloride~~ CH_3CHO (A)

$CH_3-CHO + CH_3-CHO \xrightarrow{NaOH}$ $CH_3-CH(OH)-CH_2CHO$ Aldol (B)

$CH_3-CH(OH)-CH(H)-CHO \xrightarrow{\Delta}$ $CH_3-CH=CH-CHO$ crotonaldehyde (C)

A is acetaldehyde

B is Aldol (3-hydroxybutanal)

C is crotonaldehyde (2-butenal)

(32)

Hormone	Vitamin
1) It is an organic substance that is secreted by one tissue, it limits the blood stream and induces a physiological response in other tissues	1) Small organic compds that can be synthesised by our body but are essential for certain functions. they must be obtained through diet.
2) They are produced in the ductless glands (endocrine) eg - testes of males and ovaries of female	2) They are not produced in the body, but have to be supplied through diet
3) Deficiency causes metabolic disorders	3) Deficiency (or) excess causes diseases

(33) a) tranquilizers – clozapine

b) antihistamin – cetirizine

c) artificial sweetening agent – Saccharin

(any one) examples

Part - IV

34 a) Principle of Electromagnetic separation:-

→ It is based on the difference in the magnetic properties of the ore and impurities.

→ eg:- ore - tinstone (Non-magnetic)
Impurity - wolframite (magnetic)
ore - pyrolusite (magnetic)
Impurity - siliceous matter (Non-magnetic)

→ magnetic particles are attracted by magnets

→ impurities (Non-magnetic) are away from the heap

b) Gangue:- ores associated with non-metallic impurities, rocky materials and siliceous matter known as gangue

Slag:- fusible product formed when a flux reacts with a gangue during the extraction of metals.

(or)

a) uses of borax:-

1. identification of coloured metal ions
2. manufacture of optical and borosilicate glass, enamels and glazes for pottery.
3. as a flux in metallurgy and acts as a preservative.

b) dil. NaOH on Cl_2

$Cl_2 + H_2O \rightarrow HCl + HOCl$

$HCl + NaOH \rightarrow NaCl + H_2O$

$HOCl + NaOH \rightarrow NaOCl + H_2O$

$Cl_2 + 2NaOH \rightarrow NaOCl + NaCl + H_2O$

Conc NaOH on Cl_2

$Cl_2 + H_2O \rightarrow HCl + H_2O$

$HCl + NaOH \rightarrow NaCl + H_2O$

$HOCl + NaOH \rightarrow NaOCl + H_2O$

$2NaOCl \rightarrow NaClO_3 + 2NaCl$

$3Cl_2 + 6NaOH \rightarrow NaClO_3 + 5NaCl + 3H_2O$

35 a) i) Small size

ii) Highly charged.

iii) Vacant low energy orbitals and accepts e^-s from other groups.

eg:- $[Fe(CN)_6]^{4-}$

b)

Lanthanoids	Actinoids
→ Differentiating electron enters in 4f orbitals.	→ 5f orbitals.
→ Binding energies are higher (4f)	→ lower (5f)
→ less tendency to form complexes	→ greater tendency
→ Colourless ion	→ Coloured ions
→ do not form oxocations.	→ form oxocations.
→ +3 oxidn state and +2, +4	→ +3 oxidn state, and +4, +5 +6 and +7.

b) VB theory (i) $[Ni(CN)_4]^{2-}$

$Ni \rightarrow 3d^8 4s^2$

$Ni^{2+} \rightarrow 3d^8$ [↑↓ | ↑↓ | ↑↓ | ↑ | ↑]

CN^- strong ligand, pairing occurs

$[Ni(CN)_4]$ [↑↓ | ↑↓ | ↑↓ | ↑↓ | ✗ | ✗ | ✗ | ✗ | ✗]

dsp^2

Geometry:- Sq planar.

Hybridisation:- dsp^2.

Magnetic moment:- $\mu = 0$ BM.

Magnetic character:- Diamagnetic

b) $[Fe(CN)_6]^{3-}$

$Fe \rightarrow 3d^6 4s^2$

$Fe^{3+} \rightarrow 3d^5$ [↑ | ↑ | ↑ | ↑ | ↑]

CN^- strong ligand, pairing occurs

$[Fe(CN)_6]^{3-}$ [↑↓ | ↑↓ | ↑ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗]

d^2sp^3

Hybridisation:- d^2sp^3

Geometry:- octahedral.

Magnetic moment $\mu = 1.732$ BM

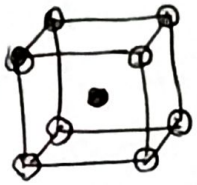
Magnetic character:- paramagnetic.

36 a) No of atoms in bcc $= \frac{N_c}{8} + \frac{N_b}{1}$

$= \frac{8}{8} + \frac{1}{1}$

$= 1+1$

$= 2$



b) Molecular crystals:

→ neutral molecules
→ held by weak vander waals force
→ Soft
→ donot conduct electricity.

eg: naphthalene, anthracene.

(or)

a) A → product

rate $= K[A]^0$

rate $= K(1)$ — ①

$-\frac{d[A]}{dt} =$ rate — ②

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

$-d[A] = K\,dt$

Integrate, $-\int_{[A_0]}^{[A]} d[A] = K\int_0^t dt$.

$-[A] + [A_0] = Kt$

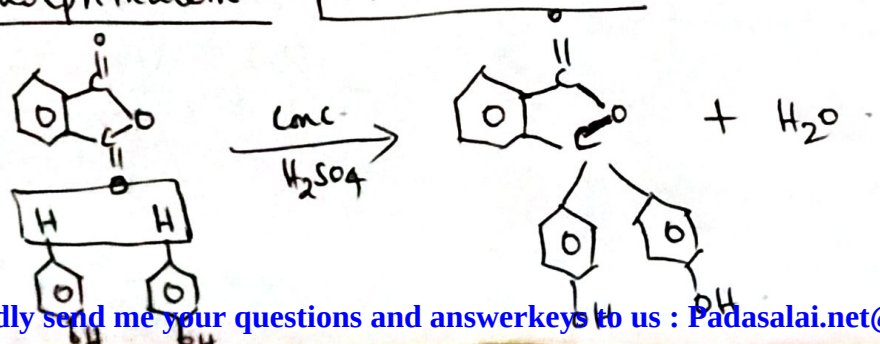
$[A_0] - [A] = Kt$

$$K = \frac{[A_0]-[A]}{t}$$

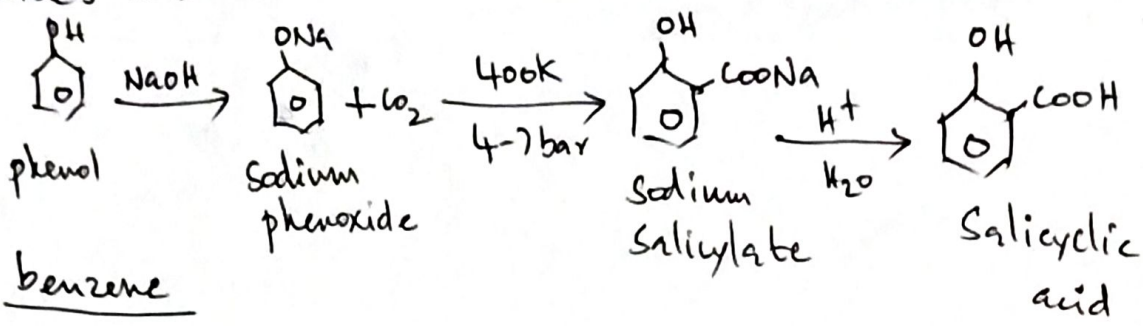
b) Various methods for coagulation.

1) Addition of electrolytes
2) Electrophoresis
3) Mixing oppositively charged sols.
4) Boiling.

37 a) phenolphthalein – phthalein reaction



b) Kolbe's reaction



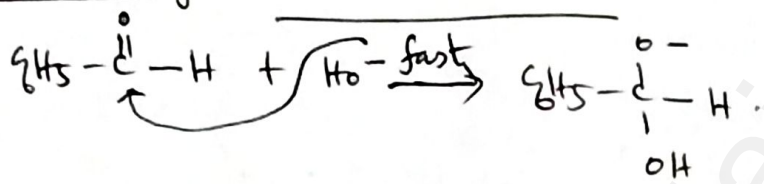
c) benzene

$C_6H_5OH + Zn \xrightarrow{\Delta} C_6H_6 + ZnO$

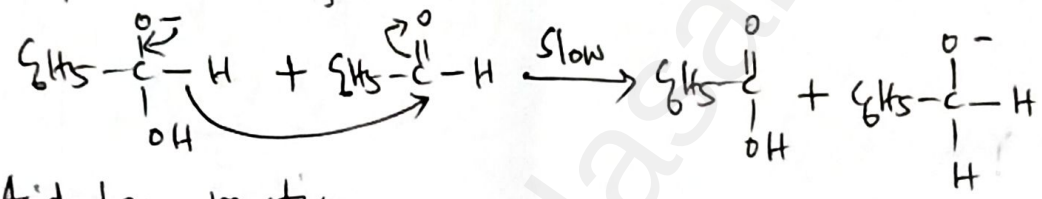
phenol Benzene

(or)

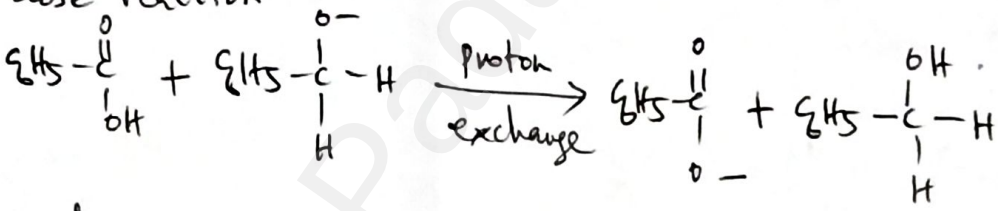
9) Mechanism of Cannizaro reaction.

1. 

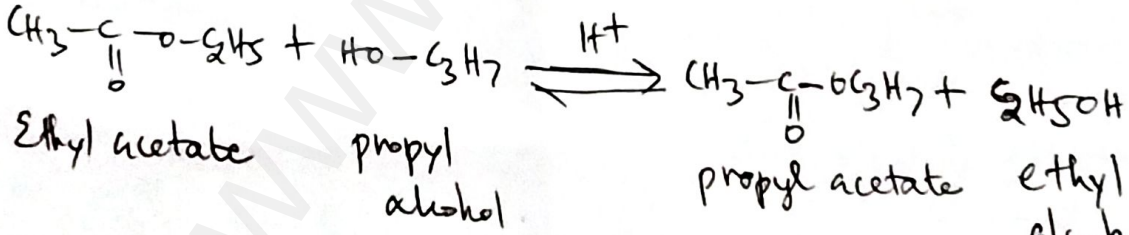
2. Hydride ion transfer



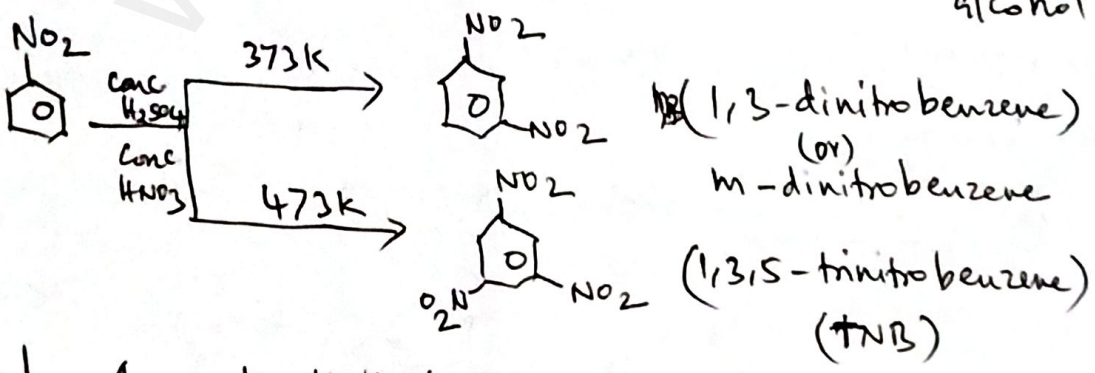
3. Acid-base reaction



b) Trans esterification



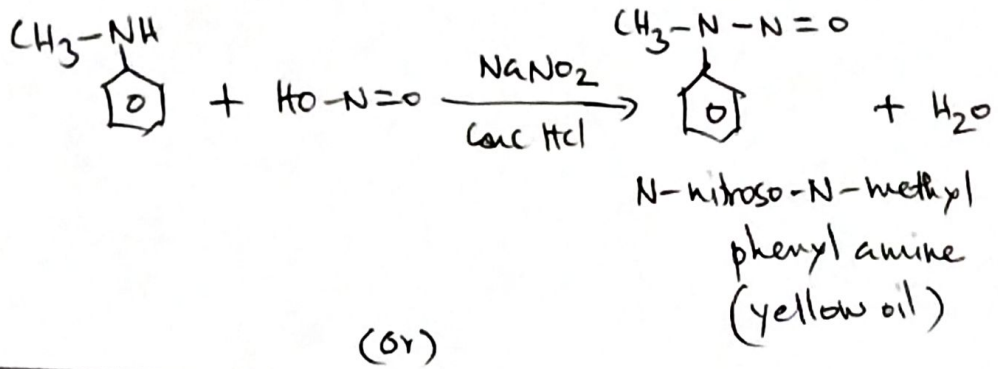
38 a)



Compound. A → 1,3-dinitrobenzene

B → 1,3,5-trinitrobenzene.

b) Libermann nitroso test



(or)

c)

DNA	RNA.
1. mainly present in nucleus, mitochondria, chloroplast.	→ present in cytoplasm, nucleolus and ribosomes.
2. contains deoxy ribose suger.	→ contains ribose sugar
3. Base pair A = T, G = C	→ Base pair A = U, C = G.
4. Double stranded molecules	→ Single stranded molecules
5. Life time high.	→ life time low (short lived)
6. Stable, not hydrolysed by alkalis	→ unstable, hydrolysed by alkalis.

b) Antacids :- the substance neutralise the acid in the stomach that causes acidity.

eg:- Milk of magnesia, sodium bicarbonate aluminium hydroxide

Uses :- To relieve symptoms such as burning sensation in the chest / throat area (heart burns) caused by acid reflux.