

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

Main 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 लिखे कोड नो दर्शाए Write code No. as written on the top of the question paper :	Code Number 56/1/2/D
	Set Number ① ② ③ ④
अतिरिक्त उत्तर-पुस्तिका (ओं) की संख्या No. of supplementary answer-book(s) used	Nil
विकलांग व्यक्ति : Person with Disabilities :	हाँ / नहीं Yes / No NO
किसी शारीरिक अक्षमता से प्रभावित हो तो संबंधित वर्ग में ☒ का निशान लगाए। If physically challenged, tick the category	
B D H S C A	
B = बुद्धिहीन, D = मूल न कोश, H = शारीरिक क्षम से विकलता, S = स्पास्टिक C = डिस्लेक्सिक, A = ऑटिस्टिक B = Visually Impaired, D = Hearing Impaired, H = Physically Challenged S = Spastic, C = Dyslexic, A = Autistic	
रखा लेखन - लिखित उपलब्ध करवाया गया : Whether writer provided :	हाँ / नहीं Yes / No NO
यदि बुद्धिहीन हो तो उपयोग में लाए गये सॉफ्टवेयर का नाम : If Visually challenged, name of software used :	

*एक खाने में एक अक्षर लिखें। नाम के प्रत्येक भाग के बीच एक खाना रिक्त छोड़ दें। यदि परीक्षार्थी का नाम 24 अक्षरों से अधिक है, तो खाली 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.

कार्यालय उपयोग के लिए
Space for office use

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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

$\text{CH}_3\text{C}(\text{CH}_3)_2\text{Br}$ is a 3° halide

- Due to less steric hinderance.
- 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 Scholtze Rule, greater the valence of coagulating ion, greater is its coagulating power.



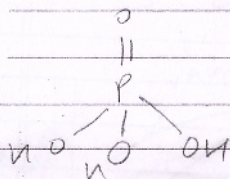
3.

Let no of Y atoms = N

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

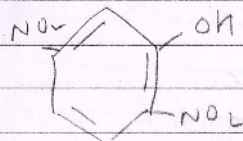
$\therefore$ X_2Y_3 is formula.

4.



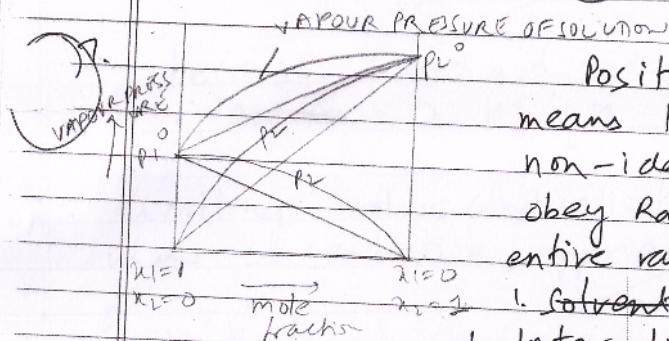
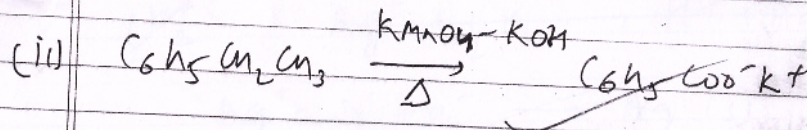
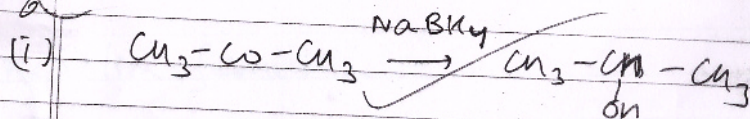
Since there are 3-OH bonds $\therefore$ basicity = 3.

5.



2,5-dinitro phenol





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-solvents).
1. Interactions in solution

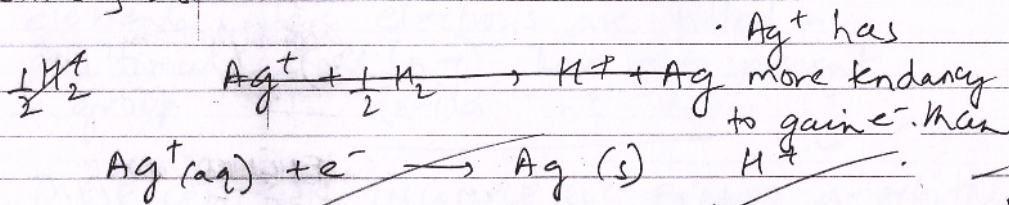
are weaker than between solvent-solvent

eg. Solution of ethanol and acetone

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

c)

a) Reaction feasible. -



because standard reduction electrode potential of $\text{Ag}^+/\text{Ag} > \text{H}^+/\frac{1}{2}\text{H}_2$ $\therefore$ 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 the current in unit volume solution. $\therefore$ conductivity decreases with decrease in concentration.



- 9) Transition elements are the d-block elements where electrons are filled in penultimate shell $(n-1)$. They 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 ^{COORDINATION} COMPOUNDS due to a small size

b high ionic charge

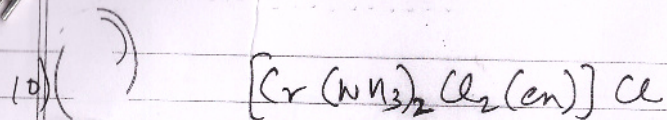
c. availability of d-orbitals

2. ACT AS ~~CATALYSTS~~ ^{CATALYSTS} as

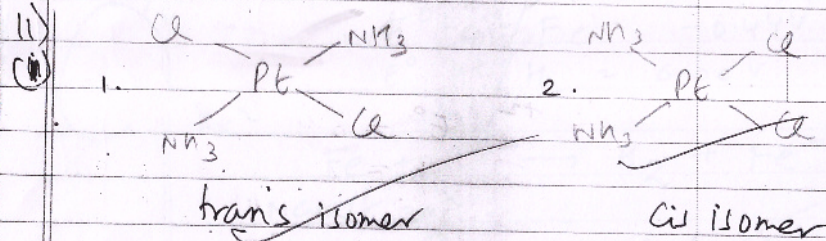
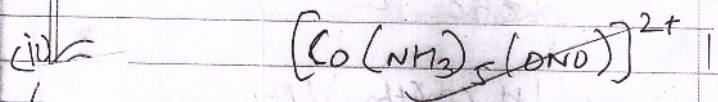
1. adopt multiple oxidation states

2. availability of $(n-1)d$ has orbital to form intermediates with reactants.



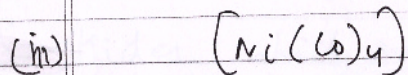


(ii) Diamminedichlorido(ethylenediamine)chromium(III) chloride



(v) It would be $t_{2g}^3 e_g^1$
since $\Delta O < P$

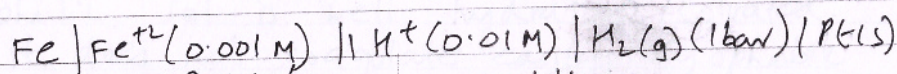




hybridization - sp^3 (tetrahedral)

magnetic behaviour - diamagnetic.

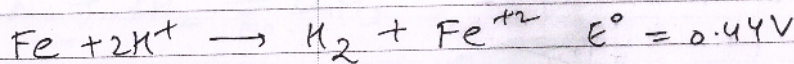
(12)



$$E^{\circ}_{Fe^{2+}/Fe} = -0.44V$$

$$E^{\circ}_{H^+/H_2} = 0.00V$$

Rx^n



Nernst eqⁿ

$$n = 2$$

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

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

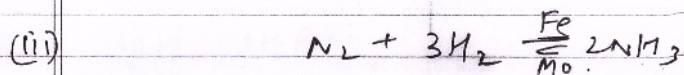
$$E = 0.44 - \frac{0.059}{2} \log \frac{10^{-3}}{10^{-4}}$$

$$E = 0.4105V$$



(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) Lyophilic sol is well hydrated/solvated. Thus it does not coagulate easily. Lyophobic sols are not solvated much.



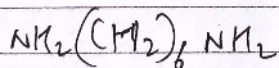
Fe acts as catalyst. ~~Co~~ inhibits the activity of Fe. Thus needs to be removed.



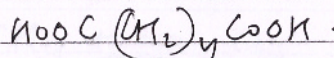
14)

(i) Nylon - 6,6.

Monomers.

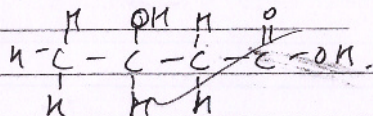


~~HEXAMETHYLENE~~
DIAMINE

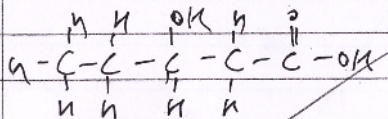


~~ADIPIC~~
ACID.

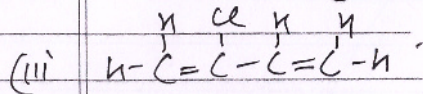
(ii) PHBV



~~3 HYDROXY~~
~~BUTANOIC ACID~~



~~3 HYDROXY~~
~~PENTANOIC ACID~~



(iii)

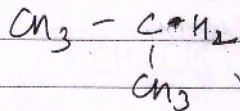
chloroprene

2-chloro-1,3-butadiene

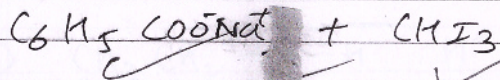


(5)

(i)



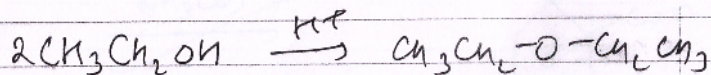
(ii)



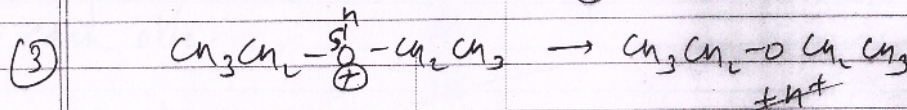
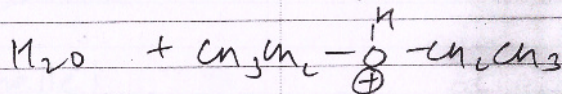
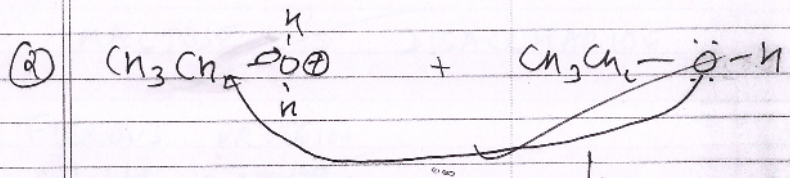
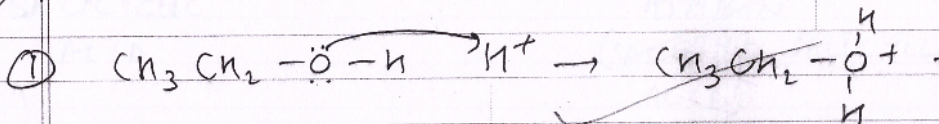
(ib)

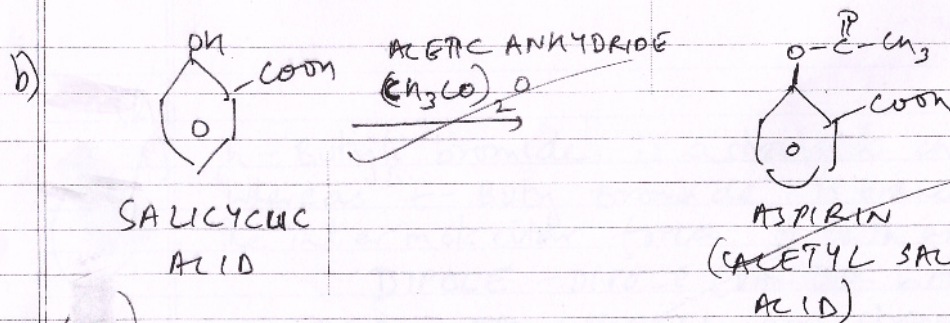


(6)



(a)





(i) MALTOSE IS DISACCHARIDE.

(ii) FIBROUS PROTEIN
- Insoluble in water.

- Arranged parallel to each other.

eg - Keratin,
Myosin

(ii) Vitamin - D

GLOBULAR PROTEIN

- Soluble in water.

- coiled in spherical shape.

eg - Insulin,
Albumins.

(12)

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)

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



c) NO_2 shows $-I$ and $-R$ effect. Halogens are $o-p$ directing. In nucleophilic substitution, anion appears at o & p position. Thus by $-I$ & $-R$ resonance, NO_2 stabilizes anion Δ increases reactivity.

(10)

$$\Delta T_f = i K_f \cdot m \quad \Delta T_f = 1.62 \text{ K} \quad K_f = 4.9 \text{ K kg mol}^{-1}$$

$$m_{\text{BENZENE}} = 3.9 \text{ g} \quad m_{\text{BENZENE}} = 49 \text{ g}$$

(ACID)

$$\text{moles} = \frac{3.9}{122}$$

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

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

$$0.5067 \approx 0.50 = i$$

Solute is associated

$$\therefore i < 1$$



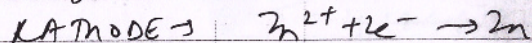
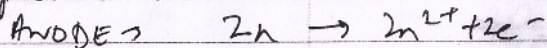
20)

(i)

Zn is refined by electrolytic refining.

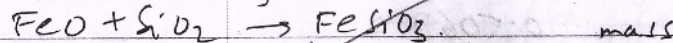
Here impure metal is taken as anode.
pure metal as cathode.

An electrolytic solution of common ion is taken. also less basic metals add to anode such as - 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) of FeO. This helps to remove impurity.



(ii) Wrought iron / malleable iron is purest form of commercial iron.

21)

$$d = \frac{Z \times M}{N_A \times a^3}$$

$$M = 27 \text{ g/mol}$$

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

$$d = 2.7 \text{ g/cm}^3$$

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

$$Z = \frac{d \times N_A \times a^3}{M} = \frac{2.7 \times 6.02 \times 10^{23} \times (4.05 \times 10^{-8})^3}{27}$$

$$Z = 4.184 \approx 3.985$$

$$Z \approx 4 \quad \therefore \text{it is fcc}$$

(face centred unit cell)



22)

a)
(i)

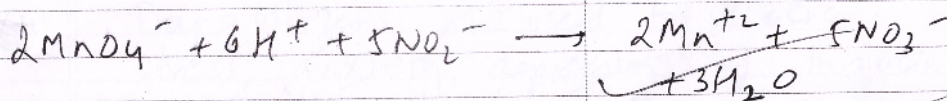
Screening effect of $5f$ orbitals $<$ $4f$ orbitals.
This is because actinoid contraction
is greater i.e. from element to element
due to poor shielding of $5f$ orbitals.

(ii)

Transition metals form coloured compounds
because of large no of electrons -
These ^{e's} 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)

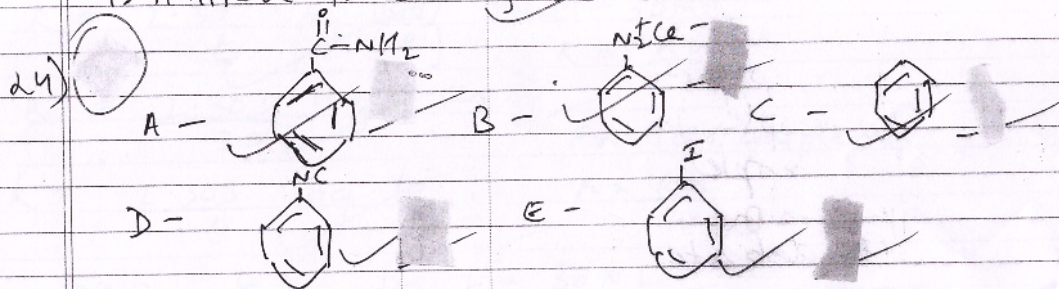
I would spread awareness by

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



(ii) 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/cooking 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 now would be:

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

$$\therefore, \text{order} = 2$$

b)

$$k = \frac{2.303 \log \frac{R_0}{R}}{t} \quad t = 30 \text{ min}$$

$$R = \frac{R_0}{2}$$

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

For 90% completion

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

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

$$\frac{\log 10}{\log 2} = \frac{t}{30}, \quad t = \frac{30 \times 1}{0.3010}$$

$t = 99.6$ minutes. for 90% completion.



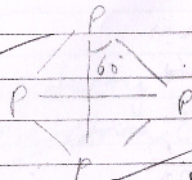
26)

(i)

White phosphorous is more reactive.

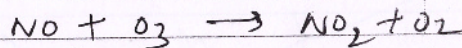
It consists of tetrahedral discrete units with

angular strain = 60° . Thus it is very reactive.



(ii)

Supersonic jet aeroplanes are responsible for depletion of ozone layer.



$\therefore$ nitrogen oxides released

convert $\text{O}_3 \rightarrow \text{O}_2$... reduced O_3 content.



(iii)

F_2 has lower bond dissociation enthalpy than Cl_2 because.

1. small size
2. high electronegativity
3. Thus interelectronic repulsion.

(iv)

He is used in filling balloons for meteorological observations.

(v)

