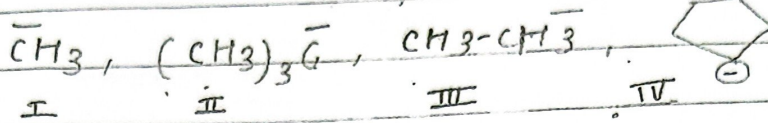


Q17] The correct stability order of



→ IV > I > III > II

Q27] In Kjeldahl's method NH_3 evolved from 1g compound neutralised 20ml of 1M H_2SO_4 ,
 What is the percentage of Nitrogen in organic comp

→ 56%

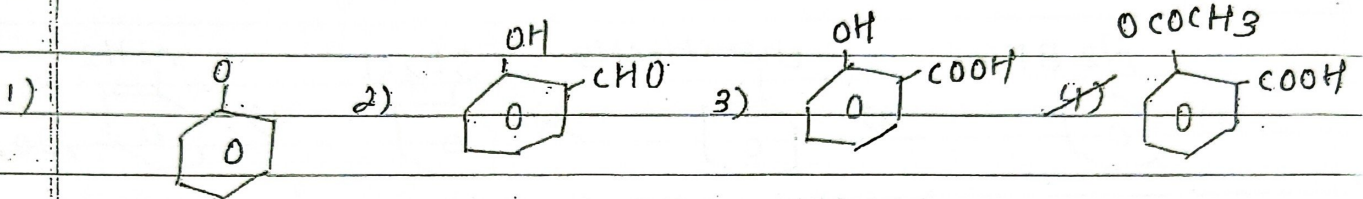
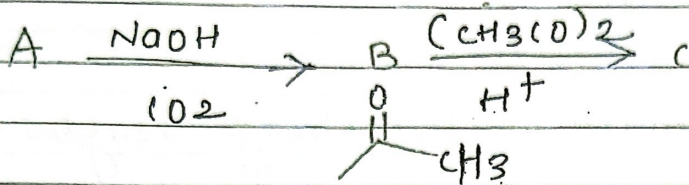
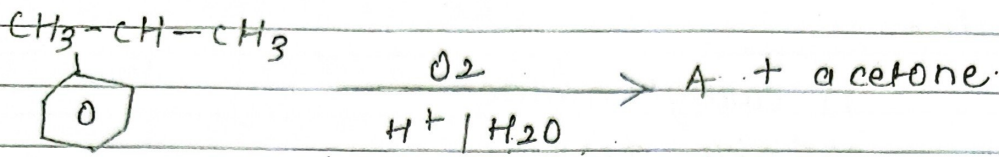
Q37] Difference in molar mass of first & fourth member of homologous series of alkane is

→ 42 g

Q47] In petroleum industry crude oil fraction is separated by

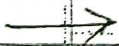
→ fractional distillation

Q57] Identify the product 'c'



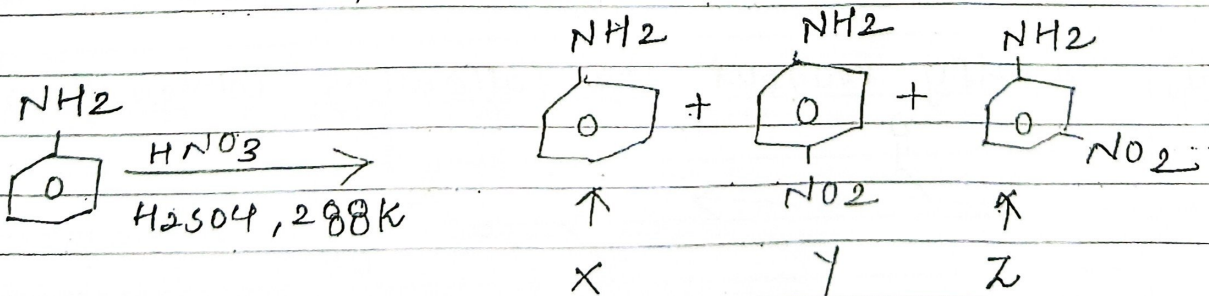
6) Which is the correct structure of

β -D-2-deoxyribose (See in Biomolecules)



7) Identify the correct order of product formed

X, Y, Z,

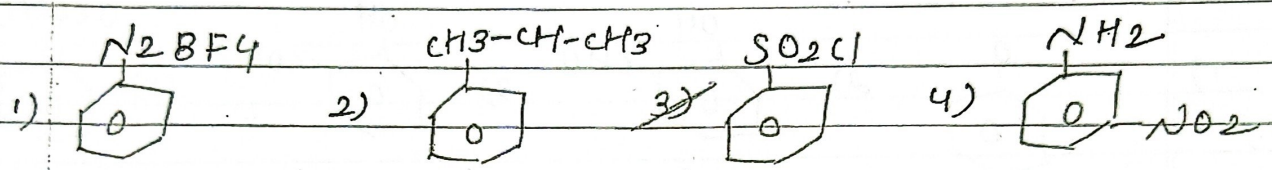


$Y > Z > X$ X = 2% Z = 47%
 Y = 51%

8) Which reagent test can not be used to detect aniline

- 1) carbyl amine
- 2) 2-4 DNP.
- 3) Heinsberg
- 4) AZO - dye

9) Identify the formula of Heinsberg reagent



10) List I List II

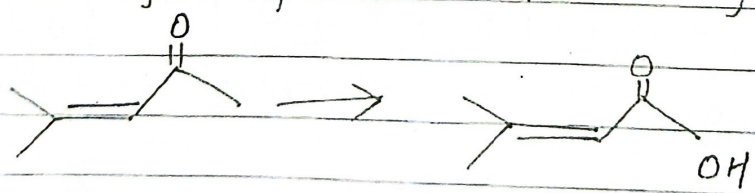
Aldol condensation \rightarrow synthesis of α - β unsaturated comp.

Cannizzaro reaction \rightarrow form of alcohol & Acid.

HYZ \rightarrow synthesis of α -halocarboxylic Acid.

Etard reaction \rightarrow synthesis of ben 3-aldehyde.

11) Identify reagent for following conversion



- 1) $\text{KMnO}_4, \text{KOH}$
- 2) $\text{K}_2\text{Cr}_2\text{O}_7, \text{H}_2\text{SO}_4$
- 3) $\text{NaOCl}_2 / \text{H}^+, \text{H}_2\text{O}$
- 4) $\text{CH}_3-\overset{\overset{\text{O}}{\parallel}}{\text{C}}-\text{O}-\text{OH}$

12) Assertion :- Ozonolysis of Alkene to produce carboxyl comp. required in addition of O_3 a mild reducing agent.

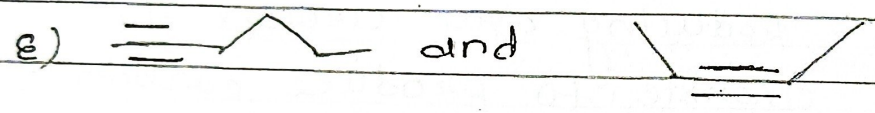
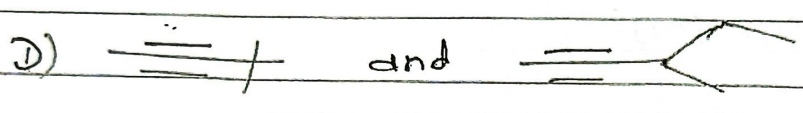
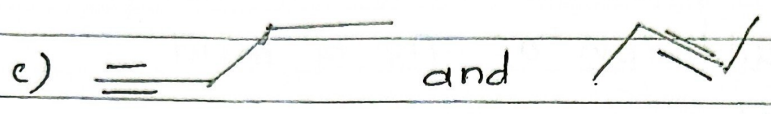
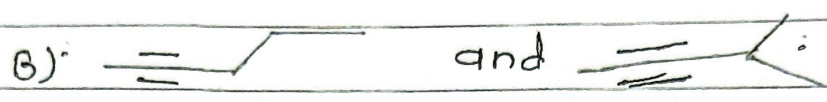
like $\text{Zn-H}_2\text{O}$

Reason :- Reducing agent cleaves the ozonide to produce carbonyl compound.

→ Both (A) & (R) are True
(R) is correct explanation of (A)

2/1/20
 1/2/20

Q 31] Which of the following pairs are position isomers



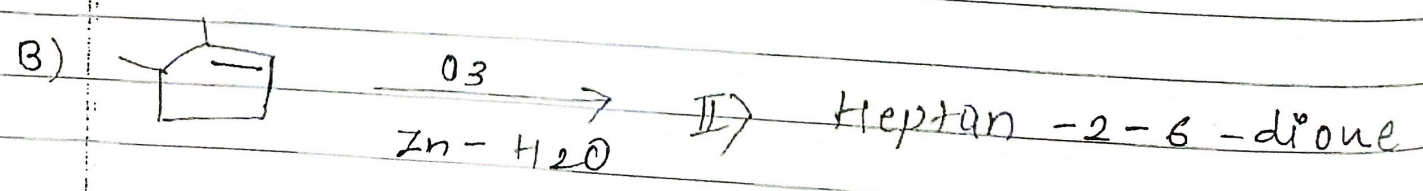
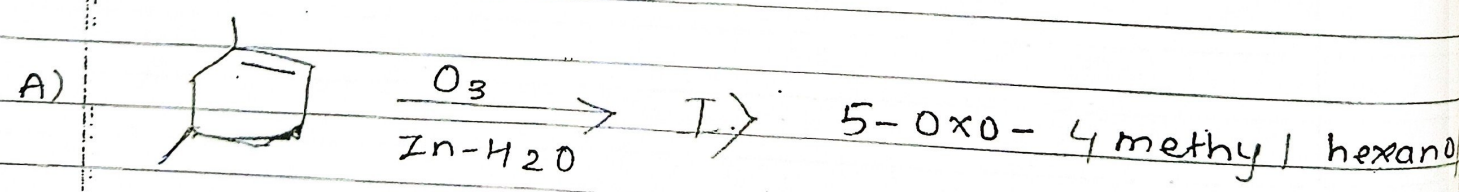
- 1) B and D D - chain isomers
- ~~2) A, C, and E~~ B - chain isomers.
- 3) A and C
- 4) B, C and E

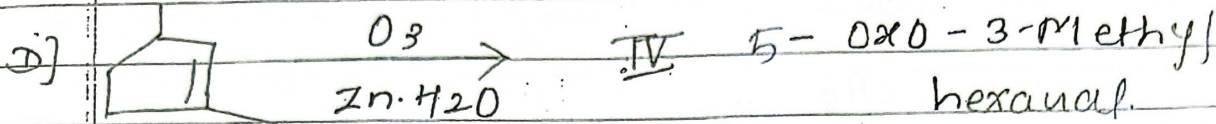
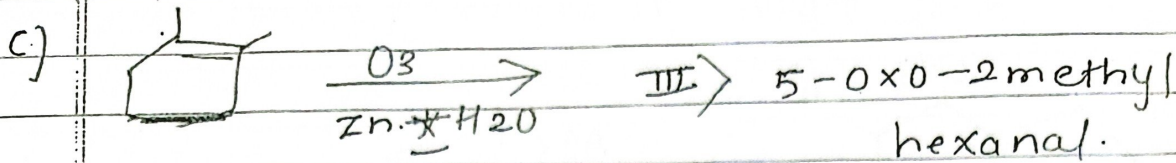
Q 32] List I

List - II

Reaction

product





A - III B - II C - I D - IV

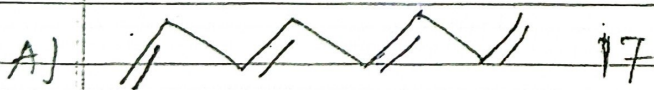
33. Which functional group activates benzene ring?

- 1) $-\text{SO}_3\text{H}$
- 2) $-\text{CN}$
- ~~3) NHCOCH_3~~
- 4) $-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$

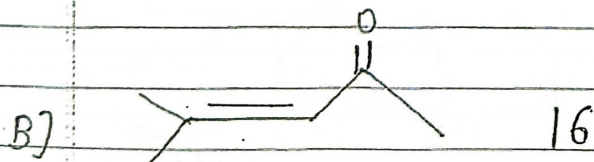
34] List (compound) I

List II

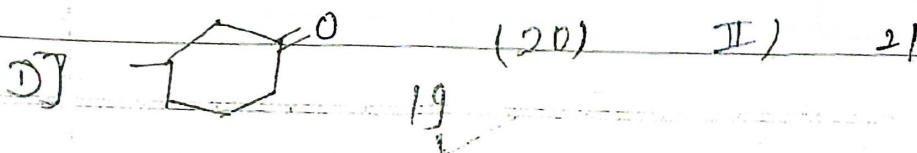
No. of sigma bonds



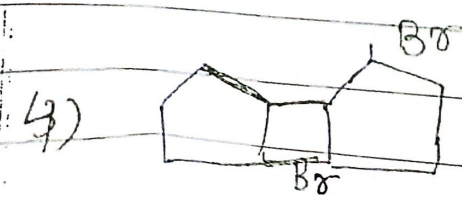
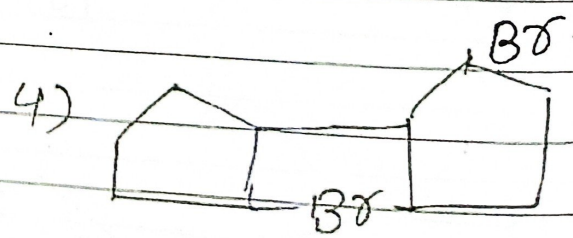
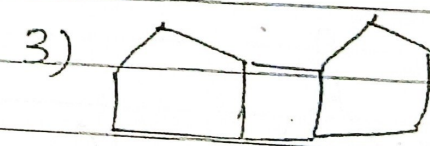
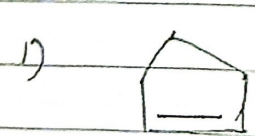
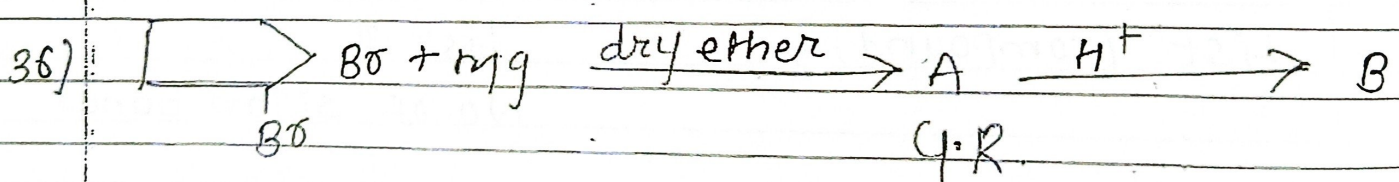
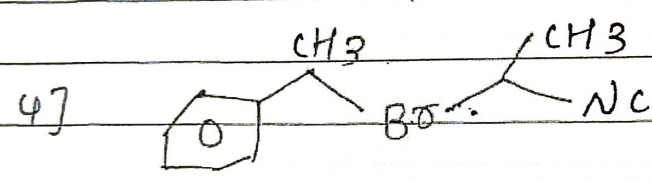
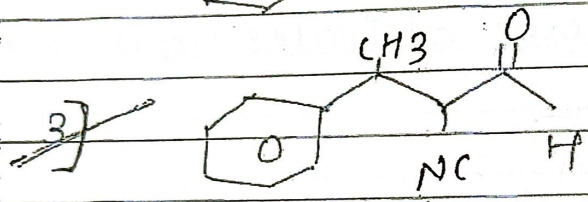
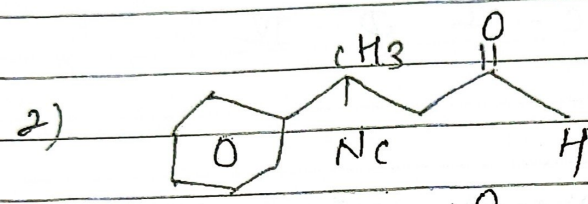
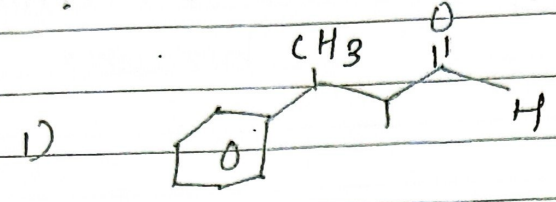
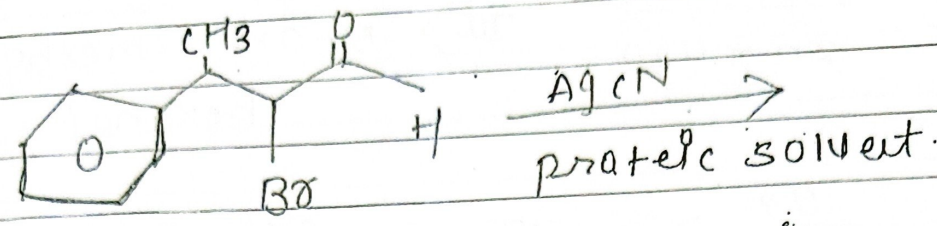
I) 20



II) 17



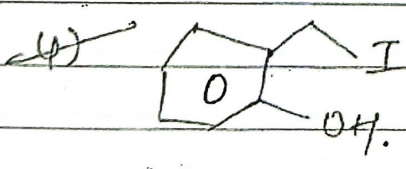
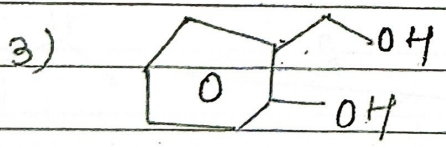
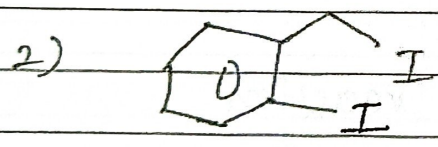
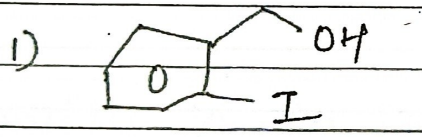
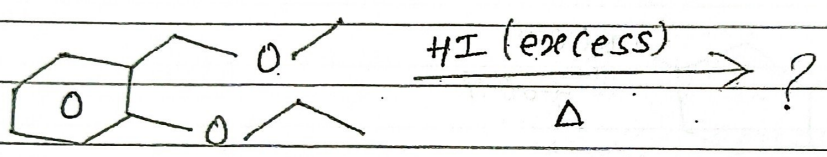
35) Identify the major product



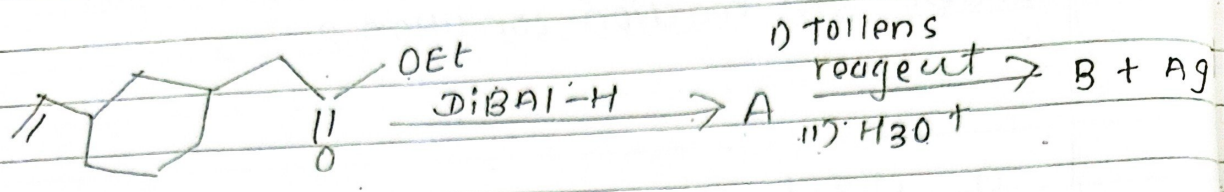
37) Which one Undergoes fastest solvolysis under S_N1 reaction condition?


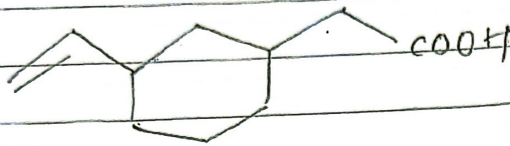
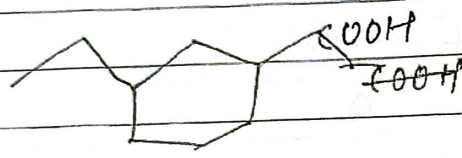
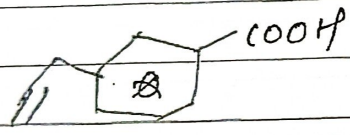
- 1) CH_3Cl
- 2) CH_3-CH_2-Cl
- 3) CH_3-O-CH_2-Cl
- 4) $CH_2=CH-Cl$

38) Identify product.

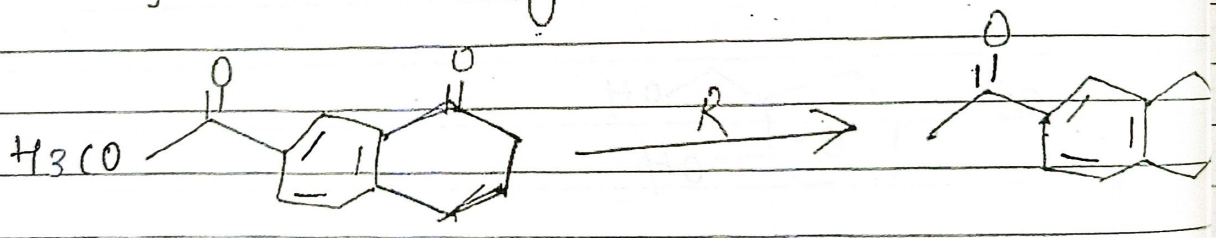


39 Identify 'B' in following.



- 1) 
- 2) 
- 3) 
- 4) 

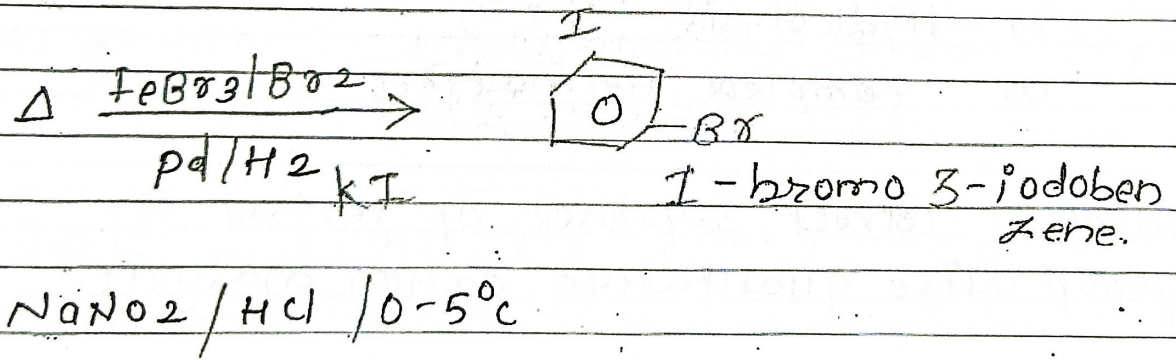
40 Identify 'R' in following reaction.



- 1) B_2H_6
- 2) LiAlH_4
- 3) $\text{NH}_2\text{-NH}_2$
- 4) Zn-Hg/HCl

- 41) List I List II
- | Reaction | Name of rxn |
|---|-----------------------|
| A) <chem>R-C(=O)-CH2-CH3</chem> $\xrightarrow{NaOB\ddot{r}}$ | I) Hoffmann Bromide |
| B) <chem>R-C(=O)-CH2-CH2-NH2</chem> $\xrightarrow[NaOH]{B\ddot{r}_2}$ | II) carbyl amine |
| C) <chem>H2N-CH2-CH2-CH2-CH2-NH2</chem> $\xrightarrow[NaOH]{CHCH_3}$ | III) Reimer & Timan |
| D) <chem>C1CCC(CC1)O</chem> $\xrightarrow[H_3O^+]{CHCl_3/NaOH}$ | IV) Haloform reaction |

42) Identify 'A' in following reaction



- ~~1) C1CCC(CC1)[N+](=O)[O-]~~ 3) C1CCC(CC1)Br
- 2) C1CCC(CC1)I 4) C1CCC(CC1)[N+](=O)[O-]Br

43) Match the List I & with List II

List I

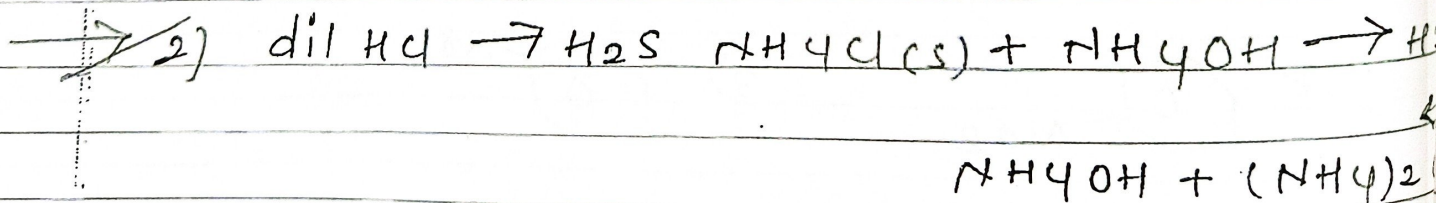
List II

- | | | | |
|---------|-----------------|------|------------------|
| III. A) | Insuline | I) | primary str. |
| IV B) | 14001 | II) | secondary str |
| I C) | polypeptide | III) | globular protein |
| II d) | α -helix | IV) | Fiber. |

44) At room temp group II sulphides are insoluble due to

- 1) High solubility product
- 2) Low solubility product
- 3) Hydrolysis
- 4) complex formation.

45) Identify correct sequence of reagent for group wise qualitative cation analysis.



1) What amount of CO_2 gas is produced by combustion of 16 kg methane & 24 kg of oxygen.

- ~~a) 375~~
- b) 625
- c) 4000
- d) 7500

2) Spherically symmetrical atomic orbital whose wave function has 3 radial nodes is

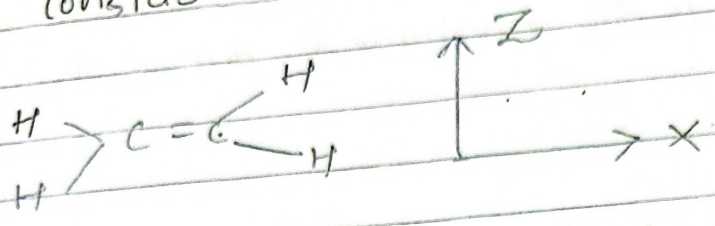
- ~~a) 4s~~
- b) sp
- c) 6d
- d) 5s

3) Assertion :- Dipole moment of both BF_3 & XeF_4 are zero

Reason :- Both BF_3 & XeF_4 are symmetrical molecules.

→ Both (A) & (R) are correct & (R) is correct explanation of (A)

4) Consider on ethylene molecules in αZ plane the atomic.



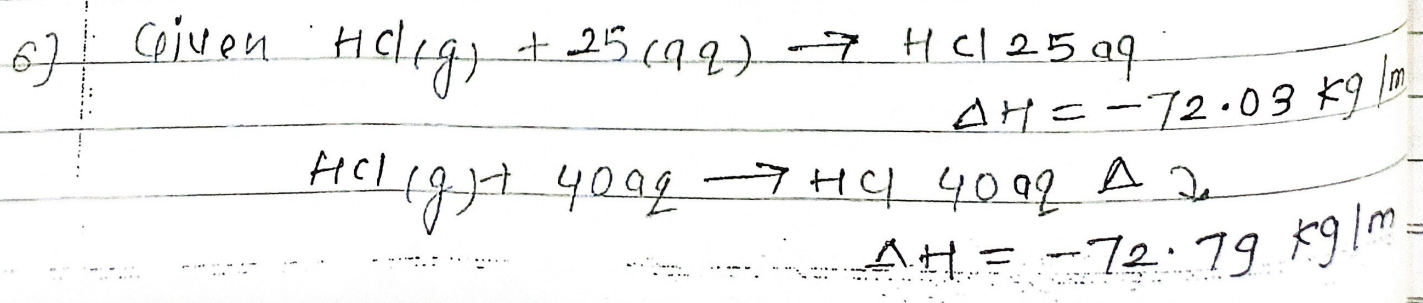
Orbitals on both carbons involved in the C-C π bond formation are labelled as

- $2p_x$
 - $2p_y$
 - $2p_z$
 - sp^2
- Unhybridised p orbital is $2p_y$ orbital which is form π bond & by lateral overlapping.

5) Which of the following is an extensive property?

- Temperature
- molar heat capacity
- Heat capacity
- molar volume

- Intensive
- Intensive
- Extensive
- Intensive



Reason :- enthalpy of dilution of solution is dependent on the original concentration of the solution & amount of solvent added.

$$\Delta H_{dil} = \Delta H_2 - \Delta H_1 = -72.79 - (-72.03) = 0.76 \text{ kJ/mol}$$

Both (A) & (R) are true
 (R) is correct explanation of (A)

7) 5 Lit ideal gas at 20 atmosphere expand isothermally at 27°C in vacuum until its total volume is 20 Lit. Which of the following is/are correct.

- is
- A) NO WORK done on by the system
 - B) NO heat is exchanged between system & surrounding
 - C) $\Delta U = 0$
 - D) It is an isothermal reversible change

1) A & B & D are correct

8) Arrange the following solution in order of van't Hoff factor.

- A) 0.04 M NaCl(aq)
- B) 0.01 M NaCl(aq)
- C) 0.001 M NaCl(aq)

D) 0.01 M K_2SO_4 (aq)
E) 0.001 M K_2SO_4 (aq)

- A) $A = B < E = D < C$
~~B) $A < B < C < D < E$~~
C) $D < E < A < B < C$
D) $E < D < C < B < A$

9. When 2 gm of organic solution X is added to 200g solvent Y, it causes depression in freezing point of 2K. If 4g of solvent X is dissolved in 200g of solvent Y it causes an elevation in boiling point of 2K. What is the relationship between k_b & k_f of Y?

a) $k_b = \frac{1}{4} k_f$

b) $k_b = 4 k_f$

~~c) $k_b = \frac{1}{2} k_f$~~

d) $k_b = 2 k_f$

10) 200 ml of 0.1 M CH_3COOH + 100 ml of 0.1 M $NaOH$
What is the pH of solution. ($pK_a = 4.75$)

a) 3.25

~~b) 4.75~~

c) 4.44

d) 5.05

11. List Statement K_{sp}

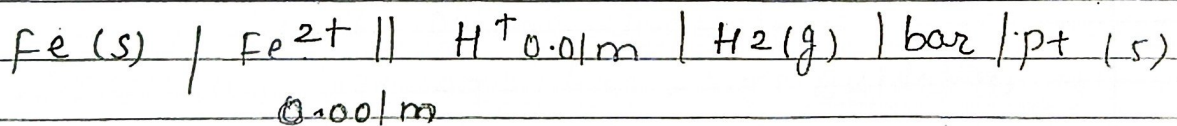
I	A x	i) 691257.
	A x 2	ii) 453
	A 2 x 3	iii) 52
	A 3 x 4	iv) 1085 ⁵

12) Assertion (A) - solubility of salt of weak (red acid) like phosphate increases at lower pH.

Reason (R) - At lower pH, conc. of anions or ions decreases due to its protonation which results in increase in solubility of salt.

Both (A) & (R) are True & (R) is correct explanation of (A)

13) Consider cell at 298 K.



[$E^\circ_{\text{Fe}^{2+}/\text{Fe}} = 0.440\text{V}$] EMF of cell in Volt is

- 1) ~~0.4105V~~
- 2) 0.4695V
- 3) 0.6500V
- 4) -0.4200V

14) $\overset{0}{\Lambda}m$ $CaCl_2$, CH_3COONa & $NaCl$ are x , y & z respectively $\overset{0}{\Lambda}m$ of calcium acetate is

1) $x + y - 2z$

2) $x + 2y - z$

3) $x + y - z$

4) $x + 2y - 2z$

15) $A \rightarrow B$ is a first order reaction. If 50% of A is converted to B in 25 min, how much of A would react in 100 minutes

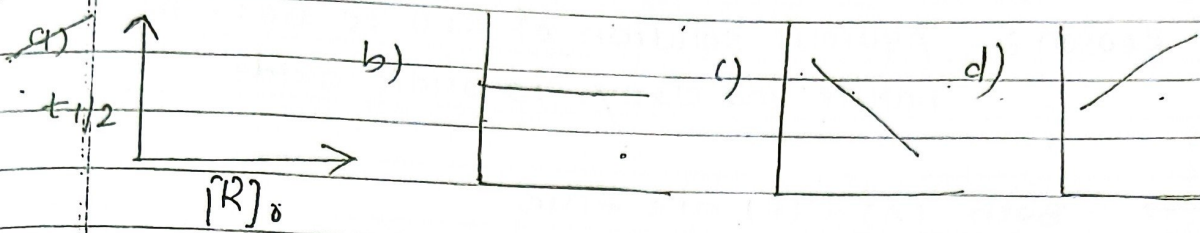
1) 6.25%

2) ~~93.75%~~

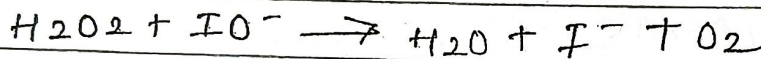
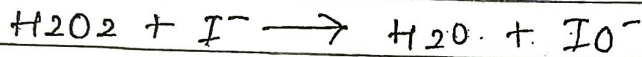
3) 87.50%

4) 75.00%

16) Which of the following graph between $t_{1/2}$ & $(A)_0$ represents zero order rxn.



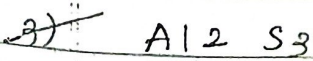
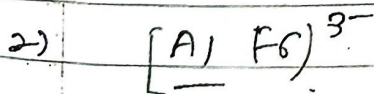
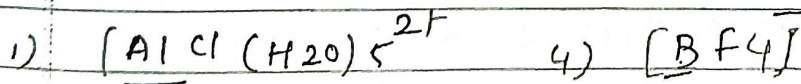
17) consider reactions



Which of the following options contain correct combination of catalyst and intermediate?

- a) catalyst — I^- Intermediate — IO^-
- b) — " — — IO^- — " — — I^-
- c) — " — — H_2O — " — — IO^-
- d) — " — — IO^- — " — — H_2O

18) Which of the following underlined element in given comp has same oxidation state and covalency?



19 Assertion: K_2O is basic oxide while Cl_2O_7 is an acidic oxide.

Reason: - Aqueous solution of K_2O is basic in nature and Cl_2O_7 is acidic oxide.

→ Both (A) & (R) are true and (R) is correct explanation of (A)

20] Which of the following group contain only pretransition

A) 1) Si, As, At

B) 2) Te, Po, Tc transition metal

C) 3) Sb, Te, Ti ———

D) 4) Si, Ge, Sb

E) 5) Se, Si, At non metal

1) D only

~~2) A and D~~

3) A, B and E

4) C and D

21) Identify correct increasing order of field strength

1) $F^- < OH^- < S^{2-} < NCS < NH_3$

~~2) $SCN^- < S^{2-} < OH^- < NCS < CN^-$~~

3) $I^- < Br^- < Cl^- < F^- < SCN^-$

4) $NCS < NH_3 < EDTA^{4-} < C_2O_4^{2-} < CN^-$

22 Identify true option for Nitrogen

- 1) It's maximum covalency is 3
- 2) It can use p and sp orbitals for bonding.
- ~~3) It can form $p\pi-p\pi$ multiple bonds~~
- 4) Nitrogen exhibits +5 oxidation state. \therefore From stable pentahalides.

23) Identify least ~~total~~ volatile element.

- 1) Zn
- ~~2) Ti~~
- 3) Hg
- 4) Cd.

24) List I
salt

List II
colour.

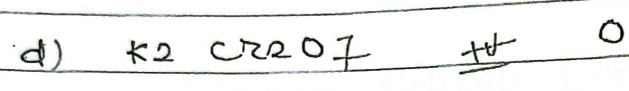
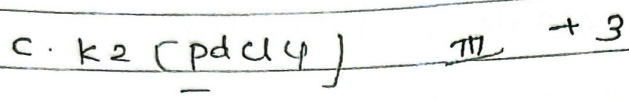
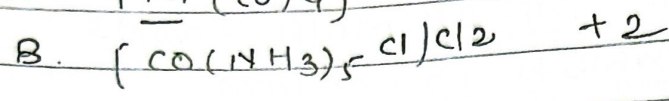
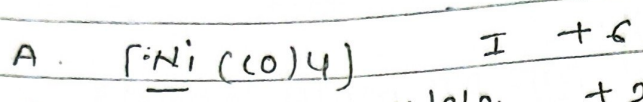
- | | | |
|-------------------------|-----|------------|
| A) PbO_2 | I | Black |
| B) $ZnSO_4$ | II | Blue |
| C) HgS | III | Yellow |
| D) $CuSO_4 \cdot 5H_2O$ | IV | colourless |

25) List I

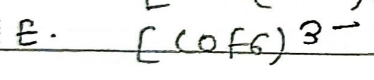
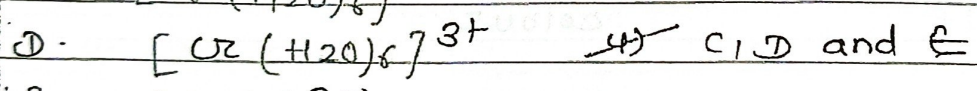
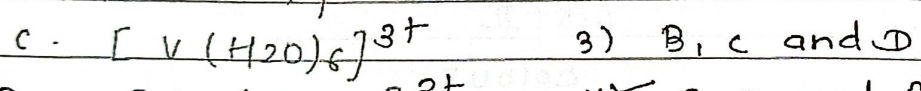
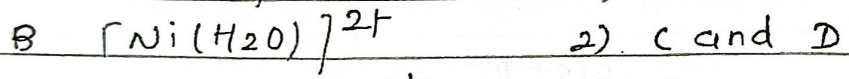
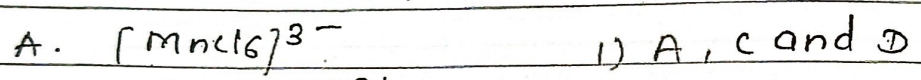
List II

- | | |
|--------------|-------------------|
| A) TiO_2 | Amphoteric oxide |
| B) Mn_3O_4 | Interstitial comp |
| C) Cr_2O_3 | chromite Ox |
| D) Fe_3O_4 | Mixed oxide |

26) List I List-II
 O.S.
 O.S. of underlined element.



27) Which of the following examples of inner orbital complexes?



28) Identify the correct statement regarding purification of organic comp

A) Aniline can be purified by steam distillation

B) ~~Bubb~~ Bubble plate column is suitable for steam distillation

C) fractional distillation is use for separating two liquids having low difference in B.P.

D) Activated charcoal is always used in organic purification.

E) separating funnel is used to perform differential extraction

1) A, B and D

2) C only

~~3) A, C and E.~~

4) A only

29. An organic compound is heated with Na_2O_2 . The obtained compound was boiled with HNO_3 and treated with ammonium molybdate, this reaction gives yellow precipitate correct formula of X is

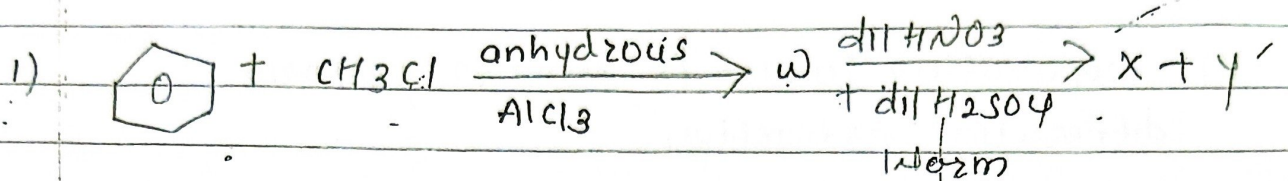
~~1) $\text{C}_{18}\text{H}_{12}\text{P}_4\text{Cl}_3$~~

2) $\text{C}_7\text{H}_5\text{N}_5$

3) $\text{C}_7\text{H}_7\text{Br}_5$

4) $\text{C}_6\text{H}_6\text{Br}_4\text{N}$

1) Which of the following compounds



The suitable method that can be used for separation of X & Y is

- 1) Sublimation
- 2) continuous extraction
- 3) Fractional distillation
- 4) Differential extraction

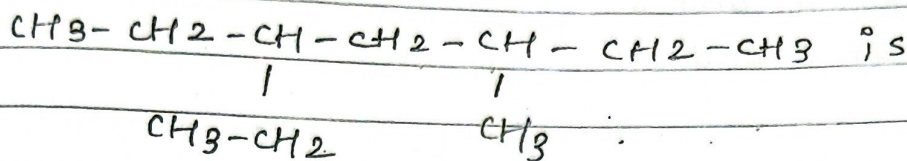
2) During Lassaigne's test, elements present in an org. compound are converted from

- 1) ~~covalent~~ covalent form to ionic form
- 2) Ionic form to covalent form
- 3) Ionic form to ionic form
- 4) covalent form to covalent form

3) pair of molecules that are metamers among the following is

- 1) CH3-CH2-CH2-CH2-CH3 and (CH3)2CHCH2C
- 2) CH3CH2CH2OH & CH3CH(OH)CH3
- 3) CH3-C(=O)-CH3 and CH3CH2-C(=O)-OH
- 4) CH3-O-CH2CH2CH3 and CH3CH2OCH2C

4) IUPAC name of



- 1) 2, 4-Diethyl hexane
- ~~2) 3-ethyl-5-methyl heptane~~
- 3) 3-methyl-3-ethyl heptane
- 4) 3, 5-Diethyl hexane

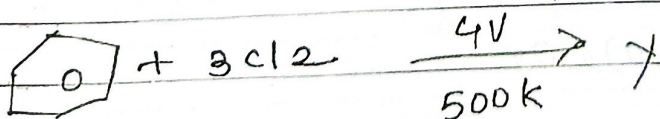
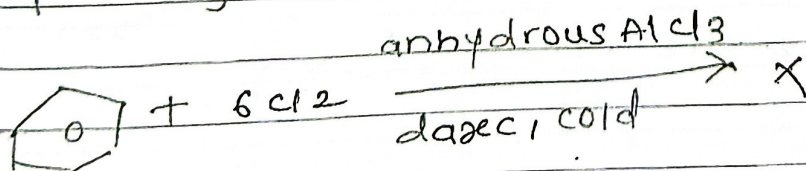
5) Methane react with steam at 1273K in presence of Ni catalyst to form.

- ~~1) CO and H₂~~
- 2) CO₂ and H₂
- 3) CO₂ and H₂O
- 4) CO and H₂O

XI II

304

6) The number of chlorine atoms present in the organic products x & y of the following reaction respectively are



- 1) 6 and 9
- 2) 3 and 9
- 3) 3 and 6
- 4) 6 and 6

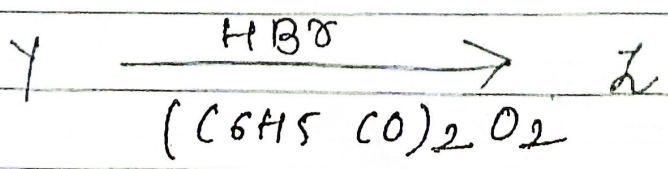
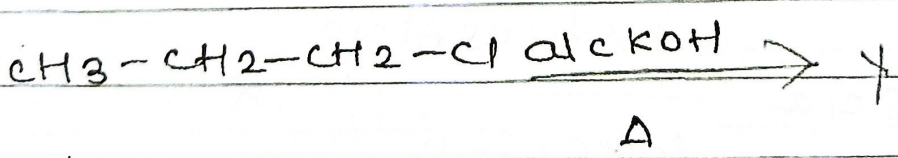
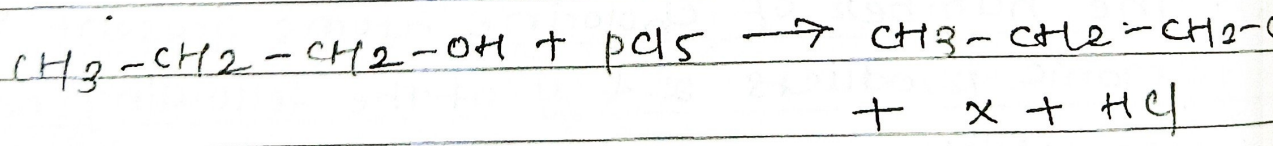
323
320

7) phenolphthalein is used as an indicator for titration of NaOH solution against standard solution of oxalic acid

The colour change is observed at an alkaline pH close to the equivalence point during titration is.

- 1) colourless to pink
- 2) pink to colourless
- 3) yellow to pinkish red
- 4) pinkish red to yellow.

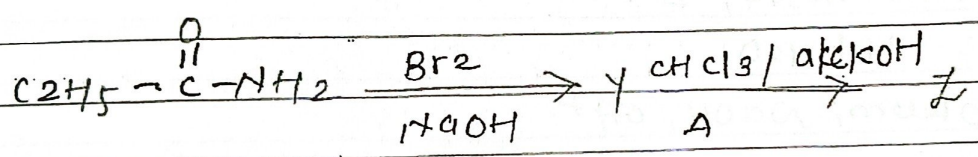
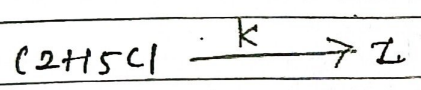
8) In following reaction sequence X, Y respectively



- 1) $X = POCl_3$ $Z = CH_3CH_2CH_2Br$
- 2) $X = H_3PO_3$ $Z = CH_3CH_2CH_2Br$
- 3) $X = POCl_3$ $Z = CH_3 - \underset{\substack{| \\ Br}}{CH} - CH_3$
- 4) $X = H_3PO_3$ $Z = CH_3 - \underset{\substack{| \\ Br}}{CH} - CH_3$

169 $X = POCl_3$ $Y = \text{propene}$ $Z = 1 \text{ bromo propane}$

9) Following 2 reactions are given which give same foul smelling prod. Z

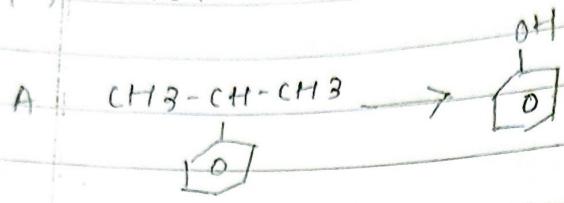


X and Z are

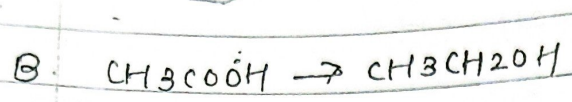
- 1) $X = KCN$ $Z = C_2H_5NC$
- 2) $X = KCN$ $Z = C_2H_5CN$
- 3) $X = AgCN$ $Z = C_2H_5NC$
- 4) $X = AgCN$ $Z = C_2H_5CN$

List II

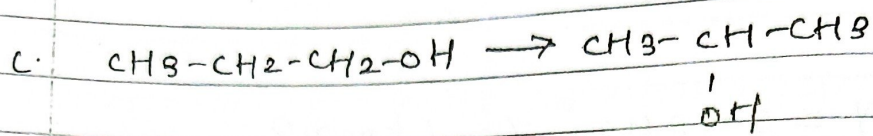
10) List I



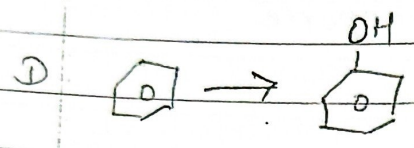
I. oleum
 $\text{NaOH}, \Delta, \text{H}^+$



II $\text{O}_2, \text{H}_2\text{O} / \text{H}^+$



III. $\text{CH}_3\text{OH}, \text{H}^+$
 H_2 catalyst.



IV conc. $\text{H}_2\text{SO}_4, \Delta$
 $\text{H}^+ / \text{H}_2\text{O}$

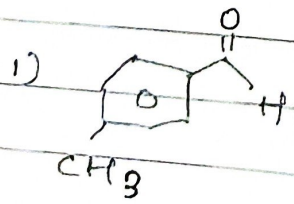
\rightarrow I) $\text{O}_2, \text{H}_2\text{O} / \text{H}^+$

II) $\text{CH}_3\text{OH}, \text{H}^+ / \text{H}_2$ catalyst

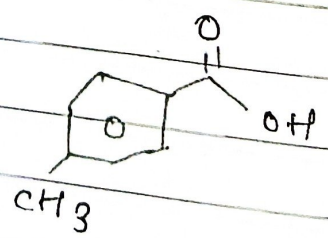
III) conc. $\text{H}_2\text{SO}_4, \Delta$
 $\text{H}^+ \text{H}_2\text{O}$

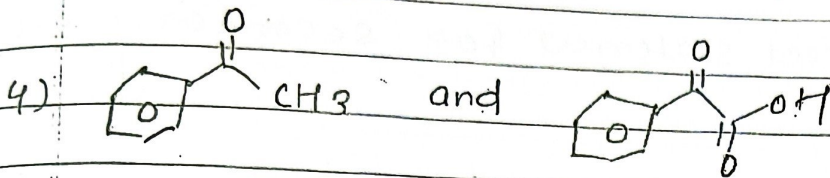
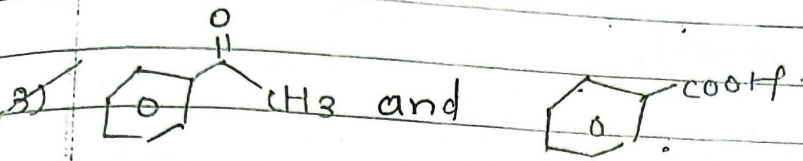
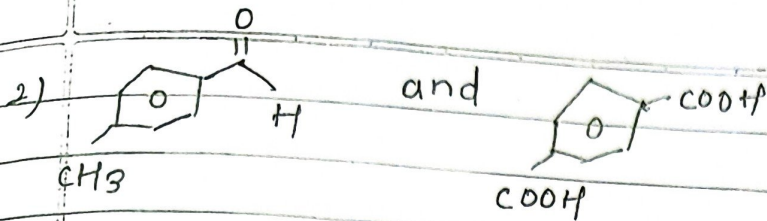
IV oleum, NaOH, OH^+

11) compound P ($\text{C}_8\text{H}_{16}\text{O}$) gives red org. orange ppt with 2,4-DNP and it does not reduce feheling solution. on drastic oxidation with chromic acid P gives chromatic product Q that product P & Q are respectively are



and





12. Select the reagents that reduce nitriles to primary amines

A. LiOH, H₂O

B. Sn + HCl

C. H₂/Ni

D. Na (Hg) / C₂H₅OH

E. B₂/aq. NaOH.

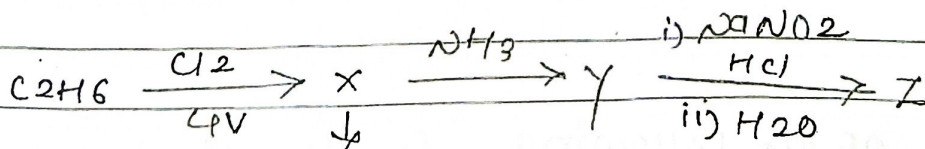
1) A, B and C

2) A, C and D

3) A, D and E

4) B, D and E

13) What is Z in following



monochlorinated
product

- 1) $C_2H_5NO_2$
- 2) $C_2H_5NH_2$
- ~~3) C_2H_5OH~~
- 4) $C_2H_5-N=N-OH$

14. Identify correct statement for secondary structure of DNA/RNA.

- 1) DNA possesses a double strand helix structure and contain thymine as one of four bases
- 2) DNA possesses a single strand helix structure and contain uracil as one of the four bases.
- 3) RNA possess a single strand helix structure contain thymine as one of the four bases.
- 4) RNA posses a double strand helix structure and contain ~~the~~ uracil as one of four bases.

- 1) correct
- 2) DNA double strand with thymine
- 3) RNA single strand with uracil
- 4) RNA - single strand with uracil

XII

299

15) Which of the following functional group can be identified by phthalein dye test.

1) $-COOH$

2) $-OH$

~~3)~~ phenolic $-OH$

4) $-CHO$

16) When 1 dm³ of CO₂ gas is passed over hot calc. the volume of gaseous mixture after complete re. at STP becomes 1.4 dm³. The composition of gaseous mix at STP is

- 1) 0.8 dm³ CO, 0.8 dm³ CO₂
- 2) 0.8 dm³ CO, 0.6 dm³ CO₂
- 3) 0.6 dm³ CO, 0.8 dm³ CO₂
- 4) 0.6 dm³ CO, 0.4 dm³ CO₂

17. How many no. of H atoms are present in 5.4 g of Urea (m.m = 60, N_A = 6.022 × 10²³)

- 1) 1.084 × 10²³
- 2) 1.084 × 10²²
- 3) 2.168 × 10²³
- 4) 2.168 × 10²²

18) List I

(Q no)

List II

(Orbitals)

A	n=2, l=1	I	3d
	n=4, l=0	II	2p
	n=5, l=3	III	4s
	n=3, l=2	IV	5f

n=2, l=1 → 2p

n=4, l=0 → 4s

n=5, l=3 → 5f

n=3, l=2 → 3d

19. A bulb is rated as 150 watt, converting 8.1 g energy as light. If energy of the photon is $4.42 \times 10^{-19} \text{ J}$, how many photons are emitted by the bulb per second?

- 1) 27.2×10^{19}
- ~~2) 2.71×10^{19}~~
- 3) 1.35×10^{19}
- 4) 4.06×10^{19}

20) At a certain temp T (K) during a process 500 J is absorbed by a system and work of 200 J is done by system.

ΔU is

- 1) 700 J
- ~~2) 300 J~~
- 3) 400 J
- 4) 500 J

21) For $2A(g) + 2D(g) \quad \Delta U^\circ = -10 \text{ kJ}$
 $\Delta S^\circ = -44 \text{ J/K/m}$

at 298 K. Identify correct option with ΔG° for the reaction and spontaneity of the reaction at 298 K ($R = 8.31 \text{ J/K/m}$)

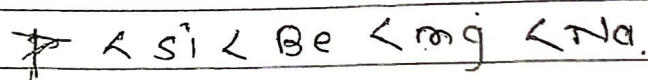
- DATE
- 1) $+ 0.63568 \text{ kJ/m}$ Non spontaneous
 - 2) $+ 0.63568 \text{ kJ/m}$ spontaneous
 - 3) $- 1.635 \text{ kJ/m}$, Non spontaneous
 - 4) $+ 1.635 \text{ kJ/m}$, spontaneous.

22) Identify reaction for which $K_p \neq K_c$

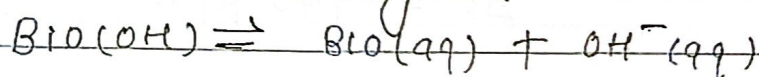
- 1) $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$
- ~~2) $\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}(\text{g})$~~
- ~~3) $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$~~
- 4) $\text{H}_2\text{O}(\text{g}) + \text{CO}(\text{g}) \rightleftharpoons \text{H}_2(\text{g}) + \text{CO}_2(\text{g})$

$$(3) \Delta n_g = -2$$

23) Arrange the following elements in increasing metallic character. Na, Be, P, Mg and Si



24) In qualitative analysis Bi^{3+} is detected by appearance of ppt of $\text{BiO}(\text{OH})$ (s). Calculate the pH when following equilibrium exists at 298K



$$K = 4 \times 10^{-10}, \log 2 = 0.3010$$

1) 4.699

~~2) 9.301~~

3) 5.286

4) 8.714

25) At 298 K buffer solution contain equal conc. of X^- and HX . K_b for X^- is 10^{-10} , what is pH of buffer solution

- 1) 6
- ~~2) 4~~
- 3) 2
- 4) 10

26) Mixture of $CHCl_3$ and CH_3COCH_3 forms a solution with negative deviation from Raoult's law due to.

- 1) formation of H bonding between $CHCl_3$ and CH_3COCH_3
- 2) Repulsive forces
- 3) Increase in escapicity tendency of molecules of each component
- 4) stronger intermolecular factor behaves $CHCl_3$ molecules than $CHCl_3$ and CH_3COCH_3 molecule

XII
14

27) Identify correct statement is

A. molality of 2.5 g of ethanoic acid (60) in 75 g benzene solution is 0.556 m

- B. Molarity of solution having 5g of NaOH (molar mass 40) in 450 ml of solution is 0.278 M at 298K.
- C. Aquatic species are more comfortable in cold water.
- D. Solubility of gas increases with decrease in pressure in pressure
- E) For binary mixture of A & B, no. of moles of A & B are n_A & n_B respectively. Then mole fraction of B will be $X_B = \frac{n_B}{n_A + n_B}$

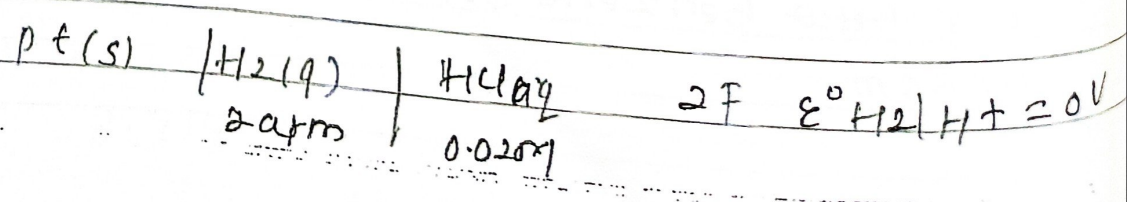
- 1) A & B
 2) A & C
~~3) A, B and C~~
 4) A and E

28) $CuSO_4$ soln is electrolysed for 10 minute with 1.5 amp current, mass of copper deposited at cathode is

(molar mass of Cu = 63)
 (1 Faraday = 96487C)

- ~~1) 0.2938g~~
 2) 0.5876g
 3) 2.4031g
 4) 1.7018g

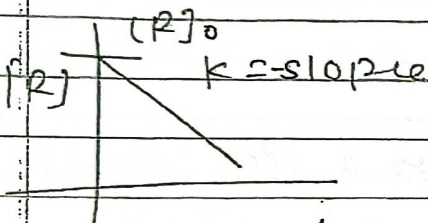
29. calculate emf of half cell



(Given $\frac{2.303 RT}{F} = 0.059$
 $\log 2 = 0.3010$)

- 1) ~~0.109V~~
- 2) -0.035V
- 3) 0.035V
- 4) -0.109V.

30) For a reaction $R \rightarrow P$, plot of $[R]$ vs time has negative slope as shown



The order of reaction is

- 1) 2
- 2) 1
- 3) ~~0~~
- 4) 2.5

31) List I (order of reaction) List II (unit of k)

A. 0	I	$\text{mol}^{-1} \text{L s}^{-1}$
B. 1	II	$\text{mol}^{-2} \text{L}^2 \text{s}^{-1}$
C. 2	III	s^{-1}
D. 3	IV	$\text{mol L}^{-1} \text{s}^{-1}$

- IV $\text{mol L}^{-1} \text{s}^{-1}$
- III s^{-1}
- I $\text{mol}^{-1} \text{L s}^{-1}$
- II $\text{mol}^{-2} \text{L}^2 \text{s}^{-1}$

32) Equation for rate constant for a first order reaction with T is.

$$\ln k = 14.34 - \frac{1.25 \times 10^4}{T}$$

Eq. for this reaction in kcal is
 (Given $R = 1.98 \text{ cal mol}^{-1} \text{K}^{-1}$)

- 1) 12.42
- 2) 18.63
- ~~3) 24.84~~
- 4) 14.34

33

List I
 (compound)

List II
 (no. of bond)

A. C_2H_4

I. 3σ and 2π

B. C_2H_2

II. 3σ and one lone pair

C. CH_4

III. 4σ

D. NH_3

IV. 5σ and 1π

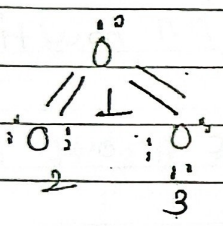
$H_2C=CH_2 - 5\sigma, 1\pi$

$HC\equiv CH - 3\sigma, 2\pi$

$CH_4 - 4\sigma$

$NH_3 - 3\sigma, 1$ lone pair

34)



formal charge on O atoms
 numbered 1, 2, 3, respectively
 are

1) 0, 0, 0

2) -1, 0, +1

3) +1, 0, -1

4) 0, +1, -1

35. Identify correct statement for ClF_3 from following.

1. It has trigonal pyramidal geometry with 2 lone pair on Cl atom

2. T shaped geometry with 3 L.p. on Cl

~~3. T shaped geometry with 2 L.p. on Cl atom~~

4) planar trigonal geometry with 2 L.p. on Cl atom.

36. Identify incorrect statement from following

- 1) Similarity in behaviour of Li and Mg is referred as diagonal relationship.
- 2) Oxidation state and covalency of Al in $[AlCl_4]^-$ are 3 and 6 respectively.
- 3) IUPAC name of element with atomic number 107 is unnilseptium
- 4) The largest and smallest species among Mg , Mg^{2+} , Al , Al^{3+} are Al and Mg^{2+} respectively.

37. Identify incorrect statement.

- 1) Carbon has ability to form $p\pi-p\pi$ multiple bonds with itself.
- 2) Order of catenation property of group 14 element is $C \gg Si > Ge = Sn$
- 3) ECl_3 ($E = B$ and Al) is a monomer atom $E = B$ and a dimer when $E = Al$
- 4) $P(C_2H_5)_3$ and $As(C_2H_5)_3$ form $d\pi-d\pi$ bonds with transition metal.

38. Calculate spin only magnetic moment of Ti^{2+} in PS

- 1) 3.87 BM
- 2) 4.90 BM
- 3) 2.84 BM
- 4) 5.92 BM

39

List I

Transition metal /
compound / complex.

List II

catalytic role

- | | | | |
|---------------|------------|-----|--|
| A. | V_2O_5 | I | preparation of NH_3 from N_2 & H_2 |
| B. | | | |
| B | Fe | II | polymerisation of alkyne |
| C. | $PdCl_2$ | III | preparation of H_2SO_4 from SO_2 |
| D | Ni complex | IV | oxidn of ethyne to ethanal |

III - prepn of H_2SO_4 from SO_2

I = prepn of NH_3 from N_2 & H_2

IV = oxidn of ethyne to ethanal

II = polymerisation of alkyne

40. Although +3 o.s. most common in lanthanoids, cerium still show +4 o.s. because.

- 1) It's atomic number is 58
- 2) After losing 1 more electron it acquires $4f^1$ electronic configuration.
- 3) After losing 1 more electron, it acquires $4f^0$ electronic configuration.
- 4) Its nearest inert gas is radon.

41) Which is ambidentate ligand.

- 1) Ethane-1,2-diamine
- 2) Oxalate
- ~~3) Thiocyanate~~
- 4) EDTA ion

42. List I List
 complex / ion shape, geometry

A $[Pt(Cl)_2(NH_3)_2]$ I Octahedral

B $[Co(NH_3)_6]Cl_3$ II trigonal bipyramidal

C $[NiCl_4]^{2-}$ III square planar

D $[Fe(CO)_5]$ IV Tetrahedral.

III square planar

I octahedral.

IV Tetrahedral

II trigonal bipyramidal

43) List I List II
 complex (isomerism)

A) $[Pt(NH_3)_2Cl_2]$ III Geometry (cis, trans)

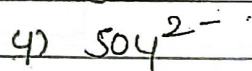
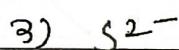
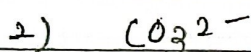
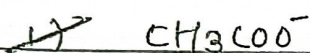
B $[Co(en)_3]$ I Optical

C $[Co(NH_3)_5NO_2]Cl_2$ IV linkage {

- N (nitro)
- O (nitrito)

1) D. $[Cr(H_2O)_6]Cl_3$ II sulfate

44) In test tube containing a salt few drops of dil H_2SO_4 were added, which give colourless vapours having smell of vinegar, the vapours turns blue litmus paper red, identify correct anion from following



45) Identify incorrect statement from following.

1) N can form $p\pi - p\pi$ multiple bonds with itself.

2) P, S and Sb show catenation property

3) N can form $d\pi - p\pi$ bond with oxygen

4) P $(C_2H_5)_3$ and As $(C_6H_5)_3$ form forms $d\pi - d\pi$ bond with transition metals.

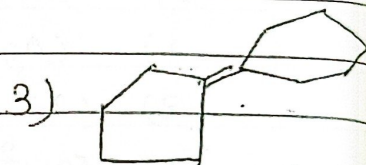
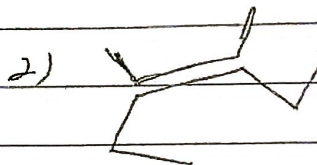
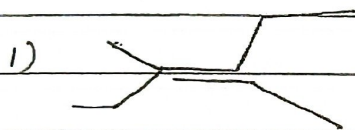
31) An Org compound contains 69.1% C, 4.8% H and remaining oxygen. calculate the masses of CO₂ and H₂O produced when 0.20g this substance is subjected to complete combustion

→ CO₂ = 0.506g, H₂O = 0.0864g

32) calculate Rf value of a sample 'A' in given diagram

→ 0.81

33) which is trans alkene



1) Trans 2) cis, 3) cis, 4) cis

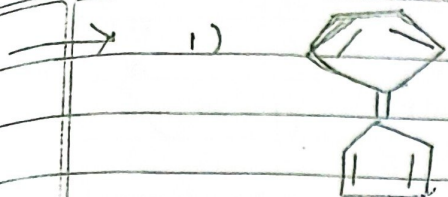
spiro no trans/cis

34) what is IUPAC name of

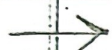


→ pent-2-ene-4-yn-1-ol

35) which is most stable



36. Identify the optically active compound having lowest molecular weight

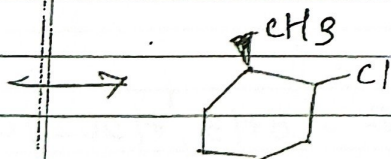
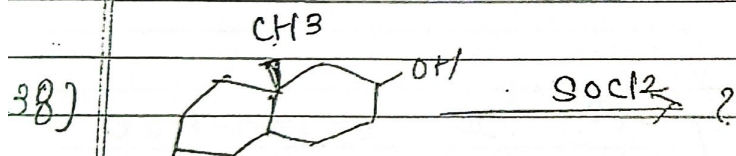


2,3-Dimethyl pentane

37) Ozonolysis of 'A' followed by treatment with Zn-H₂O gives one mole of CH₃CHO & one mole of pentane -2-one

What is A?

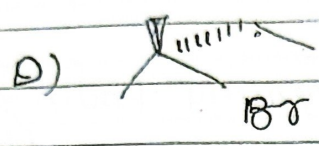
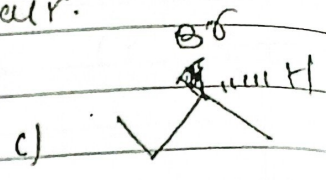
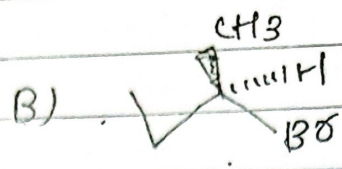
→ 3-methyl hex-2-ene



39) NH₄Cl is added before NH₄OH in gr. III analysis to.

→ control ionisation of NH₄OH

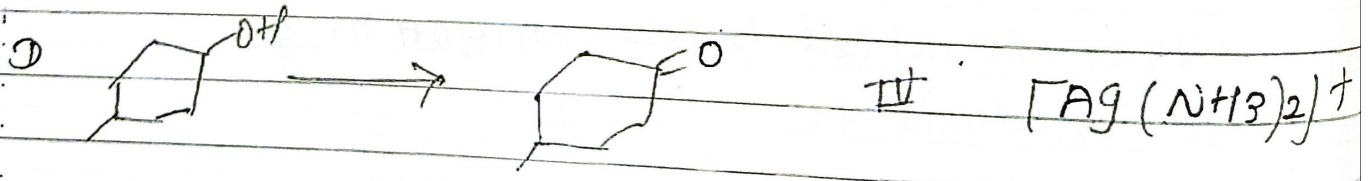
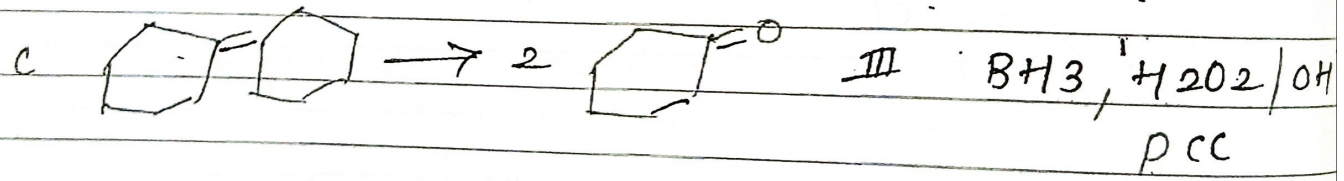
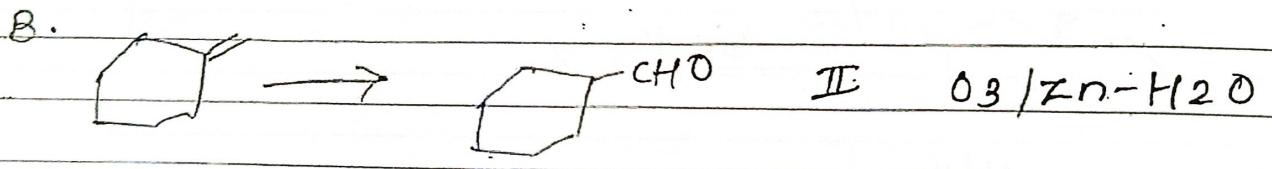
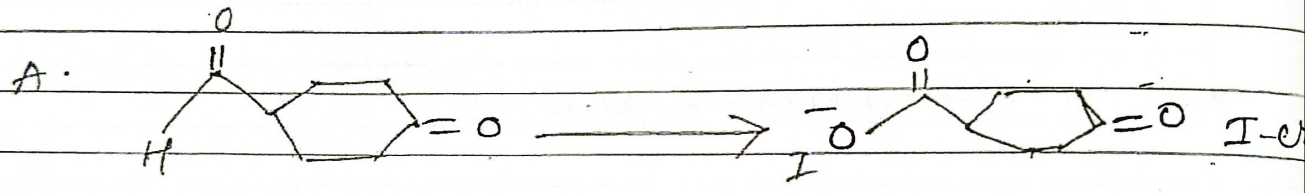
40 Identify the correct enantiomeric pair.



- a) A & B
- ~~b) A and C~~
- c) B and D
- d) A and D

Q1 List I
Reaction

List II
Reagent



→ A → IV $[Ag(NH_3)_2]^+$
 B → III BH_3, H_2O_2, OH^-, PCC
 C → II $O_3, Zn-H_2O$
 D → I CrO_3

Q42

List I

List II)

(formula)

(name)

A. $Al-H(i-Bu)_2$ I phosgene

B. $COCl_2$ II Heinsberg

C. $PhCH(CH_3)_2$ III DIBAL-H

D. $PhSO_2Cl$ IV cumene

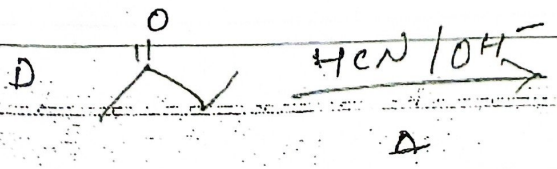
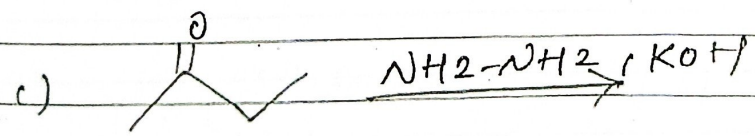
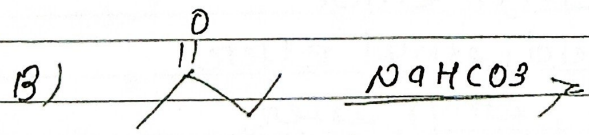
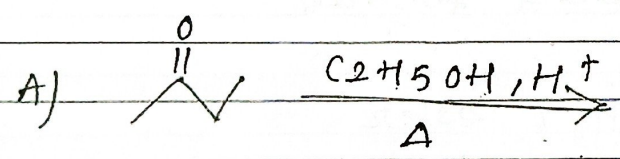
A - III DIBAL-H

B - I phosgene

C - IV cumene

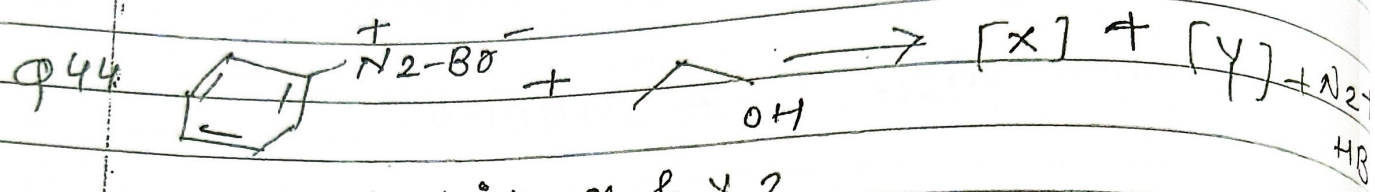
D - II Heinsberg

Q43 Identify the reaction given product with chiral carbon.





- 1) A, B and C
- 2) B, C and D
- 3) B, D and E
- 4) D and E



What are X & Y?

- 1) Ethyl phenyl ether, CH_3CHO
- 2) Ethyl benzene, water
- 3) Benzene, CH_3CHO
- 4) Benzene, Diethyl ether

45) Ethyl-5-amine-2-bromopentanoate & Ethyl-2-amine-5-bromopentanoate are independently treated for intramolecular substitution reaction; what are the products formed?

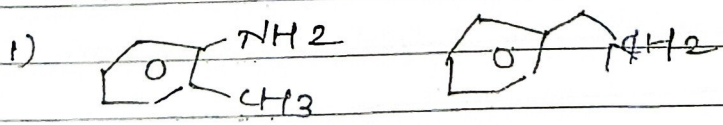
- 1) proline, ethyl ester
- 2) Histidine, ethyl ether
- 3) glutamic acid, ethyl ester
- 4) Tryptophan, ethyl ester.

Q1. correct statement for carbohydrates

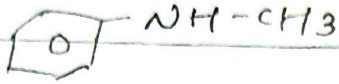
- A) glucose on treatment with Br_2/H_2O followed by NH_2OH gives oxime.
- B) glucose on treatment with HNO_3 gives saccharic acid.
- C) prolonged heating of glucose with HI gives cyclohexane
- D) lactose is composed of β -D galactose & β -D glucose
- E) Acylation of glucose with acetic anhydride gives glucose pentaacetate

- 1) A, B and E
- ~~2) B, D and E~~
- 3) B, C and E
- 4) A, B & D.

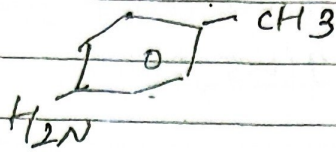
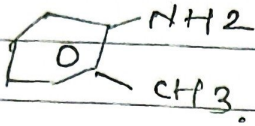
Q2. Two isomeric compounds A and B with molecular formula C_7H_9N undergoes diazotisation to give C and D
 C react with N,N Dimethyl amine but D does not. what are A and B resp.



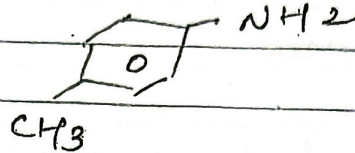
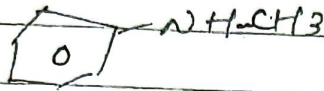
2)



3)



4)



Q3) In a fully double stranded DNA structure of mole fraction of glucose is 0.29 total base then what will be the mole fraction of adenine w.r.t. total base?

1) 0.2

~~2) 0.3~~

3) 0.4

4) 0.8

Q4)

Assume that C^{12} (at. mass = 12u) and C^{13} (at. mass = 13u) are the only isotopes of carbon. If the average atomic mass of C is 12.011u then percentage of C^{13} carbon in carbon is closest to

~~1) 1.1~~

2) 0.011

3) 0.092

4) 1.0

5) Assertion % Maximum no. of electrons in a shell with principle quantum number n is $2n^2$

Reason :- pairing of electron in the orbitals belonging to some subshell does not of the subshell is singly occupied.

(A) and (R) is True but (R) is not explanation of (A)

Q6) Statement I. $3d_{z^2}$ orbitals has two angular momentum nodes.

Statement II In $3d_{xy}$ orbitals there are two angular nodal planes passing through origin and bisecting the xy plane containing z -axis.

→ Both are true

7. which of the following statement are incorrect for σ_{1s} and σ_{1s}^* for hydrogen molecule?

- 1) the wave function σ_{1s} is symmetrical about the internuclear axis.
- 2) the wave function of σ_{1s}^* is symmetrical about the internuclear axis
- 3) The

- 3) The electron density corresponding to σ is has a nodal plane between the two nuclei
- 4) The electron density corresponding to σ^* is has a nodal plane between the two nuclei.
- 8) Equation for max work of isothermal reversible expansion of a gas is $(V_f \gg V_i)$

$$\ln = -2.303 nRT \log \frac{V_f}{V_i}$$

9) which equations represents positive entropy change?

- A) $2Cl(g) \rightarrow Cl_2(g)$
- B) $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$
- C) $H_2O(l, 100^\circ C) \rightarrow H_2O(s, 0^\circ C)$
- D) $2Fe(s) + 3O_2(g) \rightarrow 2Fe_2O_3(s)$

- 1) A and B
 2) B and C
 3) B, C and D
 4) only B.

10) List I

List II

- A) $\Delta_r H^\circ = -ve, \Delta_r S^\circ = +ve$ I. Reaction non-spontaneous at all Temp.

- B. $\Delta_r H^\circ = -ve$, $\Delta_r S^\circ = -ve$ II R_{exn} is spont at high temp
- C. $\Delta_r H^\circ = +ve$, $\Delta_r S^\circ = +ve$ III R_{exn} is spontaneous at low temp.
- D. $\Delta_r H^\circ = +ve$, $\Delta_r S^\circ = -ve$ IV R_{exn} is spontaneous at all temp.

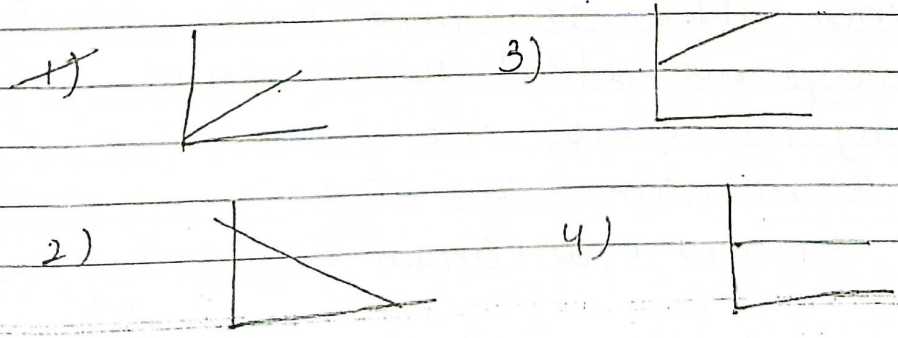
- A = IV - spont
- B = III
- C = II
- D = I -

11) Assertion. When we place blood cell in a 1.1% (m/v) NaCl solution H₂O will flow out of the cells and they would shrink.

Reason - 1.1% NaCl solution is hypotonic w.r.t. fluid inside the blood cells.

(A) True (R) False

12) Which graph correctly represents $\log p$ (partial pressure of gas A in v.p. above the solution) y-axis v $\log x$ (mole fraction of gas A in solution) x axis.



XII / 10.

13) Henry's constant for gases at T (K) in aqueous solution are given below.

- A) Ar = 40.3 kbar
 - B) CO₂ = 1.67 kbar
 - C) HCHO = 1.83×10^{-15} kbar
 - D) CH₄ = 0.413 kbar
 - E) Vinyl chloride = 0.611 kbar
- Arrange these gases with increasing solubility in water.

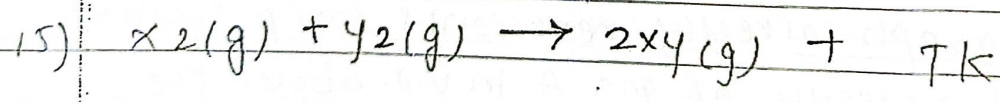
→ Ar < CO₂ < Vinyl chloride < CH₄ < HCHO.

14) 100ml of 0.1M H₂SO₄ is mixed with 100ml of 0.1M KOH (aq)

What is pH of solution?

(log 2 = 0.30, log 3 = 0.48, log 5 = 0.70)

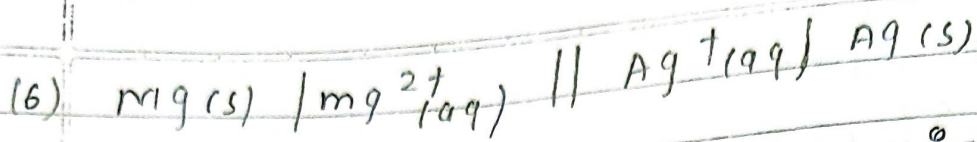
- 1) 1.67
- ~~2) 1.30~~
- 3) 0.30
- 4) 2.67.



Equilibrium conc. of X₂(g), Y₂(g) and XY(g) are each 2 moles each in a 147 container after some time 1 mole each of X₂ and Y₂ are added to the system. Keeping temperature T.K.

Equilibrium conc. of X₂ and Y₂ at new equilibrium respectively are

- 1) 1.33 , 1.67
- 2) 2.67 , 2.67
- 3) 1.67 , 1.67
- 4) 0.33 , 0.67



Nernst's equation for above cell is

$$E_{cell} = E^{\circ}_{cell} - \frac{0.0591}{2} \times \log \frac{(Mg^{2+})}{[Ag^+]^2}$$

(7) Given $\frac{E^{\circ}_{Cu^{2+}}}{Cu} = 0.34V$

$$\frac{E^{\circ}_{Ni^{2+}}}{Ni} = 0.25V$$

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

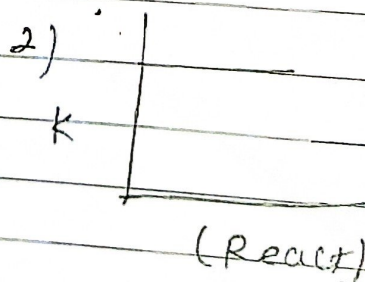
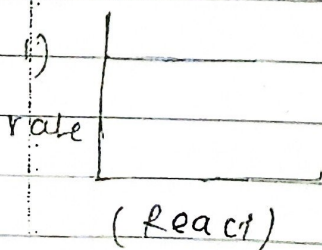
$$\frac{E^{\circ}_{Al^{3+}}}{Al} = -1.66V \text{ correct order.}$$

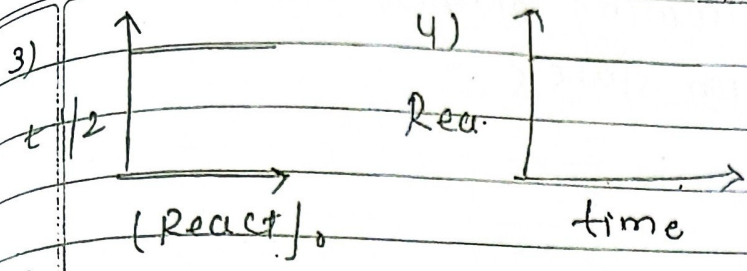
of increasing strength of oxidising agent is.

$$-1.66 < -0.44 < 0.25 < +0.34$$



18. Which graph does not represent thermal decomposition of HI on gold surface





→ (3)

19) Decomposition of A follows the equation

$$k = (2.0 \times 10^{10} \text{ s}^{-1}) \cdot e^{-\frac{1.2 \times 10^4 \text{ K}}{T}}$$

What is activation energy E_a in kJ is

- ~~1) 99.8~~
- 2) 229.7
- 3) 99788
- 4) -99.3

20) $R \rightarrow P$ is a first order reaction, which of the following are equations for $t_{1/2}$

1) $[R] = [R]_0 \cdot e^{-kt}$

2) $\ln[R] = \ln[R]_0 + kt$

3) $\ln \frac{[R]_0}{[R]} = kt$

4) $\log \frac{[R]}{[R]_0} = \frac{-kt}{2.303}$

1) & 2) are Ans

21) Which of the following element show variable oxidation state?

1) Na

~~2) Cl~~

3) Mg

4) He

22) List I
(oxide)

List II
(nature)

A K_2O

I) Acidic

B As_2O_3

II) Neutral

C Cl_2O_7

III) Basic

D N_2O

IV) Amphoteric

→ K_2O Basic

As_2O_3 - Ampho

Cl_2O_7 - Acidic

N_2O neutral

23. Arrange elements Li , Be , B , C , N , O and F in increasing order of 1st ionisation enthalpy.

→ $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{O} < \text{N} < \text{F}$

24. Oxidation state of N in nitroglycerin
($\text{C}_3\text{H}_5\text{N}_3\text{O}_9$) is

1) -3

3) $+3$

2) $+1$

~~4) $+5$~~

25. On treatment of complex with formula $PdCl_2 \cdot 4NH_3$ and $PtCl_4 \cdot 2HCl$ with excess $AgNO_3$ produces 2 and 0 mole of $AgCl$ per mole of compound respectively. What is the secondary valence of Pd and Pt respectively.

1) 4 & 6

2) 4 and 4

3) 6 and 6

4) 6 and 6

26. Identify correct statement regarding variation of atomic and ionic sizes of transition metals from following

A) In a period ions of same charge show progressive decrease in radius as atomic number increases

B) A screening effect of ~~del~~ d electrons is not very effective the net electrostatic attraction between nucleus and valence electrons decreases

C) Atomic size increases from 3d to 4d to 5d series

D) Due to lanthanoid contraction a regular decrease in atomic radius is observed in case of 5d series

E) 4d and 5d series element have similar physical and chemical properties due to lanthanoid contraction

- 1) A, C, and E
- 2) A, B and D
- 3) A, B and C
- 4) A, D and E

27. In a complex dichloridobis (ethane-1,2-diamine) cobalt (III) chloride, number of mono and bidentate ligands respectively are.

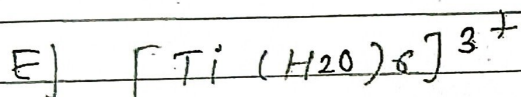
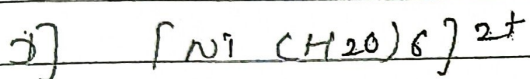
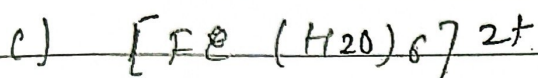
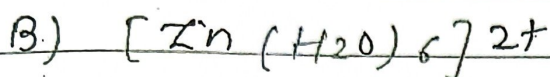
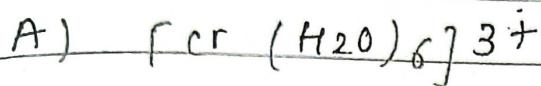
- 1) 2, 2
- 2) 4, 1
- 3) 6, 0
- 4) 0, 3

Q28. Identify correct statement about actinium and actinoids (at. no. Ac, Bk, Po, Es, no are 89, 97, 91, 99, and 102 resp).

- A) Ac shows only +3 oxidation state
- B) Bk has two variable oxidation states +3, +4
- C) Po(V) ion is paramagnetic
- D) Es(III) has 2 unpaired electrons
- E) No is diamagnetic

- Ans A, B and E
- 1) A, B and C
 - 2) A, B and D
 - 3) A, B and E
 - 4) C, D and E

29. Identify increasing spin only magnetic moment (considering H_2O as a weak field ligand).



1) $B < E < D < A < C$

2) $B < D < E < A < C$

3) $B < E < A < D < C$

4) $B < E < C < D < A$

30. What are the electronic configurations of a d^6 complex system where $\Delta_o < P$ and $\Delta_o > P$ respectively

1) $t_{2g}^4 e_g^2$ and $t_{2g}^6 e_g^0$

2) $t_{2g}^6 e_g^0$ and $t_{2g}^4 e_g^2$

3) $t_{2g}^5 e_g^1$ and $t_{2g}^4 e_g^2$

4) $t_{2g}^5 e_g^0$ and $t_{2g}^5 e_g^1$