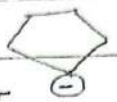
Q1] The correct stability order of

$\bar{C}H_3$, $(CH_3)_3\bar{C}$, $CH_3-\bar{C}H_2$, 

I II III IV

→ IV > I > III > II

Q2] In kjelda'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 %

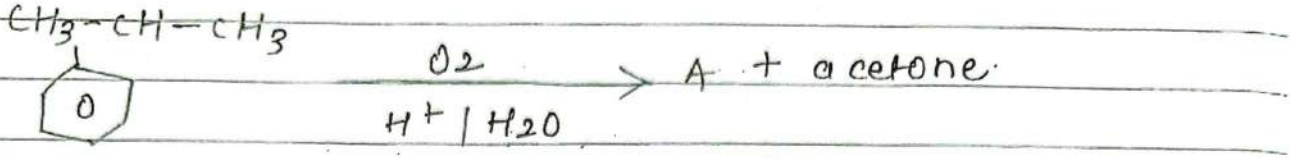
3] Difference in Molar Mass of First & Fourth Membrer of Homolougous series of alkane is

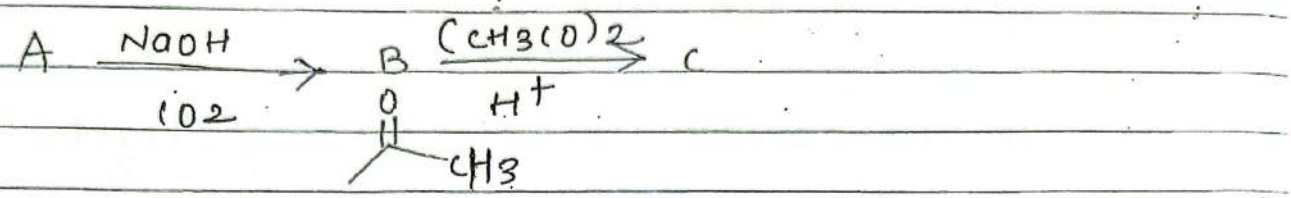
→ 42 g

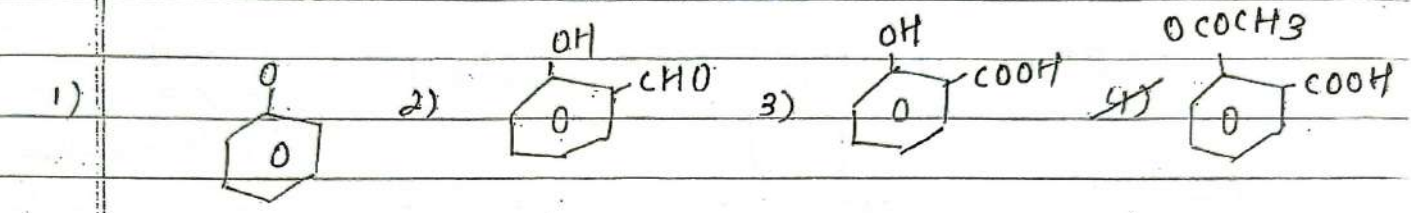
4] In petroleum Industry crude oil Fraction is seperatered by

→ fractional distilation

5] Identify the product 'C'







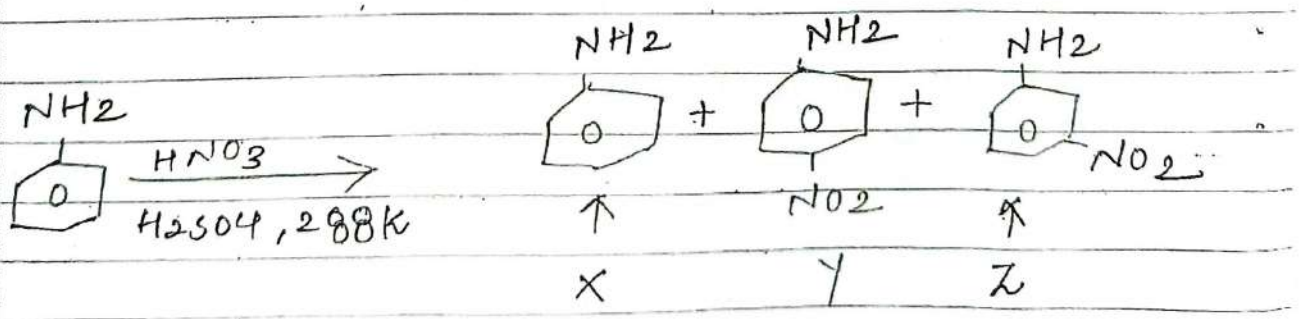
6] Which is the correct structure of

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

→

7) Identify the correct order of product formed

X, Y, Z,



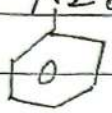
Y > Z > X X = 2% Z = 47%

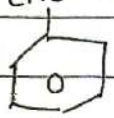
Y = 51%

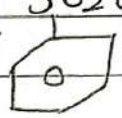
8] Which reactant test can not be used to detect aniline

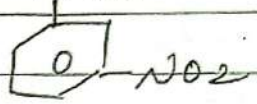
1) carbyl amine
2) ~~2-4~~ 2-4 DNP.
3) Heinsberg
4) AZO - dye

9] Identify the formula of Heinsberg reagent

1) 

2) 

~~3)~~ 

4) 

10) List I List II

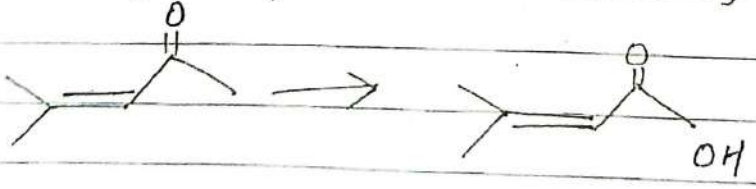
Aldol condensation ⟶ synthesis of α-β unsatura comp.

Cannizaro reaction ⟶ form of alcohol & Acid.

HVZ ⟶ synthesis of α-halo carboxylic Acid.

Etard reaction ⟶ synthesis of ben 3-aldehyde

11] Identify reagent for following conversion



1) $KMnO_4$, KOH
2) $K_2Cr_2O_7$, H_2SO_4
3) $NaOCl_2$ / H^+, H_2O
4) $CH_3-\overset{O}{\overset{\|}{C}}-OOH$.

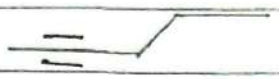
12) Asseration :- Ozonolysis of Alkene to produce carboxyl comp. required in addition of O_3 a mild reducing agent.
like $Zn-H_2O$

Reason :- Reducing agut cleares the Ozonide to produce carbonyl compound.

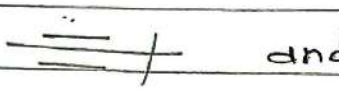
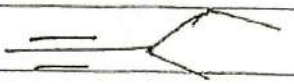
→ Both (A) & (R) are True
(R) is correct explanation of (A)

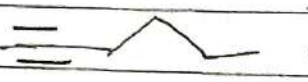
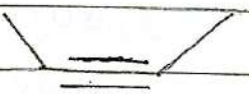
31] Which of the following pairs are position isom

A)  and 

B)  and 

C)  and 

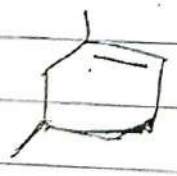
D)  and 

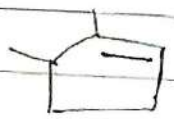
E)  and 

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

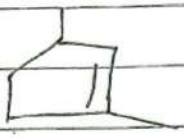
32) List I — List - II

Reaction — product

A)  $\xrightarrow[Zn-H_2O]{O_3}$ I) 5-Oxo-4 methyl hexanal

B)  $\xrightarrow[Zn-H_2O]{O_3}$ II) Heptan-2-6-dione

C)  $\xrightarrow[Zn.H_2O]{O_3}$ III) 5-oxo-2methyl hexanal.

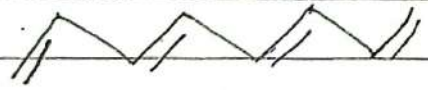
D)  $\xrightarrow[Zn.H_2O]{O_3}$ IV) 5-oxo-3-Methyl hexanal.

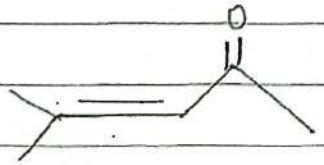
A - III B - II C - I D - IV

33. Which functional group activates benzene ring?

1) $-SO_3H$
2) $-CN$
3) $NHCOCH_3$
4) $-\overset{O}{\overset{\|}{C}}-CH_3$

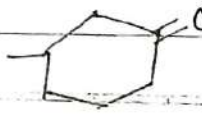
34] List (compound) I — List II: No. of sigma bonds

A)  17 I) 20



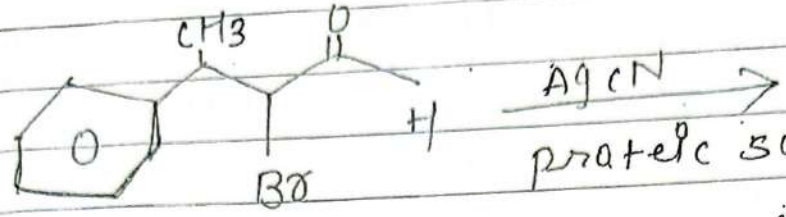
B) 16 II 17

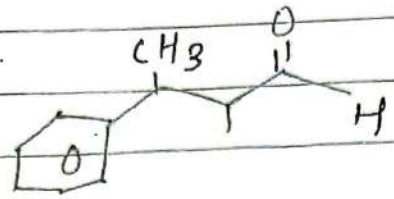
C)  21 III 16

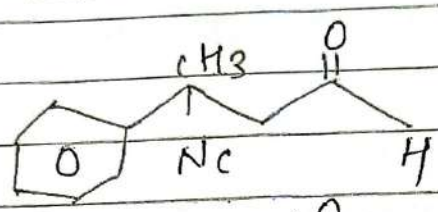
D)  (20) II) 21

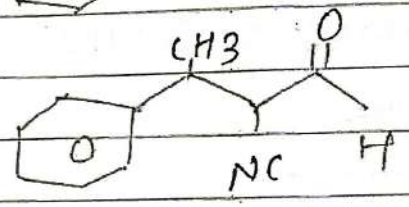
19

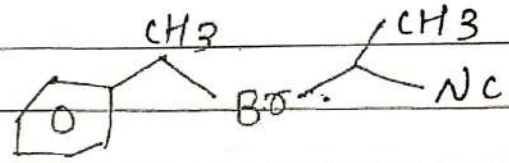
35. Identify the major product



1) 

2) 

3) 

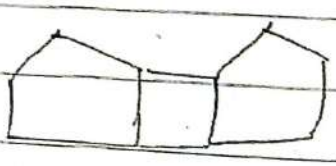
4) 

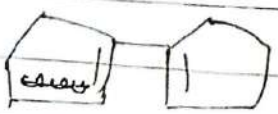
36) 

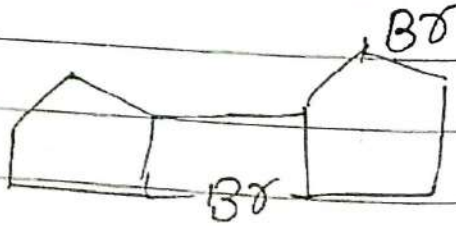
Br + mg $\xrightarrow{\text{dry ether}}$ A $\xrightarrow{H^+}$ B

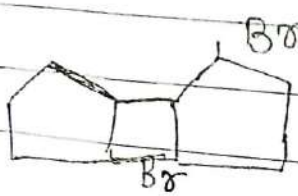
C-C

1) 

3) 

2) 

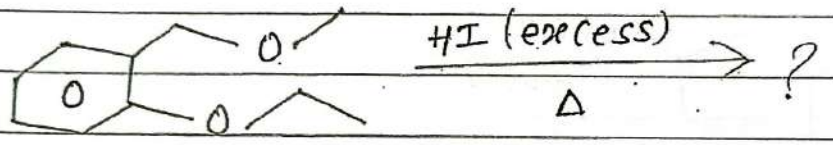
4) 

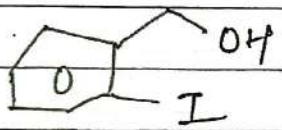
4) 

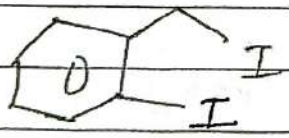
37) Which one undergoes fastest solvolysis under S_N1 reaction condition?

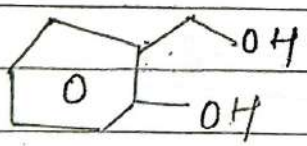
1) CH_3Cl
2) CH_3-CH_2-Cl
3) CH_3-O-CH_2-Cl
4) $CH_2=CH-Cl$

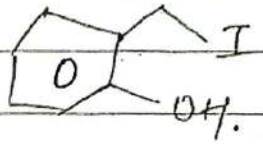
38. Identify product.



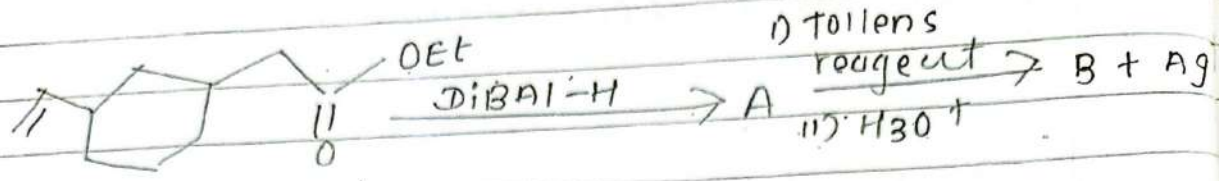
1) 

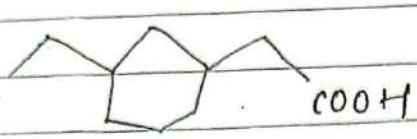
2) 

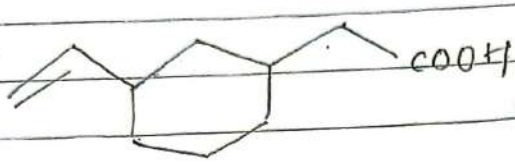
3) 

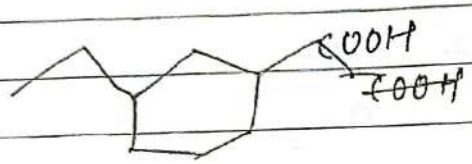
4) 

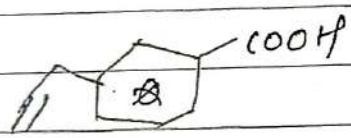
39 Identify 'B' in following.



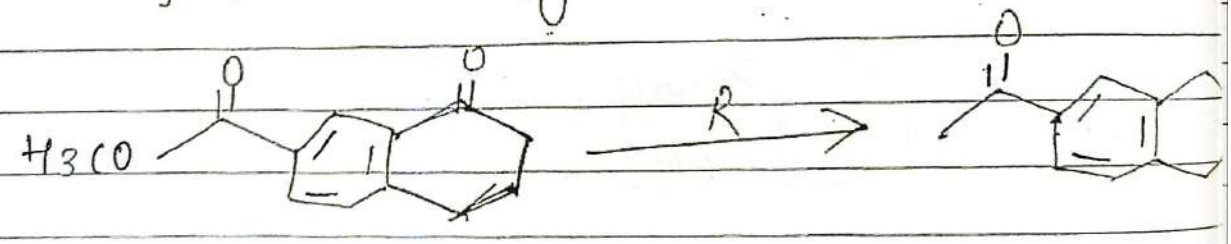
1) 

~~2)~~ 

3) 

4) 

40 Identify 'R' in following reaction.

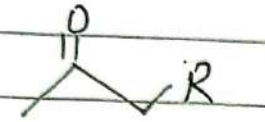


1) B_2H_6
2) $LiAlH_4$
3) NH_2-NH_2
~~4)~~ Zn-Hg / HCl

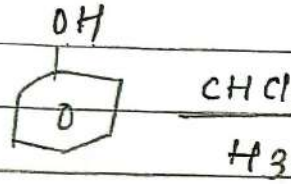
41) List I — List II

Reaction — Name of Rxn

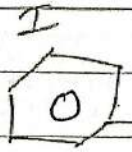
A)  $\xrightarrow{NaOBr}$ I) Hoffmann Bromide

B)  $\xrightarrow[NaOH]{Br_2}$ II) carbyl amine

C)  $\xrightarrow[NaOH]{CHCl_3}$ III) Reimer & Timan

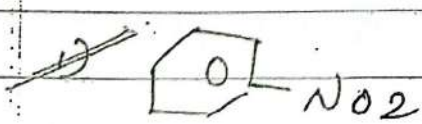
D)  $\xrightarrow[H_3O^+]{CHCl_3/NaOH}$ ~~IV~~ Haloform reaction.

42) Identify 'A' in following reaction

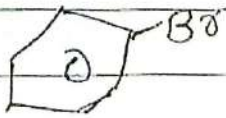


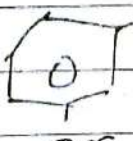
$\Delta \xrightarrow[Pd/H_2]{FeBr_3/Br_2}$ $\xrightarrow[KI]{NaNO_2/HCl/0-5^\circ C}$ A

1-bromo 3-iodobenzene.

1) 

2) 

3) 

4) 

43) Match the List I & With List II

List I	List II
III. A) Insuline	I) primary str.
IV B) INHOOI	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

i) High solubility product
~~2~~) Low solubility product
3) Hydrolysis
4) complex formation.

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

2) dil HCl → H_2S $NH_4Cl(s) + NH_4OH$ → H

$NH_4OH + (NH_4)_2$

1) What amount of CO_2 gas is produced by combustion of 16 kg Methane & 64 kg of Oxygen.

a) 375
b) 625
c) 6000
d) 7500

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

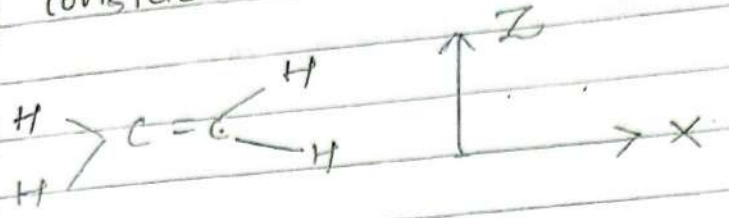
a) 4S
b) 5p
c) 6d
d) 5S

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

Reason :- Both BF_3 & XeF_4 are symmtrical Molecules.

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

4) consider on ethylene molecules in xz plane the atomic.



Orbitals on both carbons involved in the c-c. π bond formation are Lebelled as

2px	Unhybrides p orbital is ter to
2py	xz plane is 2py orbitals
2pz	which is form π bond & by
sp2	Lateral overlapping.

5) Which of the following is an extensive property?

Temperature
Molar heat capacity
Heat capacity
Molar Volume

Intensive
Intensive
Extensive
Intensive

6) Given $HCl(g) + 25(aq) \rightarrow HCl\,25aq$

$\Delta H = -72.03$ kg/m

$HCl(g) + 40aq \rightarrow HCl\,40aq$ Δ 2

$\Delta H = -72.79$ kg/m

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

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

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

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

A) No work done on by the system
B) No heat is exchanged between system & sorrounding
C)
↳ It is an isothermal reversible change
D) $\Delta U = 0$

1) A & B & D are correct

8) Arrange the following solution in order of vant Hoff factor.

A) ~~0.04~~ 0.1M 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 2gm 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 cause on 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) 200ml of 0.1m CH_3COOH + 100ml of 0.1 m NaOH what is the pH of solution (pKa = 4.75)

a) 3.25

b) 4.75

c) 4.44

d) 5.05

11.

List		Ksp
Statement		
I	AX	i) 6.9×10^{-7}
	AX_2	ii) $4s^3$
	A_2X_3	iii) s^2
	A_3X_4	iv) $108s^5$

12) Assertion :- solubility of salt of crps weak (red Acid) like phosphate increases at lower pH.

Reason :- At lower pH, conc. of ~~anions~~ an ions decreases due to it's protonation which results in increases in solubility of salt.

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

13) consider Ecell at 298 K.

$Fe(s) \mid Fe^{2+}$ (0.001 m) $\| H^+$ 0.01 m $\mid H_2(g) \mid$ bar $\mid Pt(s)$

[$E^0_{Fe^{2+}/Fe} = 0.440V$] Emf of cell in Volt is

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

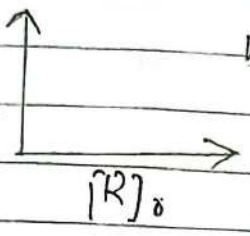
14) Λ_m $CaCl_2$, CH_3COONa & NaCl are x, y & z Respectively Λ_m of calcium acetate is

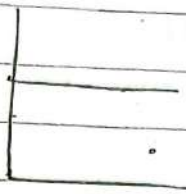
1) $x + y - 2z$
2) $x + 2y - z$
3) $x + y - z$
4) $x + 2y - 2z$

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

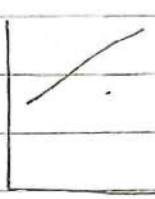
1) 6.25%
2) 93.75%
3) 87.50%
4) 75.00%

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

a) 

b) 

c) 

d) 

17] consider reactions

$H_2O_2 + I^- \longrightarrow H_2O + IO^-$

$H_2O_2 + IO^- \longrightarrow H_2O + I^- + O_2$

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

a) catalyst — I^- Intermediate — I_0^-

b) —"— — I_0^- —"— — I^-

c) —"— — H_2O —"— — I_0^-

d) I —"— — IO^- —"— — H_2O

18] Which of the following underlined element in given comp has same Oxidation ~~statement~~ state and covalancy ?

1) $[\underline{Al}\,Cl(H_2O)_5]^{2+}$ 4) $[\underline{B}F_4]^-$

2) $[\underline{Al}\,F_6]^{3-}$

3) $\underline{Al}_2S_3$

19 Asseration :- 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 metall

A) 1) Si, As, At
B) 2) Te, Po, Tc transition m
C) 3) Sb, Te, Ti —11—
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 strenght

1) $F^- < OH^- < S^{2-} < NCS < NH_3$
2) $SCN^- < S^{2-} < OH^- < NCS < CN^-$
3) $I^- < Br^- < Cl^- < F^- < SCN^-$
4) $NCS < NH_3 < EDTA^{4-} < Cr_2O_4^- < CN^-$

22 Identify true option for Nitrogen

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

23) Identify least ~~Volat~~ Volatile element.

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

24)

List I (salt)		List II (colour)
A) $PbCrO_4$	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 TiC	Amphoteric oxide
B Mn_3O_4	Interstitial comp
C) Cr_2O_3	Chromite Or
D $FeCr_2O_4$	Mixed oxide

26) List I | List II

O.S. of underlined element.

		O.S.
A.	$[\underline{Ni}(CO)_4]$	I +6
B.	$[CO(NH_3)_5Cl]Cl_2$	+2
C.	$K_2[\underline{Pd}Cl_4]$	III +3
d)	$K_2\underline{Cr}_2O_7$	IV 0

27) Which of the following examples of Inner orbital Complexes?

A.	$[MnCl_6]^{3-}$	1) A, C and D
B	$[Ni(H_2O)]^{2+}$	2) C and D
C.	$[V(H_2O)_6]^{3+}$	3) B, C and D
D.	$[Cr(H_2O)_6]^{3+}$	4) C, D and E
E.	$[CoF_6)^{3-}$	

28) Identify the correct statement regarding purification of organic comp

A) Aniline can be purified by stem distillation

B) 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 charcal is always used in organic purification.

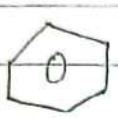
E) separating funnel is used to perform differential extraction

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

29. An organic compound as 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) $C_{18}H_{12}PCl_3$
2) C_7H_5INS
3) C_7H_7BrS
4) C_6H_6BrN

1) Which of the following compounds

1)  + CH_3Cl $\xrightarrow[AlCl_3]{\text{anhydrous}}$ W $\xrightarrow[\text{+ dil } H_2SO_4]{\text{dil } HNO_3}$ X + Y

Warm

The suitable method that can be used for separation of x & y is

1) sublimation
2) continuous extraction
3) Fractional distillation
4) Differential extration

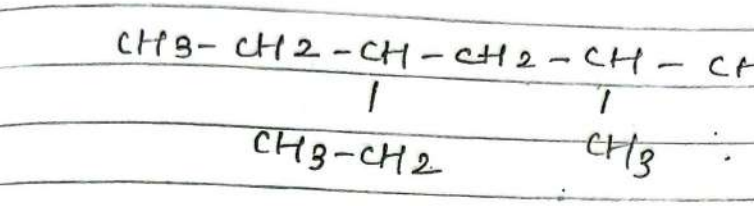
2) During Lassaigne's test, elements present in an org. compound are converted from

1) ~~ion~~ 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) $CH_3-CH_2-CH_2-CH_2-CH_3$ and $(CH_3)_2CHCH_2$
2) $CH_3CH_2CH_2OH$ & $CH_3CH(OH)CH_3$
3) $CH_3-\overset{O}{\overset{\|}{C}}-CH_3$ and $CH_3CH_2-\overset{O}{\overset{\|}{C}}-OH$
4) $CH_3-O-CH_2CH_2CH_3$ and $CH_3CH_2OCH_2$

4) IUPAC name of



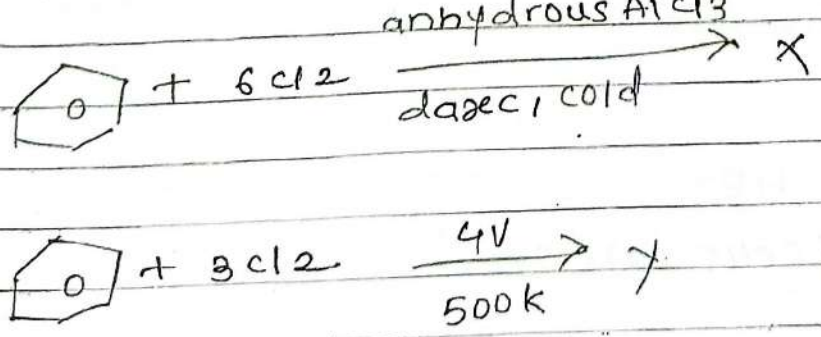
1) 2, 4-Diethyl hexane
2) 3-Ethyl-5-methyl heptane
3) 3-Methyl-3-ethyl heptane
4) 3, 5-Diethyl hexane

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

1) CO and H_2
2) CO_2 and H_2
3) CO_2 and H_2O
4) CO and H_2O

XII
304

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



1) 6 and 3
2) 3 and 3
3) 3 and 6
4) 6 and 6

323
324

7) Phenolphthalein is used as an indicator for diffraction OF NaOH solution against standard solution of ~~Oxalic~~ oxalic Acid
The colour change is observed at an alkaline pH close to the equivalent point during difration 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, I respective

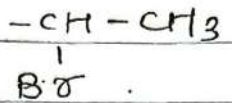
$CH_3-CH_2-CH_2-OH + PCl_5 \rightarrow CH_3-CH_2-CH_2-Cl + X + HCl$

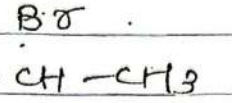
$CH_3-CH_2-CH_2-Cl \xrightarrow[\Delta]{alc\ KOH} Y$

$Y \xrightarrow[(C_6H_5CO)_2O_2]{HBr} Z$

1) $X = POCl_3$ $Z = CH_3CH_2CH_2Br$

2) $X = H_3PO_3$ $Z = CH_3CH_2CH_2Br$

3) $X = POCl_3$ $Z =$ 

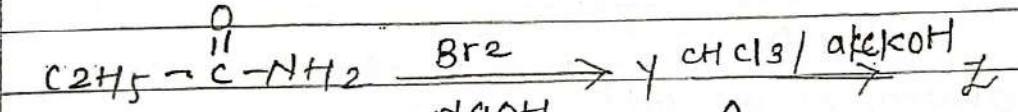
4) $X = H_3PO_3$ $Z =$ 

XII

164 $X = POCl_3$ $Y =$ propene $Z =$ 1 bromo propane

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

$C_2H_5Cl \xrightarrow{K} Z$



X and Z are

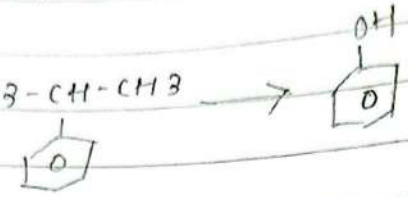
1) $X = KCN$ $Z = C_2H_5NC$

2) $X = KCN$ $Z = C_2H_5CN$

3) ~~$X = AgCN$~~ $Z = C_2H_5NC$

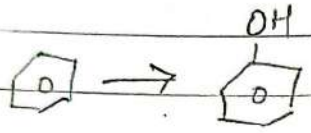
4) $X = AgCN$. $Z = C_2H_5CN$.

10) List I

A. $CH_3-CH(OH)-CH_3$ → 

B. $CH_3COOH \rightarrow CH_3CH_2OH$

C. $CH_3-CH_2-CH_2-OH \rightarrow CH_3-CH(OH)-CH_3$

D. 

List II

I. oleum
NaOH, Δ, H+

II $O_2, H_2O / H^+$

III CH_3OH, H^+
H_2 catalyst.

IV conc. H_2SO_4, Δ
H^+ / H_2O

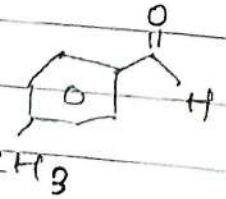
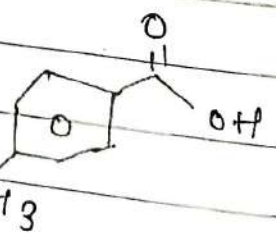
→ I) $O_2, H_2O / H^+$

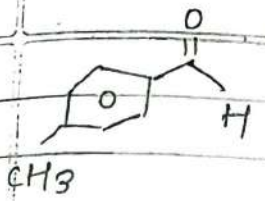
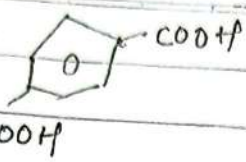
II) $CH_3OH, H^+ / H_2$ catalyst

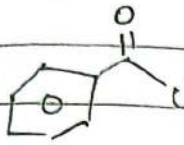
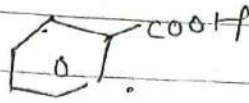
III) conc. H_2SO_4, Δ.
$H^+ H_2O$

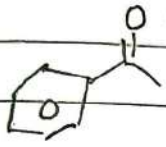
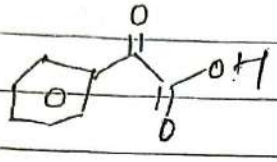
IV oleum, NaOH, OH^+

11) compound P (C_8H_8O) gives red org organce ppt with 2,4 DNp and it does not reduce fehelings solution. on drastic oxidation with chromic acid P gives an chromatic product Q that produces effervences on treating with aq $NaHCO_3$
P & Q are respectively are

1)  and 

2)  and 

3)  and 

4)  and 

12 Select the reagents that reduce nitriles to primary amines

A. LiOH, H_2O
B. sn+ HCl
C: H_2/Ni
D. Na (Hg) / C_2H_5OH
E Br_2/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

$$C_2H_6 \xrightarrow[UV]{Cl_2} X \xrightarrow{NH_3} Y \xrightarrow[ii)\ H_2O]{i)\ NaNO_2,\ HCl} Z$$

X → 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 str. of DNA/RNA.

1) DNA possesses a double strand helix str. & 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 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 dm^3 of CO_2 gas is passed over hot carbon the volume of gaseous mixture after complete reaction at STP becomes 1.4 dm^3. The composition of gaseous mix at STP is

1) 0.8 dm^3 CO, 0.8 dm^3 CO_2
2) 0.8 dm^3 CO, 0.6 dm^3 CO_2
3) 0.6 dm^3 CO, 0.8 dm^3 CO_2
4) 0.6 dm^3 CO, 0.4 dm^3 CO_2

17) How many no. of H atoms are present in 5.4 g of Urea (m.m = 60, $N_A = 6.022 \times 10^{23}$)

1) 1.084×10^{23}
2) 1.084×10^{22}
3) 2.168×10^{23}
4) 2.168×10^{22}

18)

List I (Q no)		List II (Orbitals)
A $n=2, \ell=1$	I	3d
$n=4, \ell=0$	II	2p
$n=5, \ell=3$	III	4s
$n=3, \ell=2$	IV	5F

$n=2, \ell=1 \rightarrow 2p$
$n=4, \ell=0 \rightarrow 4s$
$n=5, \ell=3 \rightarrow 5F$
$n=3, \ell=2 \rightarrow 3d$

19. A bulb is rated as 150 watt, converting 8.1 g energy as light. If energy of one photon is 4.42×10^{-19} 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 absored 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 $2A(g) + 2B(g)$ $\Delta U^\circ = -10$ kg
$\Delta S^\circ = -44$ J/K/m

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

1) + 0.69568 KJ/m Non spontaneous
2) + 0.69568 kg/m spontaneous
3) -1 1.635 kg/m , Non spontaneous
4) + 1.635 kg/m , spontaneous.

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

1) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$
2) $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$
3) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$
4) $H_2O(g) + CO(g) \rightleftharpoons H_2(g) + CO_2(g)$

(3) $\Delta ng = -2$

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

P < Si < Be < Mg < Na.

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

$BiO(OH) \rightleftharpoons BiO^+(aq) + OH^-(aq)$

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

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. kb 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 form 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 (CO) 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

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 $x_B = \frac{n_A}{n_A + n_B}$

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 5 amp current, mass of copper deposited at cathode is

(molar mass of Cu = 63)
(1 faraday = 96487 c)

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

29. calculate emf of half cell

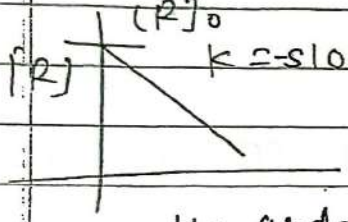
$Pt(s) \mid H_2(g) \mid H^+(aq)$ 2F $E^\circ_{H_2|H^+} = 0V$

2 atm | 0.02M

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

1) 0.109 V
2) −0.035V
3) 0.035V
4) −0.109 V.

30) For a reaction R → P, plot of [R] V 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 rxn)

A. 0
B. 1
C. 2
D. 3

List II (unit of K)

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

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

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

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

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

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

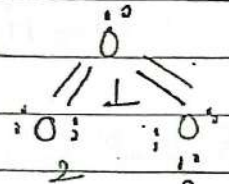
$H_2C=CH_2$ – 5σ, 1π

$HC\equiv CH$ – 3σ, 2π

CH_4 – 4σ

NH_3 – 3σ, 1 lone pair

34)



formed charge on O atoms numbered 2, 1, 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~~ T shaped Geometry with 2 L.P on Cl atom
4) planer trigonal Geometry with 2 L.P. on Cl atom.

36. Identify incorrect statement from following

1) Similarity in behaviour of Li and mg is refered as digonal relationship.
2) Oxidation state and covalency of Al in $[AlCl(CH_3)_2]$ 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+} respecti

37. Identify in correct 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 $C >> Si > Ge = Sn$
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 $As(C_6H_5)_3$ form $d\pi - d\pi$ bonds with Transition method.

38. calculate spin only magnetic moment of Ti^{2+} is

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	Fe	II polymerisation of alkyne
C.	$PdCl_2$	III preparation of H_2SO_4 from SO_2
D	Ni complex	IV oxdn of ethyne to ethanal

III - prepn of H_2SO_4 from SO_2
I = prepn of NH_3 from N_2 & H_2
IV = oxdn 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 61
2) After loosing 1 more electron it acquires $4f^{14}$ electronic configuration.
3) After loosing 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 complex / ion		List Shape, Geometery
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 planer
D $[Fe(CO)_5]$	IV	Tetrahedral.

III square planer
I octahedral.
IV Tetrahedral
II Trigonal bipyramid

43)

List I complex		List II (isomerism)
A) $[Pt(NH_3)_2Cl_2]$	III	Geometery (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 solvate

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

1) CH_3COO^-
2) CO_3^{2-}
3) S^{2-}
4) SO_4^{2-}

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 from $d\pi - p\pi$ 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.

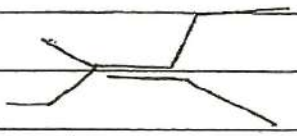
31] An Org compound contains 69.1% C, 4.8% and remaining oxygen. calculate the masses of CO_2 and H_2O produced when 0.20g this substance is subjected to complete combustion

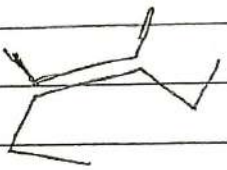
→ $CO_2 = 0.5069$, $H_2O = 0.0864$ g

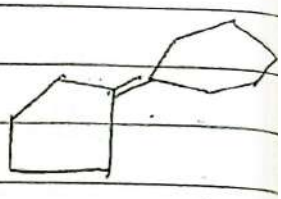
32] calculated Rf value of a sample 'A' in given diagram

→ 0.81

33] which is is transalkene

1) 

2) 

3) 

4) 

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

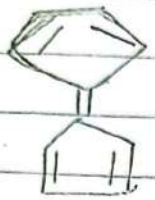
spiro no trans/cis

84] what is IUPAC name of

→ pent-2-ene-4yn-1-ol

85] which is most stable

→ 1)



36. Identify the optically active compound having lowest molecular weight

→

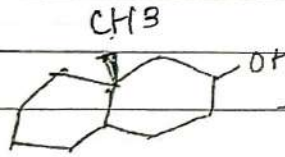
2,3-Dimethyl pentane

37) Ozonolysis of 'A' followed by treatment with Zn-H2O gives one mole of CH_3CHO & one mole of pentane-2-one

What is A?

→ 3-methyl hex-2-ene

38)



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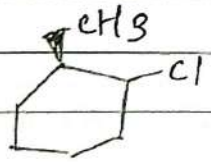
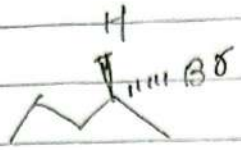
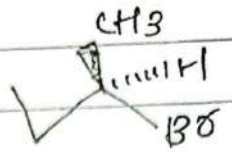


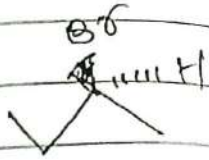
39) NH_4Cl is added before NH_4OH in gr. III analysis to.

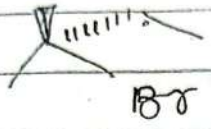
→ controll Ionisation of NH_4OH

40 Identify the correct enantiomeric pair.

A) 

B) 

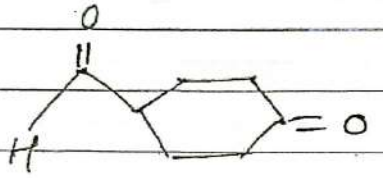
C) 

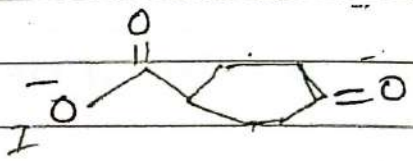
D) 

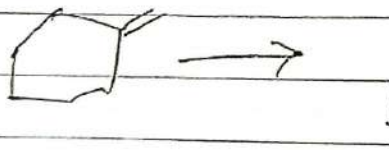
a) A & B
b) A and C
c) B and D
d) A and D

41 List I — Reaction

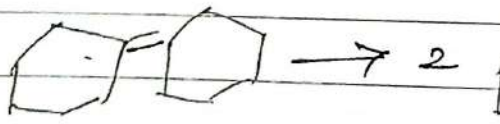
List II — Reagent

A. 

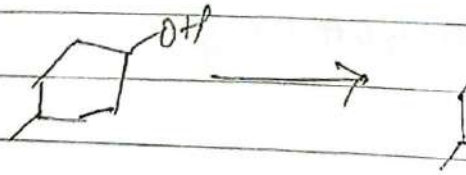


B. 

II $O_3/Zn-H_2O$

C 

III $BH_3, H_2O_2/OH$ PCC

D 

IV $[Ag(NH_3)_2]^+$

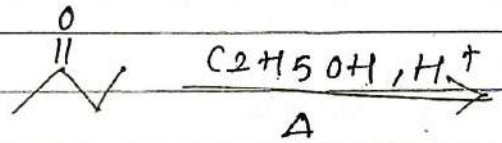
→ A → IV $[Ag(NH_3)_2]^+$
B → III $BH_3 | H_2O_2 | OH^-$ PCC
C → II $O_3/Zn-H_2O$
D → I CrO_3

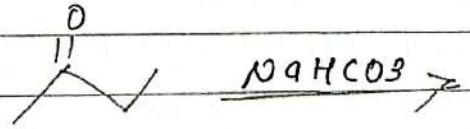
Q42

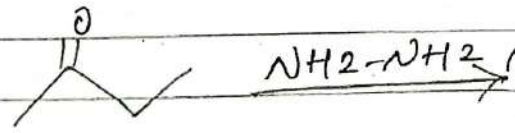
List I (formula)	List II (name)
A. Al-H(i-Bu)2	I Phosgene
B. COCl2	II Heinsberg
C. PhCH(CH3)2	III DIBAl-H
D PhSO2Cl	IV Cumene

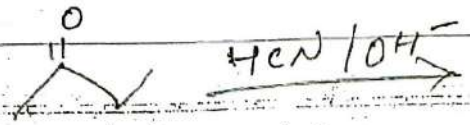
A – III DIBAl-H
B – I Phosgene
C – IV cumene
D – II Heinsberg

43 Identify the reaction given product with chiral carbon.

A) 

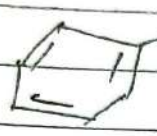
B) 

C) 

D 

E.  $\xrightarrow{NaBH_4}$

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

Q44  $\xrightarrow{}$ [X] + [Y] + N_2 + HB

What are X & Y?

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

Q45) Ethyl - 5-amine - 2-bromopentanoate & Ethyl - 2-amine - 5-bromopentanoate are independently treated for intramolecular substitution reaction; what are the product 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.

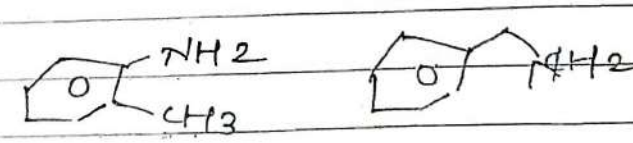
C) prolonged heating of glucose with HI gives cyclohexane

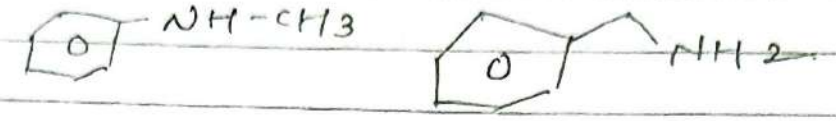
D) lactose is composed of β-D galactose & β-D glucose

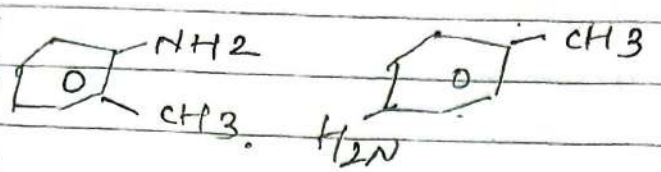
E) Acylation of glucose with acetic anhydride gives glucose pentaacetate

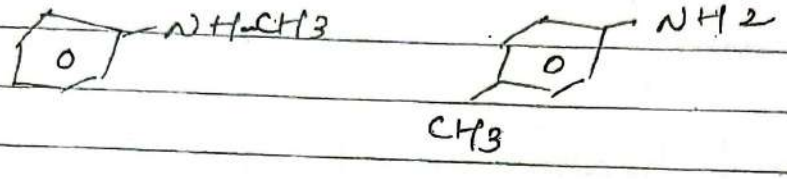
1) A, B and E
2) B, D and E
3) B, C and E
4) A, B & D.

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

1) 

2) 

3) 

4) 

Q3) In a fully double stranded DNA structure of mole fraction of glucose is 0.2 of 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 = 13 u) are the only ~~isother~~ isotopes of carbon. If the average atomic mass of C is 12.011 u then percentage of 13 carbon in carbon is closest to

1) 1.1
2) 0.011
3) 0.092
4) 1.0

5) Asseration : 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. $3dz^2$ Orbitals has two angular ~~momentum~~ nodes.

Statement II In 3dxy 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 $\sigma 1s$ and $\sigma 1s^*$ for hydrogen molecule?

1) The wave function $\sigma 1s$ is symmetrical about the intermolecular axis.
2) The wave function of $\sigma^* 1s$ is symmetrical about the internuclear axis

3) Tie

3) The electron density corresponding to $\sigma 1s$ has a nodal plane between the two nuclei

4) The electron density corresponding to $\sigma^* 1s$ has a nodal plane between the two nuclei

8) Equation for maxwork of isothermal reversible expansion of a gas is ($V_F > V_i$)

$$W = -2.303 nRT \log \frac{V_F}{V_i}$$

9) Which equations represents positive enthropy change?

A) $2Cl(g) \longrightarrow Cl_2(g)$

B) $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

C) $H_2O(l, 100^\circ C) \longrightarrow H_2O(s, 0^\circ C)$

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

B. $\Delta_r H^0 = -ve$, $\Delta_r S^0 = -ve$ II Rexn is spont at high temp

C. $\Delta_r H^0 = +ve$ $\Delta_r S^0 = +ve$ — III Rexn is spontaneous at low temp.

D. $\Delta_r H^0 = +ve$ $\Delta_r S^0 -ve$ IV Rexn is spontaneous at all temp.

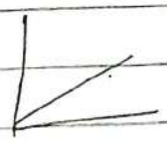
A = IV — spontany
B = III
C = II
D = I-

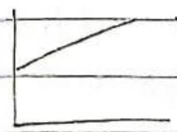
11) Asseration. when we place blood cell in a 1.1%, (m/v) NaCl solution H_2O will flow out of the cells and they would shrink.

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

~~(A) True (R) Flase~~

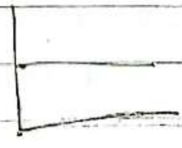
12) Which graph correctly represents log p (partial (partial pressure of gas A in v.p. above the solution) y-axis v log x (mole fraction of gas A in solution) x axis.

~~1)~~ 

3) 

XII /10.

2) 

4) 

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

A) Ar = 40.3 kbar
B) CO_2 = 1.67 kbar
C) HCHO = 1.83×10^{-15} kbar
D) CH_4 = 0.413 kbar
E) vinyl chloride = 0.611 kbar

Arrange these gases with increasing solubility in water.

→ Ar < CO_2 < vinyl chloride < CH_4 < HCHO.

14) 100ml of 0.1M H_2SO_4 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.

15) $X_2(g) + Y_2(g) \rightarrow 2XY(g) + TK$

equilibrium Conc. of $X_2(g)$ $Y_2(s)$ and $XY(g)$ are each 2 moles each in a 1 L container after sometime 1 mole each of X_2 and Y_2 are added to the system. Keeping temperature T K.
Equilibrium Conc. of X_2 and Y_2 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

(6) $Mg(s) | Mg^{2+}(aq) || Ag^{+}(aq) | Ag(s)$

Nerst's equation for above cell is

$$\rightarrow E_{cell} = E^{\circ}_{cell} - \frac{0.059}{2} \times \log \frac{(Mg^{++})}{[Ag^{+}]^2}$$

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

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

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

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

of increasing strength of oxidising agent is.

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

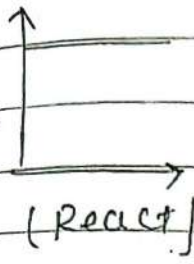
$$Al^{3+} < Fe^{2+} < Ni^{2+} < Cu^{2+}$$

18. which graph does not represents thermal decomposition of HI on gold surface

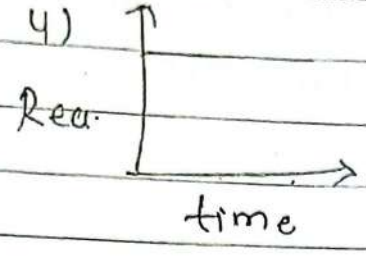
1) rate (React)

2) k (React)

3)



4)



→ (3)

19) Decomposition of A follows the equation

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

What is activation energy Eq. in kg is

~~1)~~ 99.8
2) 22g.7
3) 99788
4) -99.3.

20) $R \rightarrow P$ is a first order reaction, which of the following are equations for this

1) $[R] = [R]_0 e^{-kt}$
2) $\ln[R] = \ln [R]_0 + kt$
3) $\ln \frac{[R]^\circ}{R} = kt$
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
NO_2 neutral

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

→ Li < B < Be < C < O < N < F

24. Oxidation state of N in nitroglycerin ($C_3H_5N_3O_9$) is

1) −3
2) +1
3) +3
4) +5

25. on treatement 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 valences 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 in increases

B) A screening effect of 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 diamgnetic

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.

A) $[Cr(H_2O)_6]^{3+}$

B) $[Zn(H_2O)_6]^{2+}$

C) $[Fe(H_2O)_6]^{2+}$

D) $[Ni(H_2O)_6]^{2+}$

E) $[Ti(H_2O)_6]^{3+}$

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 $\Delta_0 < P$ and $\Delta_0 > P$ 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) $t_{2g}^6 e_g^0$ and $t_{2g}^5 e_g^1$