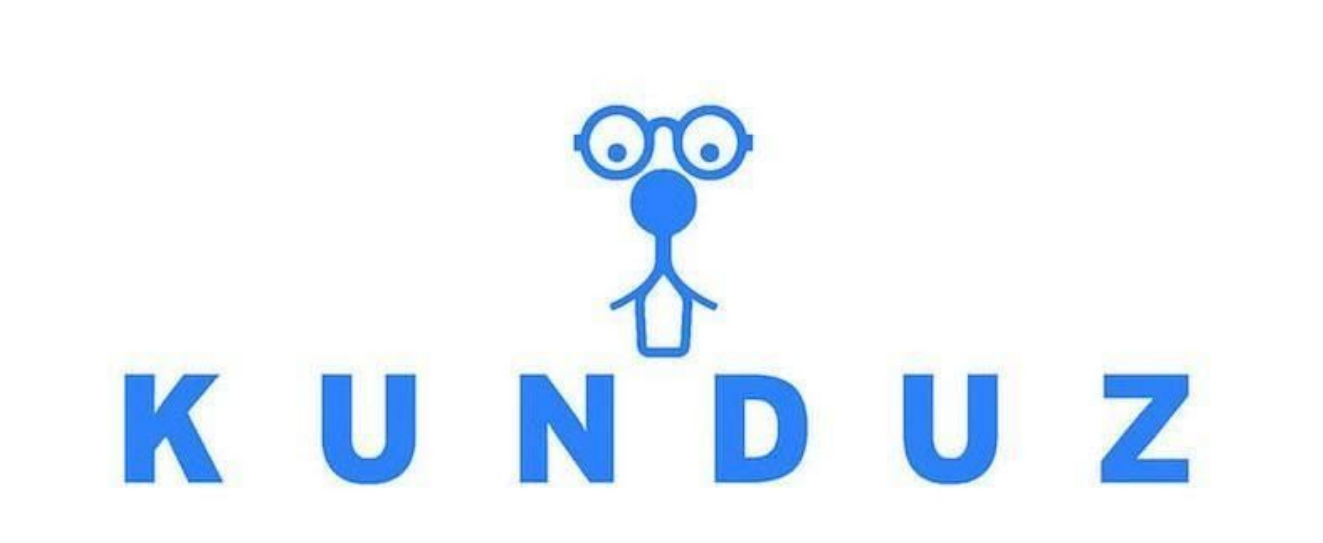
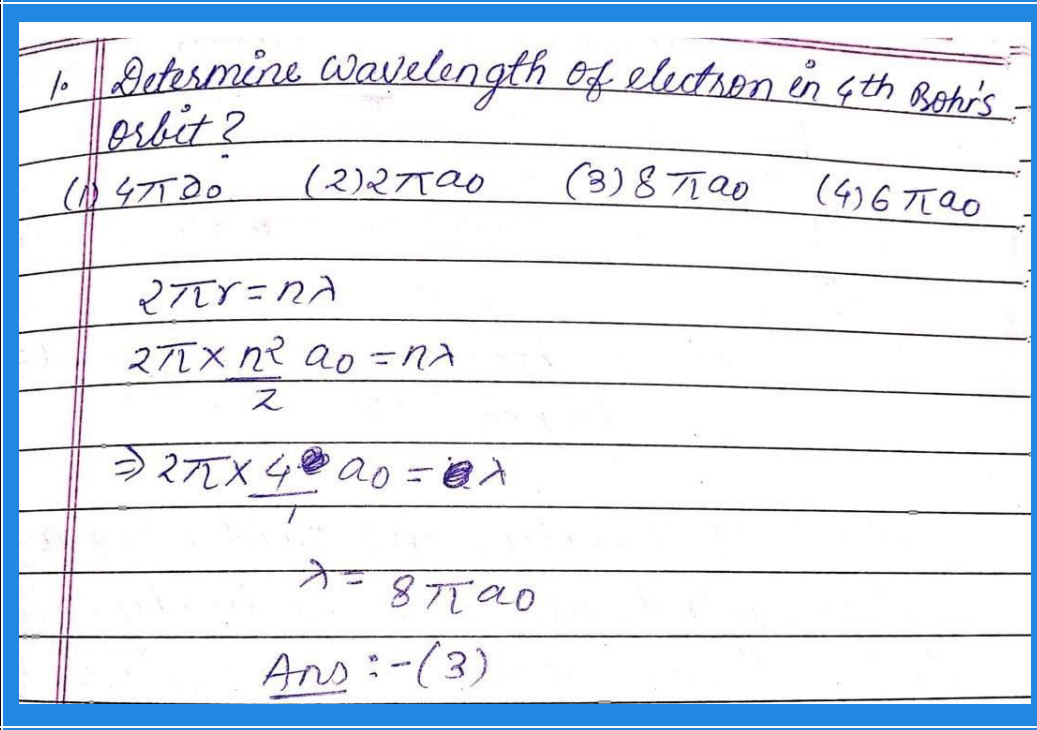
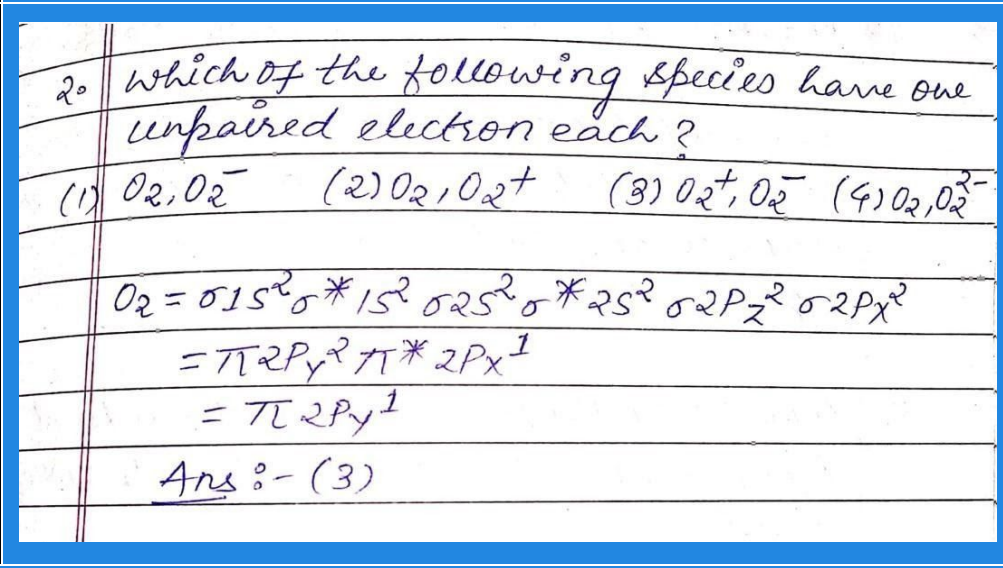


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Question no.	Questions and Answers
1	
2	

3

3. for $Br_2(l)$

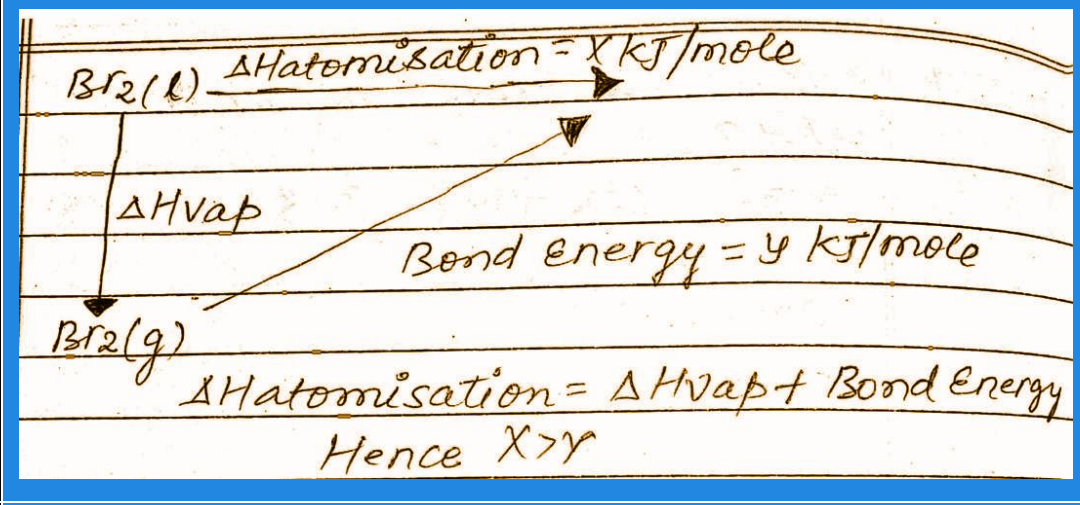
enthalpy of atomisation = X KJ/mol

Bond dissociation enthalpy of bromine = Y KJ/mole

Then

(1) $X > Y$ (2) $X < Y$

(3) $X = Y$ (4) Relation does not exist.



$\Delta H_{atomisation} = \Delta H_{vap} + \text{Bond Energy}$

Hence $X > Y$

4

4. Which of the following oxides are acidic, Basic, Amphoteric respectively.

(1) MgO, P_4O_{10}, Al_2O_3 (2) N_2O_3, Li_2O, Al_2O_3

(3) SO_3, Al_2O_3, Na_2O (4) P_4O_{10}, Al_2O_3, MgO.

Non-metal oxides are acidic in nature.

Alkali metal oxides are basic in nature.

Al_2O_3 is amphoteric.

Ans:- (2).

5

5. Complex $Cr(H_2O)_6Cl_n$ shows geometrical isomerism and also reacts with $AgNO_3$ solution.

Given :- Spin only magnetic moment = 3.8 BM

What is the IUPAC Name of the complex

(1) Hexaaquachromium (III) chloride.

(2) Tetraaquadichloridochromium (III) Chloride dihydrate.

(3) Hexaaquachromium (IV) Chloride.

(4) Tetraaquadichloridochromium (IV) Chloride dihydrate.

$Cr(H_2O)_6Cl_n$ = 3.8 B.M.

from data of magnetic moment oxidation number of Cr should be +3.

from complex is $Cr(H_2O)_6Cl_3$.

Complex shows geometrical isomerism therefore formula of Complex is $[Cr(H_2O)_4Cl_2]Cl.2H_2O$.

It's IUPAC Name :- Tetraaquadichlorido-Chromium (III) Chloride dihydrate.

Ans :- (2).

6

6. The electronic configuration of bivalent Europium and trivalent Cerium respectively is :-
(Atomic Number: Xe = 54, Ce = 58, Eu = 63).

(1) $[Xe]\,4f^7$, $[Xe]\,4f^1$ (2) $[Xe]\,4f^7 6s^2$, $[Xe]\,4f$

(3) $[Xe]\,4f^7 6s^2$, $[Xe]\,4f^1 5d^1 6s^2$

(4) $[Xe]\,4f^7$, $[Xe]\,4f^1 5d^1 6s^2$

Eu^{2+} : $Xe\,[4f^7]$

Ce^{3+} : $Xe\,[4f^1]$

Ans :- (1)

7

7. K_{SP} of $PbCl_2 = 1.6 \times 10^{-5}$

on mixing 300 mL, 0.134 M $Pb(NO_3)_2(aq)$ + 100 mL, 0.4 M NaCl (aq).

(1) $Q > K_{SP}$ (2) $Q < K_{SP}$ (3) $Q = K_{SP}$

(4) Relation does not exit

$$Q = [Pb^{+2}][Cl^-]^2$$

$$= \frac{300 \times 0.134}{400} \times \left[\frac{100 \times 0.4}{400}\right]^2$$

$$= 1.005 \times 10^{-3}$$

$Q > K_{SP}$

Ans :- (1)

8

8. Which of the following Cannot act as both Oxidising and Reducing agent ?

(1) H_2SO_3 (2) HNO_2 (3) H_3PO_4 (4) H_2O_2.

Ans :- (3)

On H_3PO_4. Phosphorous is present it's maximum oxidation number state hence Cannot act as reducing agent.

9

9. First ionisation Energy of Be is Higher than that of Boron.

Select the Correct Statements regarding this

(i) It is easier to extract electron from 2p orbital than 2s orbital.

(ii) Penetration power of 2s orbital is greater than 2p orbital.

(iii) Shielding of 2p electron by 2s electron.

(iv) Radius of Boron atom is larger than that of Be.

(1) (i), (ii), (iii), (iv) (2) (i), (iii), (iv)

(3) (ii), (iii), (iv) (4) (i), (ii), (iii)

Sol :- Theory Based

Ans :- (4).

10

10. $[PdFCl(Br)]^{2-}$ Number of geometrical isomers = n for $[Fe(CN)_6]^{n-6}$, Determine the spin only magnetic moment & CFSE (ignore the pairing energy

(1) 1.73 B.M, $-2\Delta_0$ (2) 2.84 B.M, $-1.6\Delta_0$

(3) 0, $-1.6\Delta_0$ (4) 5.92 B.M, $-2.4\Delta_0$

Number of geometrical isomers = 3

Hence $n = 3$

$[Fe(CN)_6]^{3-}$ $Fe^{3+} = 3d^5$

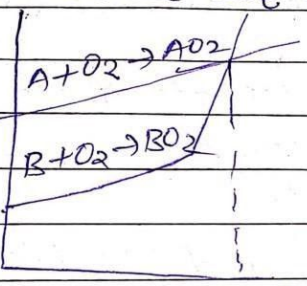
$\mu = \sqrt{n(n+2)} = 1.73$ B.M

$CFSE = -0.4\Delta_0 \times nt_{2g} + 0.6\Delta_0 \times n_{eg}$

$= -2.0\Delta_0$

11

11. A can reduce BO_2 under which Conditions



(1) >1400°C

(2) <1400°C

(3) >1200°C & <1400°C

(4) <1200°C

SOL:- $A + BO_2 \rightarrow B + AO_2$

$\Delta G = -ve$

only above 1400°C

12

12. $A \rightarrow B$ 700 K

$A \xrightarrow{C} B$ 500 K

Rate of Reaction in absence of Catalyst at 700 k is same as in presence of Catalyst at 500 k. If Catalyst decreases activation energy barrier by 30 kJ/mole, determine the activation energy in presence of Catalyst

(1) 75 kJ (2) 135 kJ (3) 105 kJ (4) 125 kJ

$k_{cat} = k$

$Ae^{-Ea_1/RT_1} = Ae^{-Ea_2/RT_2}$

$\frac{Ea_2 - 30}{500} = \frac{Ea_2}{700}$

$Ea_2 = 105$ kJ/mole

Activation Energy $= 105 - 30$

$= 75$ kJ/mole

Ans :- (1)

13

13. A substance 'x' having low melting point, does not conduct electricity in both solid and liquid state 'x' can be :-

(1) Hg (2) ZnS

(3) SiC (4) CCl_4

$CCl_4 \rightarrow$ Non Conductor in solid & liquid phase.

Ans :- 4

14

14) 

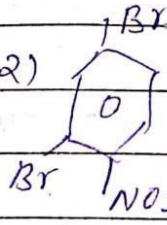
(1) $NaNO_2 + HCl$

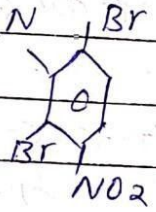
(2) Cu_2Br_2

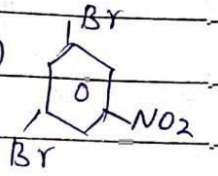
(3) HNO_3, Conc H_2SO_4

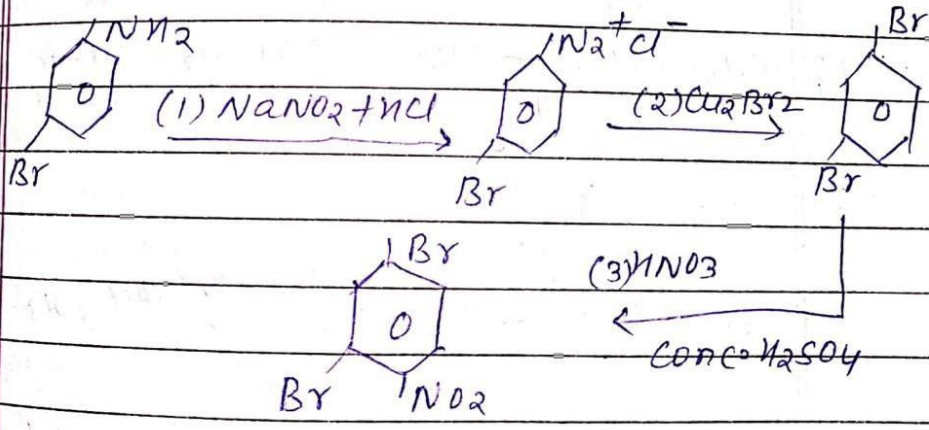
The major product for above sequence of reaction is :-

(1) 

(2) 

(3) 

(4) 



Ans :- (2)

15

15. Which of the following can give highest yield in friedal craft reaction?

(1)  (2)  (3)  (4) 

Aniline form anilium complex with lewis acid so phenol is most reactive among the given compounds for electrophilic substitution reaction

Ans:- (2)

16

16. $H_3C-CH(CH_3)-C(=O)-CH_3$ $\xrightarrow[2.\ H_3O^{\oplus}]{1.\ EtMgBr/ether}$ $\xrightarrow[\Delta]{H_2SO_4}$

What will be the major product?

(1) $CH_3-C(CH_3)=C(CH_2-CH_3)-CH_3$

(2) $CH_3-C(=CH_2)-CH(CH_2-CH_3)-CH_3$

(3) $CH_3-CH(CH_3)-C(=CH_2-CH_3)-CH_3$

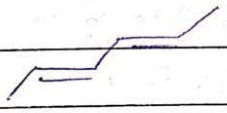
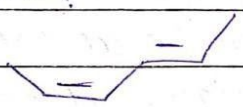
(4) $CH_3-CH(CH_3)-C(CH_2-CH_3)=CH_2$

$H_3C-CH(CH_3)-C(=O)-CH_3$ $\xrightarrow[(2)\ H_3O^{\oplus}]{(1)\ EtMgBr/ether}$ $CH_3-CH(CH_3)-C(OH)(CH_2-CH_3)-CH_3$

$\xrightarrow{H^+/\Delta}$ $CH_3-C(CH_3)=C(CH_2-CH_3)-CH_3$

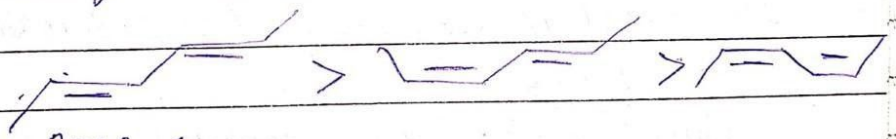
17

17. Which of the following is correct order for heat of combustion?

(A)  (B)  (C) 

(1) C>B>A (2) A>B>C (3) B>A>C (4) C>A>B

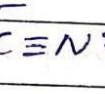
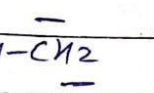
An isomers of hydrocarbon Heat of Combustion depends upon their stabilities. As the stability increases heat of Combustion decreases.



Ans:- (1)

18

18. Write the Correct osder of Basicity.

 (a)  (b)  (c)  (d) (e)

(1) a>b>d>e>c (2) a>b>e>d>c

(3) b>a>d>c>e (4) c>e>d>b>a

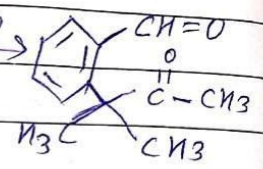
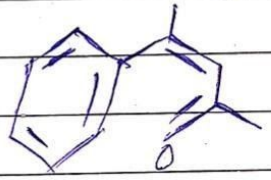
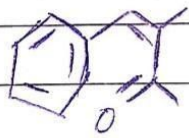
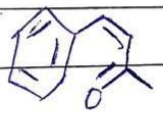
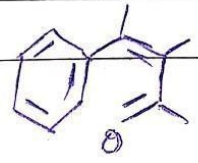
Basicity is inversely proportional to electronegativity.

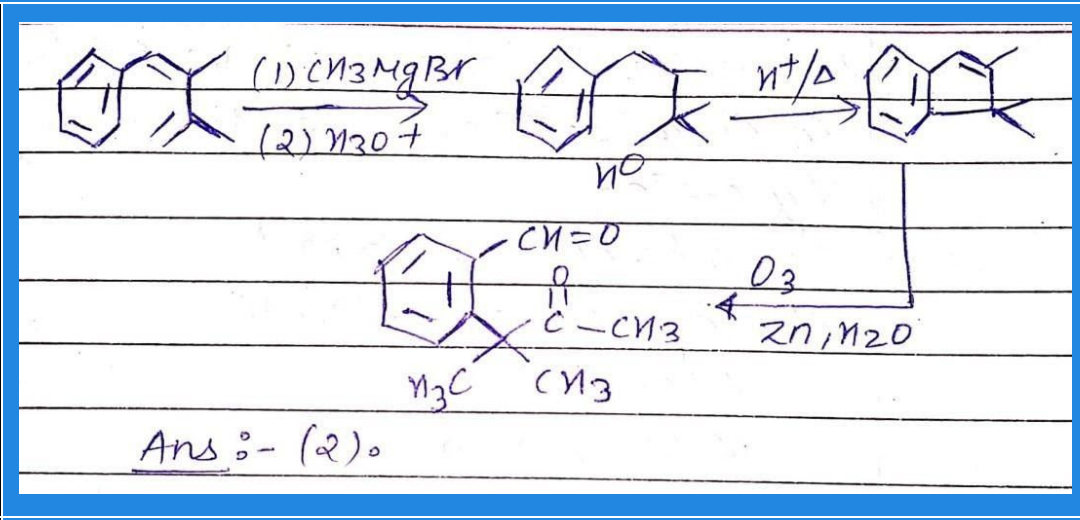
Ans:- (1)

19

19. A, B, C and D are four Artifical Sweetners.
(i) A & D give +ve test with ninhydrin.
(ii) C form precipitate with $AgNO_3$ in the lassaigne extract of the sugar.
(iii) B & D give +ve test with sodium Nitroprusside.
Correct option is
(1) A-saccharine, B-Aspartame, C-Sucralose, D-Alitame
(2) A-Aspartame, B-saccharine, C-Sucralose, D-Alitame
(3) A-saccharine, B-Aspartame, C-Alitame, D-Sucralox.
(4) A-Aspartame, B-Sucralose, C-Saccharine, D-Alitame.
~~(i) A & D give~~
Sol:- (i) A & D give +ve test when both have free carboxylic & amine groups.
(ii) C must contain Cl.
(iii) B & D must have sulphur atoms.
Ans:-(2)

20

20. Compound (P) $\xrightarrow[(2)\ H_3O^+]{(1)\ CH_3MgBr}$ $\xrightarrow[(3)\ Conc.\ H_2SO_4+\Delta]{O_3/Zn,H_2O}$ 
(P gives iodoform test)
Predict the Compound (P) on the basis of above sequence of the reactions?
Where Compound (P) gives +ve iodoform test.
(1) 
(2) 
(3) 
(4) 



Ans :- (2).

21

21. Given a solution of HNO_3 of density 1.4 g/ml and 63% W/W. Determine molarity of HNO_3 solution.

63 % W/W ⟶ HNO_3 solution

$$M = \frac{63 \times 1.4 \times 1000}{63 \times 100} \text{ mole/L}$$

$M = 14$ mole/L

22

22. Determine degree of Hardness in terms of ppm of $CaCO_3$ of 10^{-3} molar $MgSO_4$ (aq).

10^{-3} molar $MgSO_4 \equiv 10^{-3}$ moles of $MgSO_4$ present in 1 L solutions.

$n_{CaCO_3} = n_{MgSO_4}$

$$\text{ppm (in terms of } CaCO_3) = \frac{10^{-3} \times 100}{1000} \times 10^6$$

$= 100$ ppm.

23

23. Determine the amount of NaCl to be dissolved in 600 g H_2O to decrease the freezing point by 0.2°C.

Given k_f of $H_2O = 2\ K\text{-}m^{-1}$

density of $H_2O(l) = 1\ g/ml$

$\Delta T_f = 0.2°C$

$\Delta T_f = i\ k_f\ m$

$$0.2 = 2 \times 2 \times \frac{w}{58.5} \times \frac{1000}{600}\ i$$

$$w = \frac{0.2 \times 58.5 \times 600}{1000 \times 4}$$

$$= 1.76\ g$$

24

24. On passing a particular amount of electricity in $AgNO_3$ solution, 108 g of Ag is deposited. What will be the V of $O_2(g)$ in l liberated at 1 bar, 273 k by same quantity of electricity?

$$(n_{Ag})\ deposit = \frac{108}{108} = 1$$

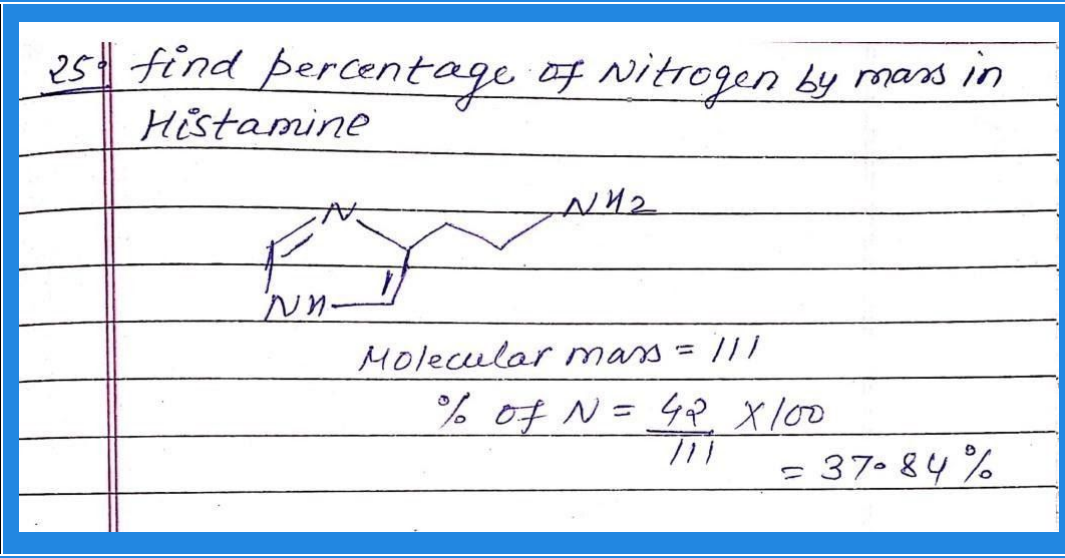
$$Ag^+ + e^- \longrightarrow Ag$$

1F Charge is required to deposit 1 mole of Ag.

$$V_{O_2} = \frac{nRT}{P}$$

$$= 5.675\ L$$

$$= 5.68\ L$$

25	

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