JEE–MAIN EXAMINATION – JANUARY 2026

(HELD ON WEDNESDAY 21st JANUARY 2026) **TIME : 9:00 AM TO 12:00 NOON**

CHEMISTRY | TEST PAPER WITH SOLUTION

SECTION-A

51. Consider the following reactions.

$PbCl_2 + K_2CrO_4 \rightarrow A + 2KCl$

(Hot solution)

$A + NaOH \rightleftharpoons B + Na_2CrO_4$

$PbSO_4 + 4CH_3COONH_4 \rightarrow (NH_4)_2SO_4 + X$

In the above reactions, A, B and X are respectively.

(1) $Na_2[Pb(OH)_2]$,$PbCrO_4$ and $(NH_4)_2[Pb(CH_3COO)_4]$

(2) $PbCrO_4$, $Na_2[Pb(OH)_4]$ and $[Pb(NH_3)_4]SO_4$

(3) $Na_2[Pb(OH)_2]$, $PbCrO_4$ and $[Pb(NH_3)_4]SO_4$

(4) $PbCrO_4$, $Na_2[Pb(OH)_4]$ and $(NH_4)_2[Pb(CH_3COO)_4]$

Ans. (4)

Sol. $\underset{\text{(Hot solution)}}{PbCl_2} + K_2CrO_4 \rightarrow \underset{\text{(A)}}{PbCrO_4} + 2KCl$

$PbCrO_4 + 4NaOH \text{ (excess)} \rightarrow \underset{\text{(B)}}{Na_2\left[Pb(OH)_4\right]} + Na_2CrO_4$

$PbSO_4 + 4CH_3COONH_4 \rightarrow \underset{\text{(X)}}{(NH_4)_2[Pb(CH_3COO)_4]} + (NH_4)_2SO_4$

52. Which of the following represents the correct trend for the mentioned property ?

A. F > P > S > B – Frist Ionization Energy

B. Cl > F > S > P – Electron Affinity

C. K > Al > Mg > B – Metallic character

D. $K_2O > Na_2O > MgO > Al_2O_3$ – Basic character

Choose the correct answer from the option given below.

(1) A, B and D only (2) A, B, C and D

(3) A and B only (4) B and C only

Ans. (1)

Sol. ⇒ On moving left to right in a period IE increases and from top to bottom in a group IE decreases.

F > P > S > B (IE order)

⇒ On moving left to right in a period metallic and basic character decreases.

K > Mg > Al > B (Metallic character order)

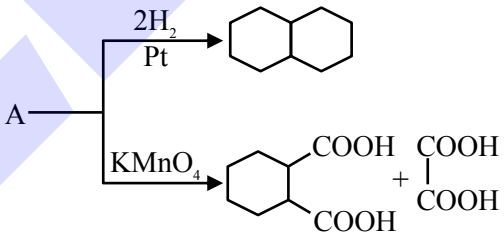
⇒ On moving top to bottom in a group metallic and basic character increases.

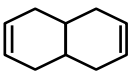
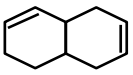
$K_2O > Na_2O > MgO > Al_2O_3$

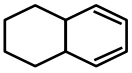
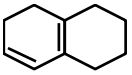
⇒ EA : Group 17 > Group 16 > Group 15

Cl > F > S > P

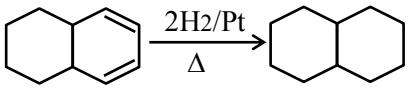
53. Identify A in the following reaction.

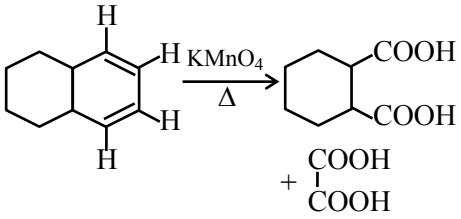


(1)  (2) 

(3)  (4) 

Ans. (3)

Sol. 



54. A hydrocarbon 'P' (C_4H_8) on reaction with HCl gives an optically active compound 'Q' (C_4H_9Cl) which on reaction with one mole of ammonia gives compound 'R' ($C_4H_{11}N$). 'R' on diazotization followed by hydrolysis gives 'S'. Identify P, Q, R and S.

(1) $P=CH_3-CH_2-CH=CH_2$, $Q=CH_3-CH_2-CH_2-\underset{\displaystyle Cl}{\underset{|}{CH_2}}$

$R=CH_3-CH_2-CH_2-\underset{\displaystyle CH_3}{\underset{|}{NH}}$, $S=CH_3-CH_2-\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle OH}{\overset{|}{CH}}}}$

(2) $P=CH_3$, $Q=Cl-CH_2$,

$R=H_2N-CH_2$, S=

(3) $P=CH_3-CH=CH-CH_3$, $Q=CH_3-CH_2-\underset{\displaystyle Cl}{\underset{|}{CH}}-CH_3$,

$R=CH_3-CH_2=\underset{\displaystyle NH_2}{\underset{|}{CH}}-CH_3$, $S=CH_3-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_3$

(4) $P=CH_3-CH=CH-CH_3$, $Q=CH_3-CH_2-CH_2-CH_2-Cl$,

$R=CH_3-CH_2-CH_2-\underset{\displaystyle NH_2}{\underset{|}{CH_2}}$, $S=CH_3-CH_2-\underset{\displaystyle OH}{\underset{|}{\underset{\displaystyle CH_2}{\underset{|}{CH_2}}}}$

Ans. (3)

Sol.

$$\underset{(P)}{CH_3-CH=CH-CH_3} \xrightarrow{HCl} \underset{(Q)}{CH_3-CH_2-\overset{*}{\underset{\displaystyle Cl}{\underset{|}{CH}}}-CH_3} \xrightarrow{\ddot{N}H_3} \underset{(R)}{CH_3-CH_2-\underset{\displaystyle NH_2}{\underset{|}{CH}}-CH_3} \xrightarrow{NaNO_2,\ Aq.HCl} \underset{(S)}{CH_3-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_3}$$

55. Given below are two statements :

Statement I : The number of pairs among [SiO_2, CO_2], [SnO, SnO_2], [PbO, PbO_2] and [GeO, GeO_2], which contain oxides that are both amphoteric is 2.

Statement II : BF_3 is an electron deficient molecule can act as a lewis acid, forms adduct with NH_3 and has a trigonal planar geometry.

In the light of the above statement, choose the correct answer from the option given below.

(1) Both **Statement I** and **Statement II** are true.

(2) Both **Statement I** and **Statement II** are false.

(3) **Statement I** is true but **Statement II** is false.

(4) **Statement I** is false **Statement II** is true.

Ans. (1)

Sol. $\Rightarrow$ SiO_2, CO_2, GeO, GeO_2 are acidic in nature.

SnO, SnO_2, PbO, PbO_2 are amphoteric in nature.

$\Rightarrow$ BF_3 is lewis acid acoording to lewic octet theory and has sp^2 hybridization with trigonal planar geometry and it can accept lone pair form ammonia to form adduct.

56. 80 mL of a hydrocarbon on mixing with 264 mL of oxygen in a closed U-tube undergoes complete combustion. The residual gases after cooling to 273 K occupy 224 mL. When the system is treated with KOH solution, the volume decreases to 64 mL. The formula of the hydrocarbon is :

(1) C_2H_4 (2) C_4H_{10} (3) C_2H_2 (4) C_2H_6

Ans. (3)

Sol.

$$C_xH_{y(g)} + \left(x+\frac{y}{4}\right)O_{2(g)} \longrightarrow xCO_{2(g)} + \frac{y}{2}H_2O_{(\ell)}$$

t=0	80	264	0	-
$t=t_{final}$	-	$264-80\left(x+\frac{y}{4}\right)$	80x	-

$$264-80\left(x+\frac{y}{4}\right)+80x=224$$

$$264-\frac{80y}{4}=224$$

$$40=\frac{80y}{4} \Rightarrow y=2$$

$$264-80\left(x+\frac{y}{4}\right)=64$$

$$264-80\left(x+\frac{1}{2}\right)=64$$

$$264-80x-40=64$$

$$x=2$$

Predict your JEE Main 1 2026 percentile
Try ALLEN's FREE Percentile Predictor
Check Now

57. 14.0 g of calcium metal is allowed to react with excess HCl at 1.0 atm pressure and 273 K.

Which of the following statements is **incorrect** ?

[Given : Molar mass in g mol^{-1} of Ca–40, Cl–35.5,H–1]

(1) 0.35 mol of H_2 gas is evolved.

(2) 7.84 L of H_2 gas is evolved.

(3) 33.3 of $CaCl_2$ is produced.

(4) The limiting reagent is calcium metal.

Ans. (3)

Sol. $\underset{\frac{14}{40}}{Ca_{(s)}} + \underset{\text{excess}}{2HCl_{(g)}} \longrightarrow \underset{-}{CaCl_{2(s)}} + \underset{-}{H_{2(g)}}$

$= 0.35$ mole $\quad$ 0.35 mole $\quad$ 0.35 mole

Volume of $H_{2(g)}$ evolved $= 0.35 \times 22.4 = 7.84$ L

(3) is wrong because weight of $CaCl_2 = .35 \times 111 = 38.85$ gm

58. In Carius method, 0.75 g of an organic compound gave 1.2 g of barium sulphate, find percentage of sulphur (molar mass 32 g mol^{-1}). Molar mass of barium sulphate is 233 g mol^{-1}.

(1) 4.55%

(2) 10.30%

(3) 21.97%

(4) 16.48%

Ans. (3)

Sol. $$\frac{n_{BaSO_4} \times 32}{W_{(\text{unknown comp.})}} \times 100$$

$$= \frac{1.2 \times 32}{233} \times \frac{100}{0.75} = 21.97\%$$

59. Elements P and Q form two types of non-volatile, non-ionizable compounds PQ and PQ_2. When 1 g of PQ is dissolved in 50 g of solvent 'A'. ΔT_b was 1.176 K while when 1 g of PQ_2 is dissolved in 50 g of solvent 'A', ΔT_b was 0.689 K. (K_b of 'A' = 5 K kg mol^{-1}). The molar masses of elements P and Q (in g mol^{-1}) respectively, are :

(1) 70, 110

(2) 65, 145

(3) 60, 25

(4) 25, 60

Ans. (4)

Sol. $(\Delta T_b)_{PQ} = K_b m$

$$1.176 = 5 \times \frac{1}{M_1} \times \frac{1000}{50}$$

$$M_1 = 85.03$$

$$(\Delta T_b)_{PQ_2} = 5 \times \frac{1}{M_2} \times \frac{1000}{50} = 0.689$$

$$M_2 = 145.13$$

Let molar mass of P & Q are M_P and M_Q respectively

$$M_P + M_Q = 85.03$$

$$M_P + 2M_Q = 145.13$$

$$M_P = 24.93 \approx 25$$

$$M_Q = 60.1 \approx 60$$

60. An organic compound (P) on treatment with aqueous ammonia under hot condition forms compound (Q) which on heating with Br_2 and KOH forms compound (R) having molecular formula C_9H_7N. Names of P, Q and R respectively are.

(1) Benzoic acid, benzamide, aniline

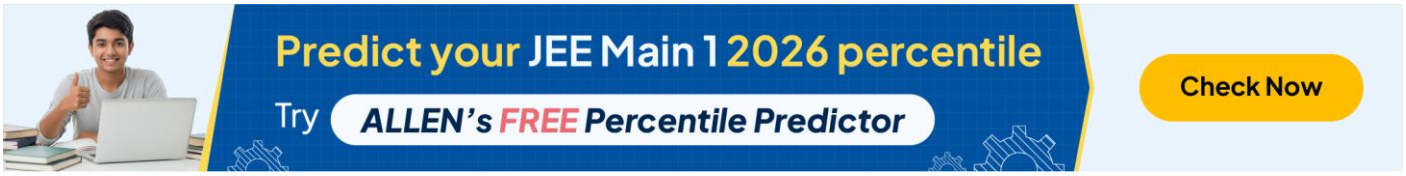
(2) Toluic acid, methylbenzamide, 2-methylaniline

(3) Benzoic acid,4-methylbenzamide,4-methylaniline.

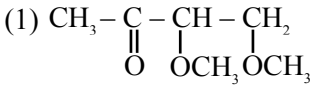
(4) Phenylethanoic acid, phenylethanamide, benzamine

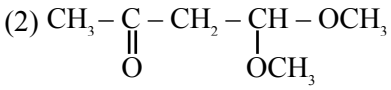
Ans. (1)

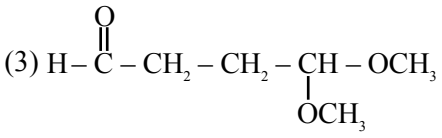
Sol. $$\underset{(P)}{Ph\text{–}COOH} \xrightarrow[\Delta]{NH_3} \underset{(Q)}{Ph\text{–}\overset{\overset{O}{\|}}{C}\text{–}NH_2} \xrightarrow{Br_2 \mid KOH} \underset{(R)}{Ph\text{–}NH_2}$$

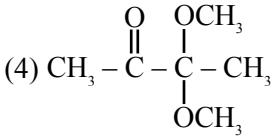


61. An organic compound "P" of molecular formula $C_6H_{12}O_3$ gives positive lodoform test but negative Tollen's test. When "P" is treated with dilute acid, it produces "Q". "Q" gives positive Tollen's test and also iodoform test. The structure of "P" is :

(1) 

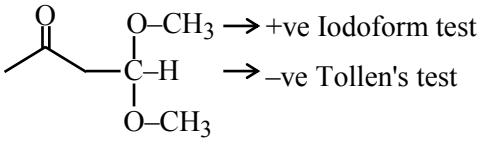
(2) 

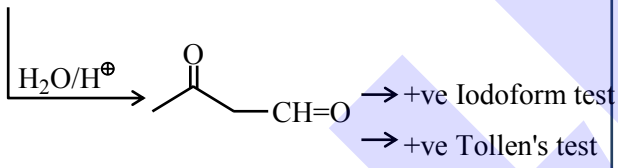
(3) 

(4) 

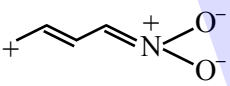
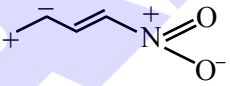
Ans. (2)

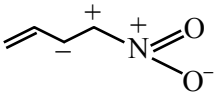
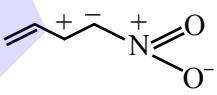
Sol.



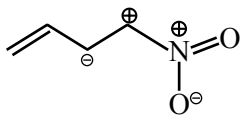


62. From the following, the least stable structure is :

(1)  (2) 

(3)  (4) 

Ans. (3)

Sol. 

This resonating structure having +ve charge on adjacent atoms so it is least stable.

63. MnO_4^{2-}, in acidic medium, disproportionates to :

(1) Mn_2O_7 and MnO_2

(2) MnO_4^- and MnO

(3) MnO_4^- and MnO_2

(4) Mn_2O_7 and MnO

Ans. (3)

Sol. $3MnO_4^{2-} + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O$

64. Given below are two statements:

Statement I: The number of species among SF_4, NH_4^+, $[NiCl_4]$, XeF_4, $[PtC1_4]^{2-}$, SeF_4 and $[Ni(CN)_4]^{2-}$, that have tetrahedral geometry is 3.

Statement II: In the set $[NO_2, BeH_2, BF_3, AIC1_3]$, all the molecules have incomplete octet around central atom. In the light of the above statements, choose the correct answer from the options given below:

(1) **Statement I** is true but **Statement II** is false

(2) Both **Statement I** and **Statement II** are false

(3) **Statement I** is false but **Statement II** is true

(4) Both **Statement I** and **Statement II** are true

Ans. (3)

Sol. Statement-I

SF_4 (See-saw)

XeF_4 (square planar),

$[PtCl_4]^{2-}$ (square planar),

$[NiCl_4]^{2-}$ (Tetrahedral),

$[Ni(CN)_4]^{2-}$ (square planar),

SeF_4 (See-saw)

NH_4^+ (Tetrahedral)

Statement-II

NO_2 (seven electrons on N)

BeH_2 (four electrons on Be)

BF_3 (six electrons on B)

$AlCl_3$ (six electrons on Al)

65. Given below are two statements:

Statement I: Among $[Cu(NH_3)^{2+}$, $[Ni(en)_3)]^{2+}$, $[Ni(NH_3)_6]^{2+}$ and $[Mn(H_2O)_6]^{2+}$, $[Mn(H_2O)_6]^{2+}$, has the maximum number of unpaired electrons.

Statement II: The number of pairs among $\{[NiCl_4]^{2-}$, $[Ni(CO)_4]\}$, $\{[NiCl_4]^{2-}$, $[Ni(CN)_4]^{2-}$ and $\{[Ni(CO)_4]$, $[Ni(CN)_4]^{2-}\}$ that contain only diamagnetic species is two.

In the light of the above statements, choose the **correct** answer from the options given below:

(1) **Statement I** is false but **Statement II** is true

(2) Both **Statement I** and **Statement II** are true

(3) Both **Statement I** and **Statement II** are false

(4) **Statement I** is true but **Statement II** is false

Ans. (4)

Sol. $[Cu(NH_3)_4]^{2+} \Rightarrow d^9, dsp^2$ one unpaired electron

$[Ni(en)_3]^{2+} \Rightarrow d^8, sp^3d^2$ two unpaired electrons

$[Ni(NH_3)_6]^{2+} \Rightarrow d^8, sp^3d^2$ two unpaired electrons

$[Mn(H_2O)_6]^{2+} \Rightarrow d^5, sp^3d^2$ five unpaired electrons

$[Ni(CO)_4]$ (diamagnetic)

$[NiCl_4]^{-2}$ (paramagnetic)

$[Ni(CN)_4]^{-2}$ (diamagnetic)

66. Identify correct statement from the following :

A. Propanal and propanone are functional isomers.

B. Ethoxyethane and methoxypropane are metamers.

C. But-2-ene shows optical isomerism.

D. But-1-ene and but-2-ene are functional isomers.

E. Pentane and 2, 2-dimethyl propane are chain isomers.

Choose the **correct** answer from the options given below :

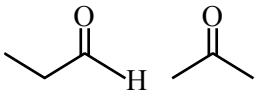
(1) B, C and D only

(2) A, B and C only

(3) A, B and E only

(4) C, D and E only

Ans. (3)

Sol.  are Functional isomer

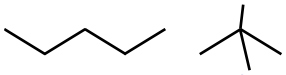
$CH_3–CH=CH–CH_3$ & $CH_3–CH_2–CH=CH_2$

Are Positional isomer

$CH_3–CH_2–O–CH_2–CH_3$ & $CH_3–CH_2–CH_2–O–CH_3$

are Metamer

$CH_3–CH=CH–CH_3$ does not have optical isomer

 Chain isomer

67. Identify the correct statements.

A. Arginine and Tryptophan are essential amino acids.

B. Histidine does not contain heterocyclic ring in its structure.

C. Proline is a six membered cyclic ring amino acid.

D. Glycine does not have chiral centre.

E. Cysteine has characteristic feature of side chain as $MeS-CH_2-CH_2-$.

Choose the **correct** answer from the options given below:

Option

(1) C and E Only

(2) B and E Only

(3) C and D Only

(4) A and D Only

Ans. (4)

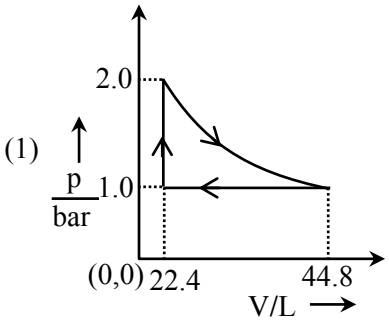
Sol. · Histidine does contain heterocyclic ring.

· Proline is a five membered cyclic ring amino acid.

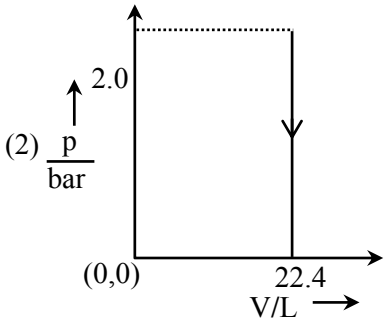
· Cysteine has characteristic feature of side chain as $CH_2–SMe$

68. Which of the following graphs between pressure 'P' versus volume 'V' represent the maximum work done ?

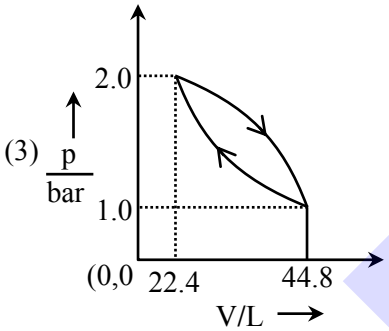
(1)



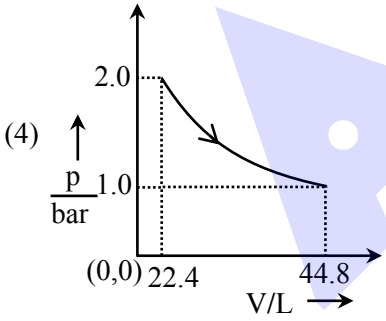
(2)



(3)



(4)



Ans. (4)

Sol. Area under the P v/s V curve, is equal to magnitude of work.

In option (2) work done is zero while in remaining options net work done is negative due to expansion.

NTA has given the answer without considering the negative sign that is considered only magnitude.

69. For the reaction, $N_2O_4 \rightleftharpoons 2NO_2$, graph is plotted as shown below. Identify correct statements.

A. Standard free energy change for the reaction is -5.40 kJ mol^{-1}.

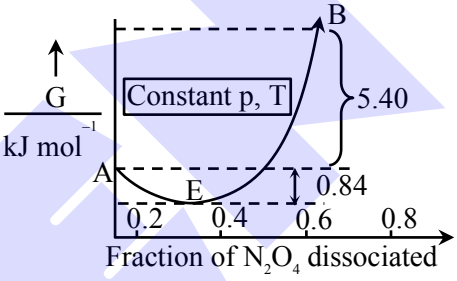
B. As $\Delta G^{\ominus}$ in graph is positive, N_2O_4 will not dissociate into NO_2 at all.

C. Reverse reaction will go to completion.

D. When 1 mole of N_2O_4 changes into equilibrium mixture, value of $\Delta G^{\ominus} = -0.84$ kJ mol^{-1}

E. When 2 mole of NO_2, changes into equilibrium mixture, $\Delta G^{\ominus}$ for equilibrium mixture is -6.24 kJ mol^{-1}.

E. When 2 mole of NO_2, changes into equilibrium mixture, $\Delta G^{\ominus}$ for equilibrium mixture is -6.24 kJ mol^{-1}.



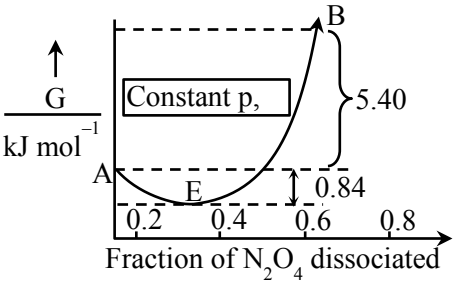
Choose the **correct** answer from the options given below :

(1) D and E only (2) C and E only

(3) A and D only (4) B and C only

Ans. (1)

Sol.



(A) $\Delta_r G^\circ = G^\circ_B - G^\circ_A = +ve$

(B) $\Delta_r G^\circ = +ve$, N_2O_4 will partially dissociates into NO_2.

(C) For reverse reaction

It is partially completed as there is equilibrium at E.

(D) For 1 mole N_2O_4; $\Delta_r G^\circ = -0.84$ kJ mol^{-1}

(E) For 2 mole NO_2 ; $\Delta G^\circ = -5.4 - 0.84$

$= -6.24$ kJ mol^{-1}.

70. Given below are two statements:

Statement I: When an electric discharge is passed through gaseous hydrogen, the hydrogen molecules dissociate and the energetically excited hydrogen atoms produce electromagnetic radiation of discrete frequencies.

Statement II: The frequency of second line of Balmer series obtained from He^+ is equal to that of first line of Lyman series obtained from hydrogen atom.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both **Statement I** and **Statement II** are true

(2) Both **Statement I** and **Statement II** are false

(3) **Statement I** is false but **Statement II** is true

(4) **Statement I** is true but **Statement II** is false

Ans. **(1)**

Sol. $\frac{1}{\lambda} = RZ^2\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$

For Ist line of lyman series in H-atom

$\frac{1}{\lambda} = R(1)^2\left(\frac{1}{1^2} - \frac{1}{2^2}\right)$

$\frac{1}{\lambda} = \frac{3R}{4}$

for 2nd line of Balmer series of He^+

$\frac{1}{\lambda'} = R(2)^2\left(\frac{1}{2^2} - \frac{1}{4^2}\right)$

$\frac{1}{\lambda'} = \frac{3R}{4}$

As λ and λ' is equal so frequency of these lines will be also equal.

SECTION-B

71. Pre-exponential factors of two different reactions of same order are identical. Let activation energy of first reaction exceeds the activation energy of second reaction by 20 kJ mol^{-1}. If k_1 and k_2 are the rate constants of first and second reaction respectively at 300 K, then In $\frac{k_2}{k_1}$ will be …….. . (nearest integer) [R=8.3 J K^{-1} mol^{-1}]

Ans. **(8)**

Sol. $A \xrightarrow{RX^n(1)} \text{product} \quad E_1$

$B \xrightarrow{RX^n(2)} \text{product} \quad E_2$

Assuming 'A' same for both reaction.

$\ln k_1 = \ln A - \frac{E_1}{300R}$

$\ln k_1 = \ln A - \frac{E_2}{300R}$

$\ln\left(\frac{k_2}{k_1}\right) = \frac{E_1 - E_2}{300R} = \frac{20\times1000}{300R}$

$= 8.032$

72. The pH and conductance of a weak acid (HX) was found to be 5 and 4×10^{-5} S, respectively. The conductance was measured under standard condition using a cell where the electrode plates having a surface area of 1 cm^2 were at a distance of 15 cm apart. The value of the limiting molar conductivity is …….. S m^2 mol^{-1}. (nearest integer)
(Given: degree of dissociation of the weak acid (a) << 1)

Ans. **(6)**

Sol. pH = 5

$[H^+] = 10^{-5} = [HX].\alpha$

$= [HX].\frac{\Lambda_m}{\Lambda_m^\infty}$

$\Lambda_m = \frac{k\times1000}{[HX]}$

$K = G.G^* = 4\times10^{-5}\times\frac{15}{1} = 6\times10^{-4}\ S.cm^{-1}$

$[H^+] = 10^{-5} = [HX]\times\frac{6\times10^{-4}\times1000}{\Lambda_m^\infty\times[HX]}$

$\Lambda_m^\infty = 60000\ S.cm^2\ mol^{-1}$

$\Lambda_m^\infty = 6\ S.m^2\ mol^{-1}$

73. Use the following data :

Substance	$\frac{\Delta_f H^{\ominus}(500K)}{kJ\,mol^{-1}}$	$\frac{S^{\ominus}(500K)}{J\,K^{-1}\,mol^{-1}}$
AB(g)	32	222
$A_2(g)$	6	146
$B_2(g)$	X	280

One mole each of $A_2(g)$ and $B_2(g)$ are taken in a 1L closed flask and allowed to establish the equilibrium at 500K.

$A_2(g) + B_2(g) \rightleftharpoons 2AB(g)$

The value of x (in $kJ\,mol^{-1}$) is …….. (Nearest integer)

(Given: log K=2.2 R=8.3 $JK^{-1}\,mol^{-1}$)

Ans. (70)

Sol. $A_2 + B_2 \xrightarrow{500K} 2AB \;\; \log K = 2.2$

$\Delta H° = (2 \times 32) - (6 + x) = (58 - x)$ kJ

$\Delta S° = (2 \times 222) - (146 + 280) = 18$ Joule

$\Delta G° = -RT\ln K$

$$\Delta G° = -\frac{8.314 \times 500 \times 2.2 \times 2.303}{1000}$$

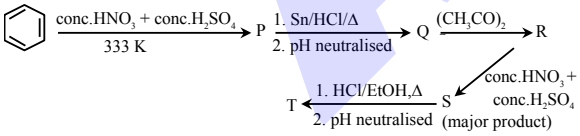
$\Delta G° = -21.06$

$\Delta H° - T\Delta S° = -21.06$

$$58 - x - 500\left(\frac{18}{1000}\right) = -21.06$$

x = 70.06 KJ/mol

74. Consider the following reaction sequence

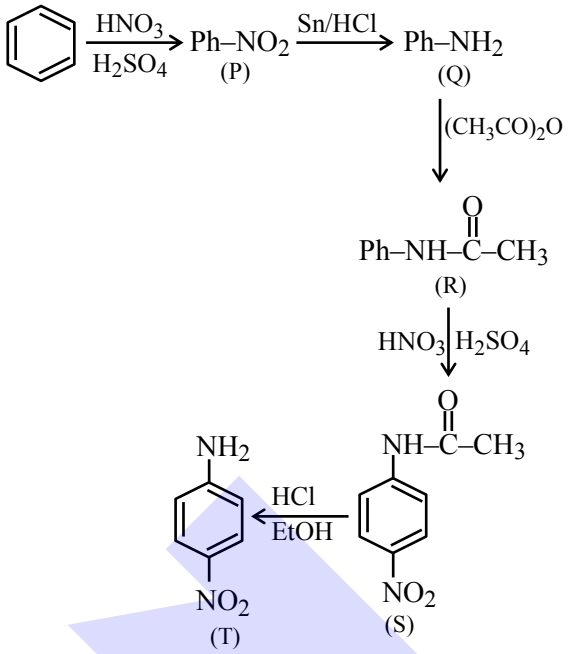


The percentage of nitrogen in product 'T' formed is _____%. (Nearest integer)

(Given molar mass in $g\,mol^{-1}$ H:1, C:12, N:14, O:16)

Ans. (20)

Sol.



Mol. wt = $6 \times 12 + (6 \times 1) + (2 \times 14) + (2 \times 16) = 138$

$$\%N = \frac{28}{138} \times 100 = 20.29\%$$

75. Consider the following reactions:

$NaCl + K_2Cr_2O_7 + H_2SO_4 \rightarrow A + KHSO_4 + NaHSO_4 + H_2O$

$A + NaOH \rightarrow B + NaCl + H_2O$

$B + H_2SO_4 + H_2O_2 \rightarrow C + Na_2SO_4 + H_2O$

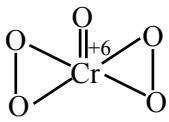
In the product 'C', 'X' is the number of O_2^{2-} units, 'Y' is the total number oxygen atoms present and 'Z' is the oxidation state of Cr. The value of X + Y + Z is _____ .

Ans. (13)

Sol. $A \rightarrow CrO_2Cl_2$

$B \rightarrow Na_2CrO_4$

$C \rightarrow CrO_5$



X = 2 , Y = 5 and Z = 6

ALLEN

For Class 12th Pass Students

RISE. REPEAT.
RANK UP IN JEE

JOIN LEADER COURSE
JEE (Main+Adv.) 2027

26th Mar & 15th Apr

Know more

ALLEN ONLINE

Think JEE 2027 will be your best shot?

Join the **Leader Online Course!**

Win up to **90%** scholarship via **ASAT**

Enrol Now

ALLEN ONLINE

Get REAL exam practice for JEE Main 2026

with the

Major Online Test Series!

- 13 full-syllabus tests
- 100+ additional mock tests
- 50,000+ teacher-recommended Qs. & more

Buy Now

ALLEN

Get The Latest

IIT-JEE Special Books

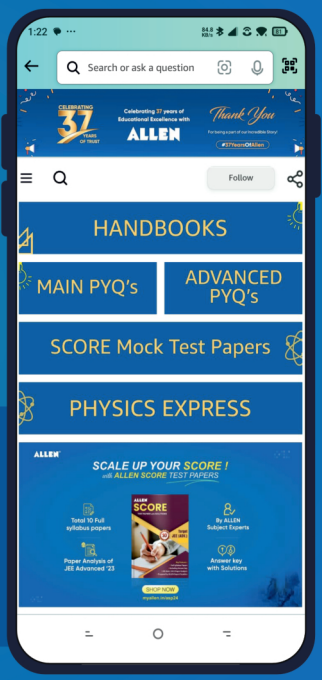
at Your Door Steps...!!

JOIN THE JOURNEY OF LEARNING

with

HANDBOOKS | ADVANCED-QB | SCORE PAPERS

PHYSICS EXPRESS | MAIN PYQ's | Adv. PYQ's



SHOP NOW

Available in
HINDI & ENGLISH