

JEE Main January 2026
Question Paper With Text Solution
28 January | Shift-1

CHEMISTRY



JEE Main & Advanced | XI-XII Foundation | VI-X Pre-Foundation

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JEE MAIN JANUARY 2026 | 28 JANUARY SHIFT-1**SECTION - A**

Question ID : 444792734

51. Regarding the hydrides of group 15 elements EH_3 ($\text{E} = \text{N}, \text{P}, \text{As}, \text{Sb}$), select the correct statement from the following:

- A. The stability of hydrides decreases down the group.
- B. The basicity of hydrides decreases down the group.
- C. The reducing character increases down the group.
- D. The boiling point increases down the group.

Choose the correct answer from the options given below:

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- (1) B & C only (2) A, B & C only (3) A & D only (4) A, B, C & D

Ans. Official answer NTA (2)

Sol. Stability order : $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3 > \text{SbH}_3$

Lewis Basic Strength : $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3 > \text{SbH}_3$

Reducing character : $\text{NH}_3 < \text{PH}_3 < \text{AsH}_3 < \text{SbH}_3$

Boiling point : $\text{PH}_3 < \text{AsH}_3 < \text{NH}_3 < \text{SbH}_3$

Question ID : 444792732

52. An organic compound undergoes first order decomposition. The time taken for decomposition to $\left(\frac{1}{8}\right)^{\text{th}}$ and $\left(\frac{1}{10}\right)^{\text{th}}$ of its initial concentration are $t_{1/8}$ and $t_{1/10}$ respectively.

What is the value of $\frac{t_{1/8}}{t_{1/10}} \times 10$? ($\log 2 = 0.3$)

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- (1) 3 (2) 30 (3) 0.9 (4) 9

Ans. Official answer NTA (4)

Sol. 1st order rate constant (k) = $\frac{2.303}{t} \log \left(\frac{C_0}{C_t} \right)$



$$t_{\frac{1}{8}} = \frac{2.303}{k} \log \left(\frac{C_0}{\frac{C_0}{8}} \right)$$

$$t_{\frac{1}{10}} = \frac{2.303}{k} \log \left(\frac{C}{\frac{C_0}{10}} \right)$$

$$\frac{t_{\frac{1}{8}}}{t_{\frac{1}{10}}} = \frac{\log 8}{\log 10} = 0.9$$

$$\frac{t_{\frac{1}{8}}}{t_{\frac{1}{10}}} \times 10 = 9$$

Question ID : 444792731

53. Consider a weak base 'B' of $pK_b = 5.699$. 'x' mL of 0.02 M HCl and 'y' mL of 0.02 M weak base 'B' are mixed to make 100 mL of a buffer of pH 9 at 25°C. The values of 'x' and 'y' respectively are:

[Given: $\log 2 = 0.3010$, $\log 3 = 0.4771$, $\log 5 = 0.699$]

क

(1)

x	y
11.1	88.9

(2)

x	y
14.3	85.7

(3)

x	y
85.7	14.3

(4)	<table border="1"><tr><td>x</td><td>y</td></tr><tr><td>42.7</td><td>57.3</td></tr></table>	x	y	42.7	57.3
x	y				
42.7	57.3				

Ans. Official answer NTA (2)

Sol. $pK_b = 5.699$

$$pH = 9$$



$$0.02 \text{ M} \quad 0.02 \text{ M}$$

$$x \text{ ml} \quad y \text{ ml}$$

$$0 \quad 0.02 y - 0.02 x \quad 0.02 x \quad 0.02 x$$

Millimoles in Buffer $\rightarrow 0$

$$pOH = pK_b + \log \left[\frac{\text{salt}}{\text{base}} \right]$$

$$5 = 5.691 + \log \left[\frac{\text{salt}}{\text{base}} \right]$$

$$-0.691 = \log \frac{x}{y-x}$$

$$\frac{x}{y-x} = \frac{1}{5}$$

$$6x = y$$

$$\text{Total volume} = 100 \text{ ml}$$

$$x + y = 100$$

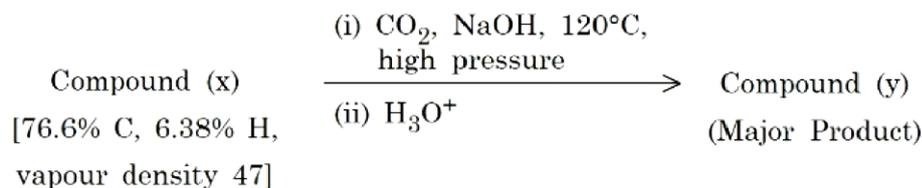
$$7x = 100$$

$$x = \frac{100}{7} = 14.28$$

$$y = \frac{600}{7} = 85.71$$

Question ID : 444792741

54. Consider the following reaction sequence



Compound (y) develops characteristic colour with neutral $FeCl_3$ solution.

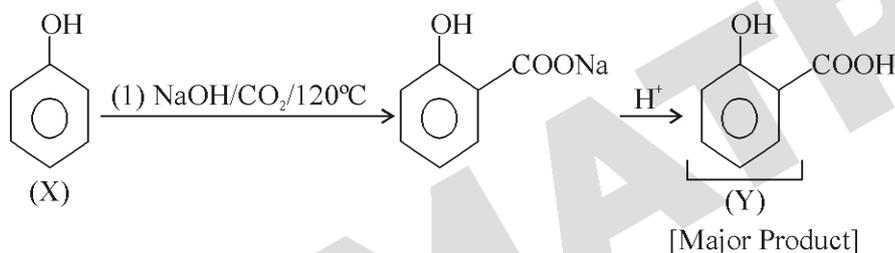
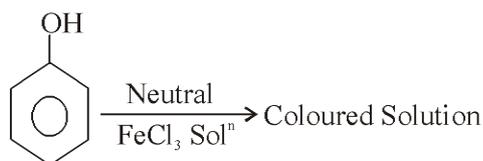
Identify the INCORRECT statement from the following for the above sequence.

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- (1) Both compounds x and y will dissolve in NaOH .
- (2) Both compounds x and y will burn with sooty flame.
- (3) Compound y will dissolve in NaHCO₃ and evolve a gas.
- (4) Compound x is more acidic than compound y .

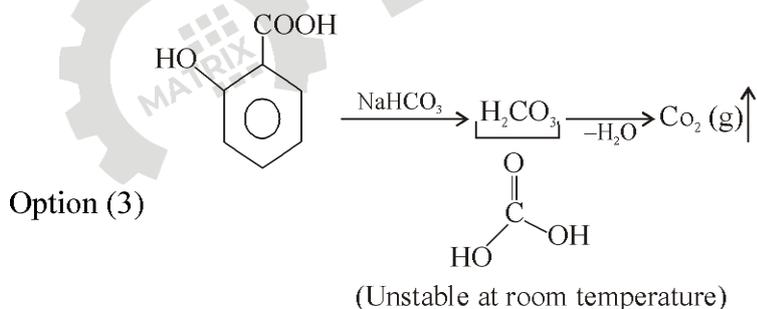
Ans. Official answer NTA (4)

Sol. Compound X will be Phenol.



Option (1) Both compounds form salts so dissolved.

Option (2) Both are aromatic compounds → Burns with sooty flame.

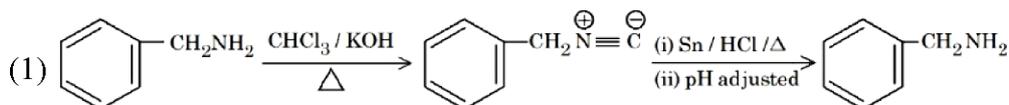


Option (4) Acidic Strength Carboxylic acid > Phenol

Question ID : 444792743

55. Consider the following reactions giving major product. Identify the correct reaction.

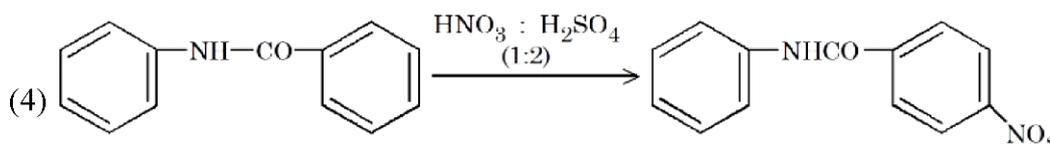
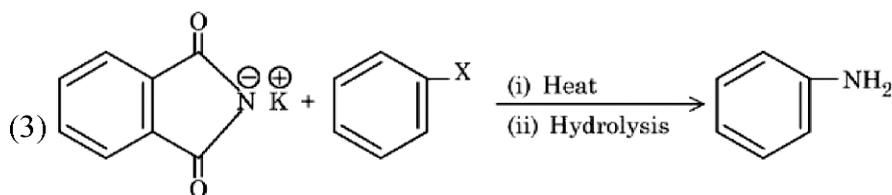
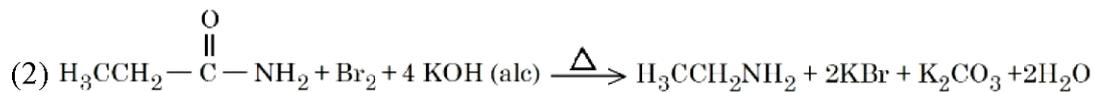
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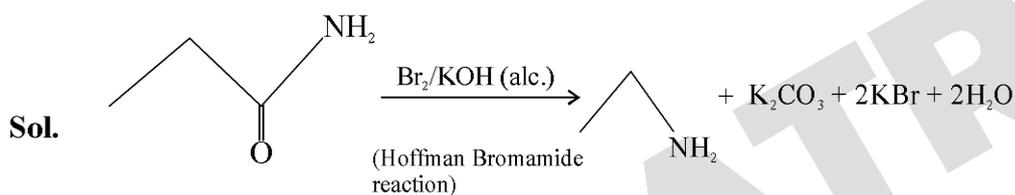
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Ans. Official answer NTA (2)



Question ID : 444792726

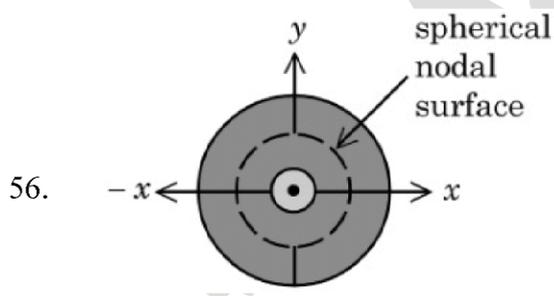


Figure 1. electron probability density for 2s orbital

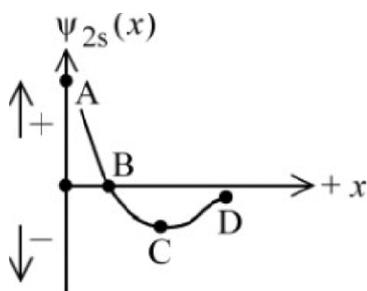


Figure 2. wave function for 2s orbital

Which of the following point in Figure 2 most accurately represents the nodal surface as shown in Figure 1?

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- (1) A (2) D (3) C (4) B

Ans. Official answer NTA (4)

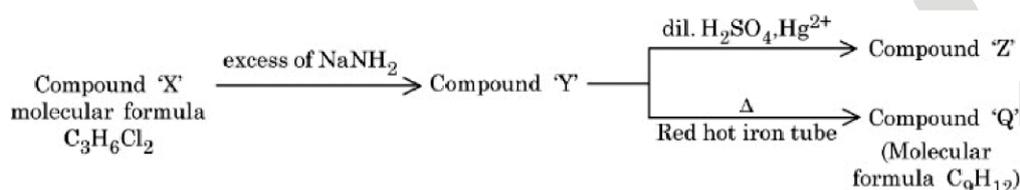
Sol. at nodal surface : $|\psi^2| = 0$

$$\Rightarrow |\psi| = 0$$

at point B $|\psi| = 0$

Question ID : 444792740

57. Given below are two statements for the following reaction sequence.



Statement I: Compound 'Z' will give yellow precipitate with NaOI .

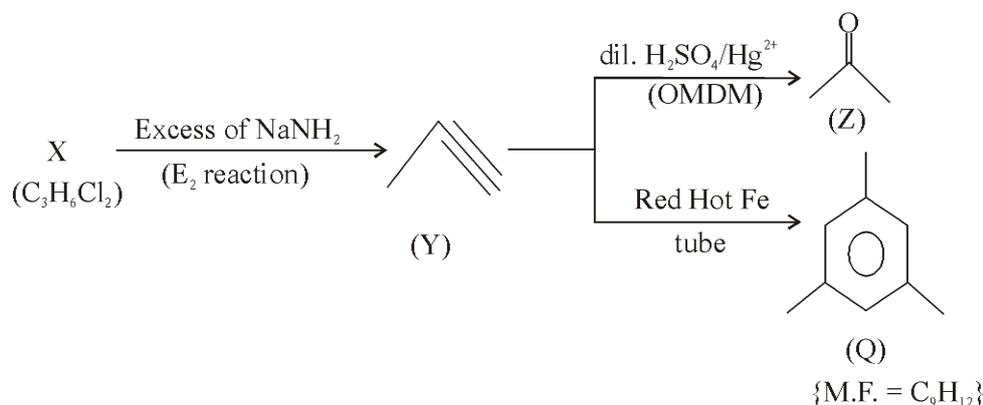
Statement II: Compound 'Q' has two different types of 'H' atoms (aromatic : aliphatic) in the ratio 1:3.

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

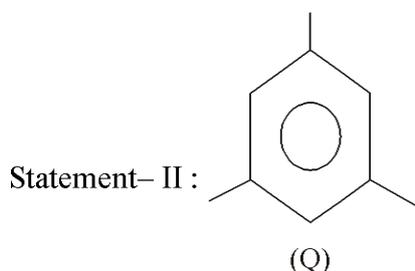
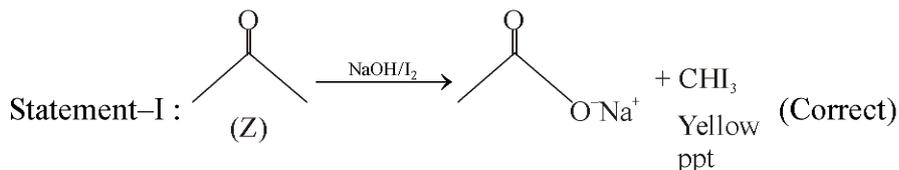
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- (1) Statement I is false but Statement II is true
 (2) Both Statement I and Statement II are true
 (3) Statement I is true but Statement II is false
 (4) Both Statement I and Statement II are false

Ans. Official answer NTA (2)



Sol.



$$\begin{aligned} \text{type of H} &\Rightarrow 1^\circ = 9 \\ &2^\circ = 3 \end{aligned}$$

$$\text{ratio} \Rightarrow 3 : 1 \text{ (Correct)}$$

Question ID : 444792728

58. Given below are two statements:

Statement I: The number of species among BF_4^- , SiF_4 , XeF_4 and SF_4 , that have unequal E – F bond lengths is two. Here, E is the central atom.

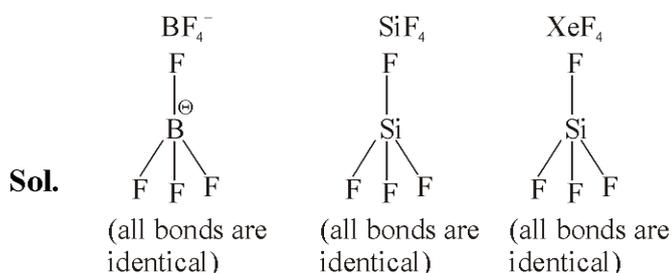
Statement II: Among O_2^- , O_2^{2-} , F_2 and O_2^+ , O_2^- has the highest bond order.

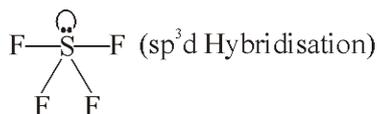
In the light of the above statements, choose the correct answer from the options given below

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- (1) Both Statement I and Statement II are false
- (2) Statement I is false but Statement II is true
- (3) Statement I is true but Statement II is false
- (4) Both Statement I and Statement II are true

Ans. Official answer NTA (1)





(axial S–F bonds are longer as compared to equatorial S–F bonds)

→ Statement I is false.

Molecular	Bond order
O_2^{2-}	1
F_2	1
O_2^-	1.5
O_2^+	2.5 (highest)

Question ID : 444792730

59. At T(K), 2 moles of liquid A and 3 moles of liquid B are mixed. The vapour pressure of ideal solution formed is 320 mm Hg . At this stage, one mole of A and one mole of B are added to the solution. The vapour pressure is now measured as 328.6 mm Hg . The vapour pressure (in mm Hg) of A and B are respectively:

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- (1) 300,200 (2) 400,300 (3) 600,400 (4) 500,200

Ans. Official answer NTA (4)

Sol. Initially → 2 moles of + 3 moles of B

$$X_A = \frac{2}{5} \text{ and } X_B = \frac{3}{5}$$

$$P_s = P_A^\circ X_A + P_B^\circ X_B$$

$$320 = P_A^\circ \left(\frac{2}{5}\right) + P_B^\circ \left(\frac{3}{5}\right)$$

$$2P_A^\circ + 3P_B^\circ = 1600$$

Now 1 mole of A and 1 mole of B is added

$$X'_A = \frac{3}{7} \text{ and } X'_B = \frac{4}{7}$$

$$P'_s = P_A^\circ X'_A + P_B^\circ X'_B$$

$$328.57 = P_A^\circ \left(\frac{3}{7}\right) + P_B^\circ \left(\frac{4}{7}\right)$$

$$3P_A^\circ + 4P_B^\circ = 2300$$

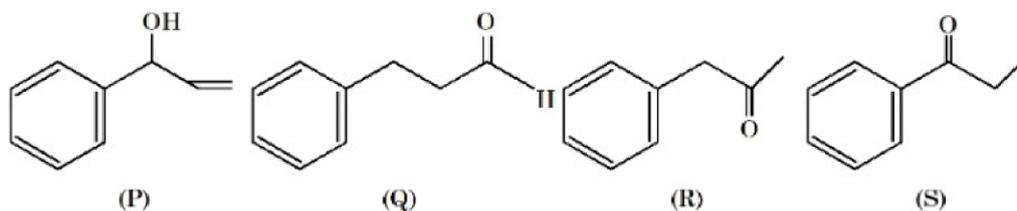
on solving these two equations

$$P_A^\circ = 200 \text{ mm of Hg}$$

$$P_B^\circ = 500 \text{ mm of Hg}$$

Question ID : 444792742

60. Given below are the four isomeric compounds (P, Q, R, S)



Identify correct statements from below.

- A. Q, R and S will give precipitate with 2, 4-DNP.
- B. P and Q will give positive Bayer's test.
- C. Q and R will give sooty flame.
- D. R and S will give yellow precipitate with $I_2/NaOH$.
- E. Q alone will deposit silver with Tollen's reagent

Choose the correct option.

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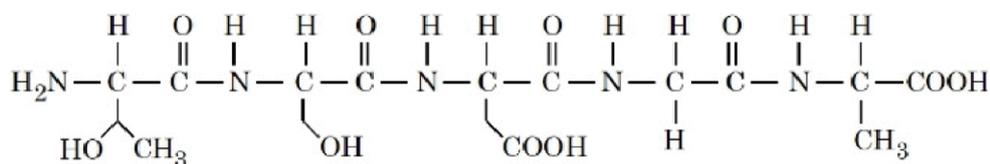
- (1) A, C and E only (2) C and E only (3) A and E only (4) A, B, D and E only

Ans. Official answer NTA (1)

- Sol.** A \Rightarrow 2,4-DNP Test will be given by carbonyl compounds (Q, R, S) – Correct
 B \Rightarrow Bayer Test is given by unsaturated ($C=C$ or $C\equiv C$) compounds (P) – Incorrect
 C \Rightarrow Aromatic compounds burns with sooty flames (P, Q, R, S) – Correct
 D \Rightarrow Iodoform test is given by methyl carbonyl compounds (R) – Incorrect
 E \Rightarrow Tollen's test is used for aldehyde (Q) – Correct

Question ID : 444792744

61. In the given pentapeptide, find out an essential amino acid (Y) and the sequence present in the pentapeptide:



Choose the correct answer from the options given below:

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	(Y)	(Sequence)
(1)	Threonine	Thr-Ser-Asp-Gly-Ala

	(Y)	(Sequence)
(2)	Serine	Thr-Ser-Asp-Ala-Gly

	(Y)	(Sequence)
(3)	Threonine	Ser-Thr-Asp-Gly-Ala

	(Y)	(Sequence)
(4)	Serine	Ser-Asp-Thr-Ala-Gly

Ans. Official answer NTA (1)

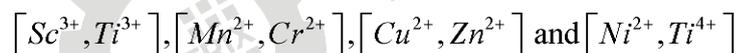
Sol. Sequence is \Rightarrow Thr – Ser – Asp – Gly – Ala

 Essential Amino acid \Rightarrow Threonine

Question ID : 444792736

62. Given below are two statements:

Statement I: The number of pairs, from the following, in which both the ions are coloured in aqueous solution is 3 .


 Statement II: Th^{4+} is the strongest reducing agent among $Th^{4+}, Ce^{4+}, Gd^{3+}$ and Eu^{2+}

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

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- (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. Official answer NTA (2)

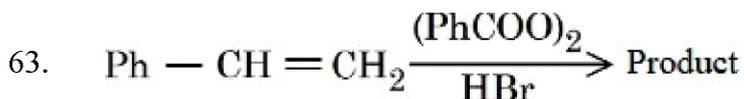
Sol. $Sc^{+3} \rightarrow$ Colourless $Cr^{+2} \rightarrow$ Violet

 $Ti^{+4} \rightarrow$ Colourless $Mn^{+2} \rightarrow$ Pink

$Zn^{+2} \rightarrow$ Colourless $Cu^{+2} \rightarrow$ Blue

 Tb^{+4} cannot act as reducing agent. Eu^{+2} is good reducing agent.

Question ID : 444792739



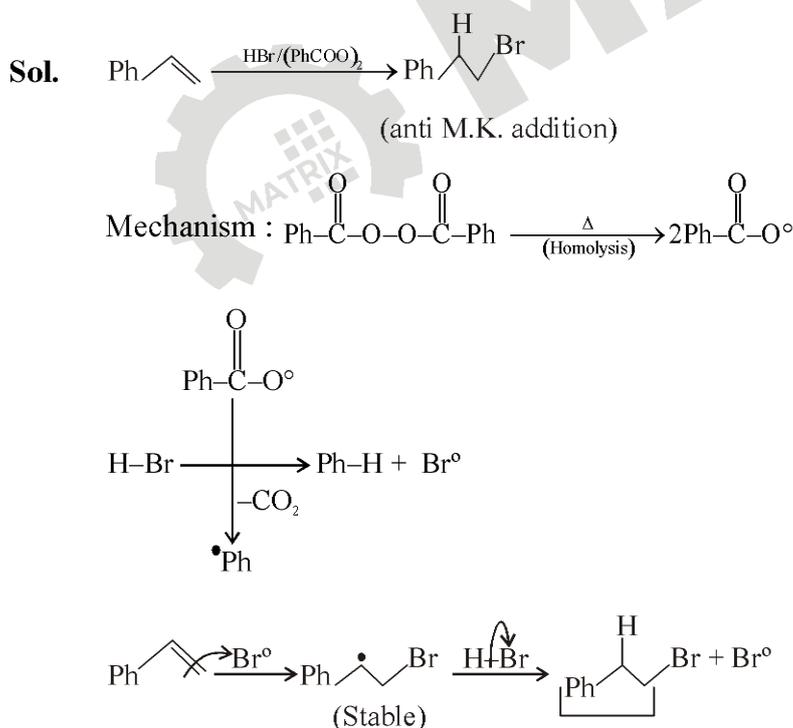
Consider the above reaction

- A. The reaction proceeds through a more stable radical intermediate.
- B. The role of peroxide is to generate H^\cdot (Hydrogen radical).
- C. During this reaction, benzene is formed as a byproduct.
- D. 1-Bromo-2-phenylethane is formed as the minor product.
- E. The same reaction in absence of peroxide proceeds via carbocation intermediate.

Identify the correct statements. Choose the correct answer from the options given below:

 \bar{c}

- (1) A, B & D Only (2) A, C & E Only (3) C, D & E Only (4) A & E Only

Ans. Official answer NTA (2)

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A ⇒ Correct

B ⇒ Br° is generated not H°

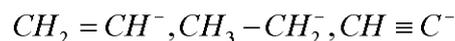
C ⇒ Correct

D ⇒ This is major Product (incorrect)

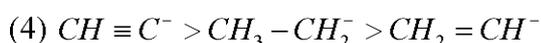
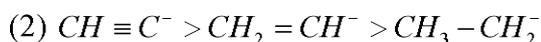
E ⇒ In absence of peroxide M.K. addition takes place. (Correct)

Question ID : 444792738

64. CORRECT order of stability for the following is

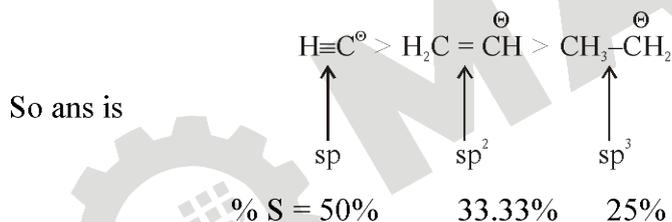


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Ans. Official answer NTA (2)

Sol. Order of stability of carbanion \propto %s-character



Question ID : 444792733

65. In period 4 of the periodic table, the elements with highest and lowest atomic radii are respectively.

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(1) K & Br

(2) Na & Cl

(3) K & Se

(4) Rb & Br

Ans. Official answer NTA (1)

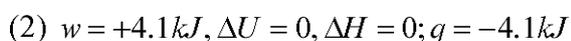
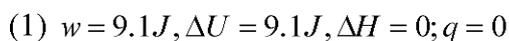
Sol. On moving from left to right in a period size decreases.

Question ID : 444792729

66. 20.0 dm^3 of an ideal gas 'X' at 600 K and 0.5 MPa undergoes isothermal reversible expansion until pressure of the gas is 0.2 MPa . Which of the following option is correct?

(Given : $\log 2 = 0.3010$ and $\log 5 = 0.6989$)

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$$(3) w = -3.9 \text{ kJ}, \Delta U = 0, \Delta H = 0; q = 3.9 \text{ kJ}$$

$$(4) w = -9.1 \text{ kJ}, \Delta U = 0, \Delta H = 0, q = 9.1 \text{ kJ}$$

Ans. Official answer NTA (4)

Sol. $P_1 = 0.5 \text{ M Pa}$

$$P_2 = 0.2 \text{ M Pa}$$

$$T = 600 \text{ K}$$

For isothermal process $\Delta U = 0$ and $\Delta H = 0$

$$\Delta U = q + W$$

$$\Delta U = 0 \text{ (isothermal)}$$

$$q = -W$$

$$W = -nRT \ln \left(\frac{P_1}{P_2} \right)$$

$$W = -2.303nRT \log \left(\frac{P_1}{P_2} \right)$$

$$(PV = nRT)$$

$$W = -2.303(P_1 V_1) \log \left(\frac{P_1}{P_2} \right)$$

$$W = -2.303 \times (0.5 \times 10^6) \times (20 \times 10^{-3}) \log \left(\frac{0.5}{0.2} \right)$$

$$W = -9.1 \text{ kJ}$$

$$q = -W = 9.1 \text{ kJ}$$

Question ID : 444792745

67. Given below are two statements:

Statement I: Griss-Ilosvay test is used for the detection of nitrite ion, which involves the use of sulphanilic acid and α -naphthylamine reagent.

Statement II: In the above test, sulphanilic acid is diazotized by the acidified nitrite ion, which on further coupling with α -naphthylamine forms an azo-dye.

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

क

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

(2) Both Statement I and Statement II are false

(3) Both Statement I and Statement II are true

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

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Ans. Official answer NTA (3)

Sol.

Question ID : 444792735

68. The correct statement among the following is:

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(1) $Ni(CO)_4$ is diamagnetic and $[NiCl_4]^{2-}$ and $[Ni(CN)_4]^{2-}$ are paramagnetic.

(2) $Ni(CO)_4$ and $[NiCl_4]^{2-}$ are diamagnetic and $[Ni(CN)_4]^{2-}$ is paramagnetic.

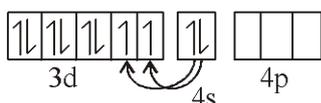
(3) $Ni(CO)_4$ and $[Ni(CN)_4]^{2-}$ are diamagnetic and $[NiCl_4]^{2-}$ is paramagnetic.

(4) $[Ni(CN)_4]^{2-}$ and $[NiCl_4]^{2-}$ are diamagnetic and $Ni(CO)_4$ is paramagnetic.

Ans. Official answer NTA (3)

Sol. $[Ni(CO)_4]$

$Ni \rightarrow 3d^8 4s^2$

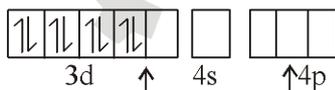


$\rightarrow sp^3$ hybridisation and diamagnetic

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

$Ni^{+2} \rightarrow 3d^8 4s^2$

$CN^- \rightarrow S.F.L.$

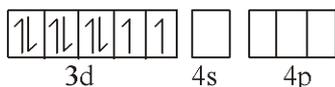


dsp^2 Hybridisation
and diamagnetic

$[NiCl_4]^{2-}$

$Cl^- \rightarrow W.F.L.$

$Ni^{+2} \rightarrow 3d^8 4s^0$



sp^3 hybridisation and paramagnetic

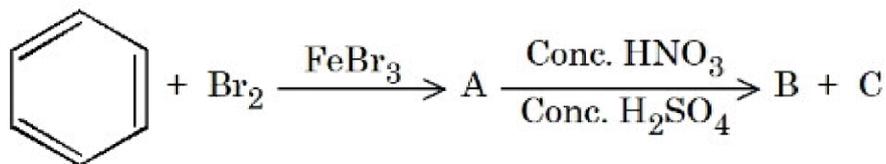
Question ID : 444792737

69. Method used for separation of mixture of products (B and C) obtained in the following reaction is

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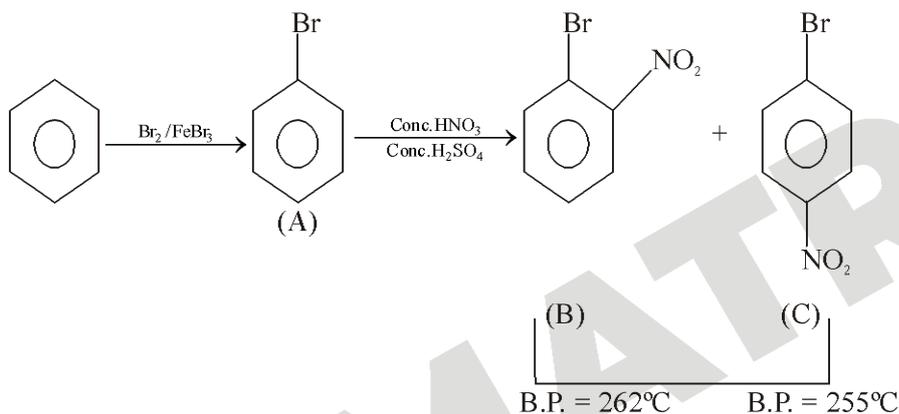
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(1) steam distillation

(2) fractional distillation

(3) simple distillation

(4) sublimation

Ans. Official answer NTA (2)

Sol.

Separated by fractional distillation

Question ID : 444792727

70. The wave numbers of three spectral lines of H atom are considered. Identify the set of spectral lines belonging to Balmer series.

(R = Rydberg constant)

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- (1) $\frac{5R}{36}, \frac{3R}{16}, \frac{21R}{100}$
 (2) $\frac{7R}{144}, \frac{3R}{16}, \frac{16R}{255}$
 (3) $\frac{3R}{4}, \frac{3R}{16}, \frac{7R}{144}$
 (4) $\frac{5R}{36}, \frac{8R}{9}, \frac{15R}{16}$

Ans. Official answer NTA (1)

Sol.
$$\frac{1}{\lambda} = RZ^2 \left[\frac{1}{n_L^2} - \frac{1}{n_H^2} \right]$$

For Balmer series

$$n_L = 2$$

$$3 \rightarrow 2$$

$$n_H = 3/4/5$$

$$\frac{1}{\lambda} = R(1)^2 \left[\frac{1}{2^2} - \frac{1}{3^2} \right]$$

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$$\frac{1}{\lambda} = \frac{5R}{36}$$

$$4 \rightarrow 2$$

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

$$\frac{1}{\lambda} = \frac{3R}{16}$$

$$5 \rightarrow 2$$

$$\frac{1}{\lambda} = R(1)^2 \left[\frac{1}{2^2} - \frac{1}{5^2} \right]$$

$$\frac{1}{\lambda} = \frac{21R}{100}$$

SECTION - B

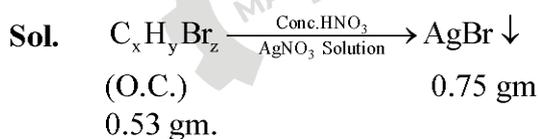
Question ID : 444792747

71. 0.53 g of an organic compound (x) when heated with excess of nitric acid (concentrated) and then with silver nitrate gave 0.75 g of silver bromide precipitate. 1.0 g of (x) gave 1.32 g of CO₂ gas on combustion. The percentage of hydrogen in the compound (x) is ____%. [Nearest Integer]

[Given: Molar mass in $gmol^{-1}$ H :1, C :12, Br :80, Ag :108, O :16 ; Compound(x) : $C_xH_yBr_z$]

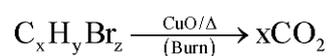
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Ans. Official answer NTA (4)



$$\%Br = \frac{80}{188} \times \frac{W_{\text{AgBr}}}{W_{\text{O.C.}}} \times 100$$

$$= \frac{80}{188} \times \frac{0.75}{0.53} \times 100 = 60.21\%$$



(O.C.) 1.32 gm

1 gm

$$\%C = \frac{12}{44} \times \frac{W_{\text{CO}_2}}{W_{\text{O.C.}}} \times 100$$

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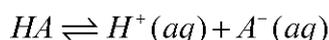
$$= \frac{12}{44} \times \frac{1.32}{1} \times 100 = 36\%$$

$$\% \text{ H} = 100 - (\% \text{ of Br} + \% \text{ of C})$$

$$= 100 - (60.21 + 36) \Rightarrow 100 - 96.21 = 3.79\% \approx 4\%$$

Question ID : 444792750

72. Consider the dissociation equilibrium of the following weak acid



If the pK_a of the acid is 4, then the pH of 10 mM HA solution is _____. (Nearest integer)

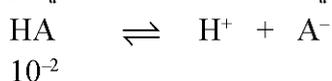
[Given: The degree of dissociation can be neglected with respect to unity]

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Ans. Official answer NTA (3)

Sol. $[HA] = 10 \text{ mM} = 10^{-2} \text{ M}$

$$pK_a = 4 \quad K_a = 10^{-4}$$



$$10^{-2} - x \quad x \quad x \quad \left[\alpha = \frac{x}{10^{-2}} \right]$$

$$10^{-2} - 10^{-2}\alpha \quad 10^{-2}\alpha \quad 10^{-2}\alpha \quad x = 10^{-2}\alpha$$

$$K_a = \frac{(10^{-2}\alpha)(10^{-2}\alpha)}{10^{-2}(1-\alpha)} \quad \left(\begin{array}{l} \alpha \ll 1 \\ 1-\alpha \approx 1 \end{array} \right)$$

$$10^{-4} = 10^{-2} \alpha^2$$

$$\alpha = 10^{-1}$$

$$[H^+] = 10^{-2}\alpha = 10^{-3}$$

$$pH = -\log[H^+]$$

$$= 3$$

Question ID : 444792746

73. X is the number of geometrical isomers exhibited by $[Pt(NH_3)(H_2O)BrCl]$.

Y is the number of optically inactive isomer(s) exhibited by $[CrCl_2(ox)_2]^{3-}$

Z is the number of geometrical isomers exhibited by $[Co(NH_3)_3(NO_2)_3]$.

The value of $X + Y + Z$ is _____.

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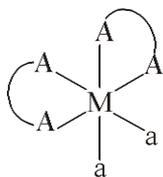
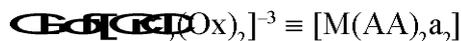
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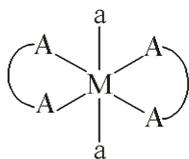
Ans. Official answer NTA (6)

Sol. G.I. of $[\text{Pt}(\text{NH}_3)(\text{H}_2\text{O})(\text{Br})(\text{Cl})] = 3$



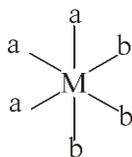
Cis

(Optically active)

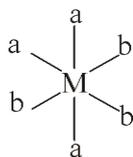


Trans

(Optically Inactive)

 $Y = 1$


(fac)



(mer)

 $Z = 2$

$$X + Y + Z = 3 + 1 + 2 = 6$$

Question ID : 444792749

74. Consider the following redox reaction taking place in acidic medium



If the Nernst equation for the above balanced reaction is

$$E_{\text{cell}} = E_{\text{cell}}^\circ - \frac{RT}{nF} \ln Q,$$

then the value of n is _____. (Nearest integer)

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Ans. Official answer NTA (24)



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n-factor = 8

$$n = 3 \times 8 = 24$$

Question ID : 444792748

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75. 500 mL of 1.2 M KI solution is mixed with 500 mL of 0.2 M KMnO_4 solution in basic medium. The liberated iodine was titrated with standard 0.1M $\text{Na}_2\text{S}_2\text{O}_3$ solution in the presence of starch indicator till the blue color disappeared. The volume (in L) of $\text{Na}_2\text{S}_2\text{O}_3$ consumed is _____. (Nearest integer)

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Ans. Official answer NTA (3)

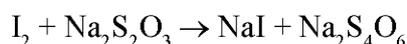


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↓

n-factor = 1

n-factor = 3

Milli equivalents of KI = $1.2 \times 500 \times 1 = 600$ Milli equivalents of $\text{KMnO}_4 = 0.2 \times 500 \times 3 = 300$ Milli equivalents of I_2 formed = 300Milli equivalents of $\text{I}_2 =$ Milli equivalents of $\text{Na}_2\text{S}_2\text{O}_3$

$$300 = M \times V(\text{ml}) \times \text{n-factor}$$

$$300 = 0.1 \times V(\text{ml}) \times 1$$

$$V = 3000 \text{ ml}$$

$$V = 3\text{L}$$