JEE Main April 2026

Question Paper With Text Solution

02 April | Shift -1

CHEMISTRY

MATRIX

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

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JEE MAIN APRIL 2026 | 00 APRIL SHIFT-1

SECTION – A

Question ID : 69112151

51. The mass of iron converted into Fe_3O_4 by the action of 18 g of steam is :

(Given : Molar mass of H, O and Fe are 1, 16 and 56 g mol^{-1} respectively)

Assume iron is present in excess :

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(1) 2.1 g (2) 4.2 g (3) 21 g (4) 42 g

Ans. Official answer NTA (D)

Sol. $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$

$\because$ 4 mole H_2O react with 3 mole Fe

$\therefore$ for 1 mole H2O we need $\frac{3}{4}$ mole Fe

mass of $Fe = \frac{3}{4} \times 56 = 42g$

Question Id : 69112152

52. What is the energy (in J $atom^{-1}$) required for the following process?

$Li^{2+}(g) \rightarrow Li^{3+}(g) + e^-$

(Take the ionization energy for the H atom in the ground state as 2.18×10^{-18} J $atom^{-1}$)

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(1) 8.72×10^{-18} (2) 1.962×10^{-18} (3) 1.962×10^{-17} (4) 6.54×10^{-17}

Ans. Official answer NTA (C)

Sol. $IE = IE_H \times Z^2$

$= 2.18 \times 10^{-18} \times Z^2$ J/atom

$= 2.18 \times 10^{-18} \times (3)^2$

$= 1.96 \times 10^{-17}$ J/atom

Question Id : 69112153

53. Given below are two statements :

Statement (I) : The correct sequence of bond lengths in the following species is :

$O_2^+ < O_2 < O_2^- < O_2^{2-}$

Statement (II) : The correct sequence of number of unpaired electrons in the following species is :

$O_2 > O_2^+ > O_2^- > O_2^{2-}$

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 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 but Statement II is true

Ans. Official answer NTA (C)

Sol.

Species	B.O.	Unpaired e^-
O_2^+	2.5	1
O_2	2.0	2
O_2^-	1.5	1
O_2^{2-}	1.0	0

true (I) $\text{B.O.} \propto \frac{1}{\text{B.L.}}$

B.L : $O_2^+ < O_2 < O_2^- < O_2^{2-}$

false (II) Unpaired e^- : $O_2 > O_2^+ = O_2^- > O_2^-$

Question Id : 69112154

54. Consider the following data.

(i) $2Al(s) + 6HCl(aq) \rightarrow Al_2Cl_6(aq) + 3H_2(g) + 1200\,kJ/mol$

(ii) $H_2(g) + Cl_2(g) \rightarrow 2HCl(g) + 164\,kJ/mol$

(iii) $HCl(g) + aq \rightarrow HCl(aq) + 83\,kJ/mol$

(iv) $Al_2Cl_6(s) + aq \rightarrow Al_2Cl_6(aq) + 663\,kJ/mol$

The enthalpy of formation of anhydrous solid

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(1) $-648\,kJ\,mol^{-1}$ (2) $-1350\,kJ\,mol^{-1}$ (3) $-2002\,kJ\,mol^{-1}$ (4) $-1527\,kJ\,mol^{-1}$

Ans. Official answer NTA (D)

Sol. (i) $2Al(s) + 6HCl(aq) \rightarrow Al_2Cl_6(aq) + 3H_2(g); \Delta H_1 = -1200\,kJ/mol$

(ii) $H_2(g) + Cl_2(g) \rightarrow 2HCl(g); \Delta H_2 = -164kJ$

(iii) $HCl(g) + aq \rightarrow HCl(aq); \Delta H_3 = -83kJ$

(iv) $Al_2Cl_6(s) + aq \rightarrow Al_2Cl_6(aq); \Delta H_4 = -663kJ$

$2Al(s) + 3Cl_2(g) \rightarrow Al_2Cl_6(s)$ $\Delta H_f = ?$

$\Delta H_f = (1) + 3 \times (2) + 6 \times (3) - (4)$

$= \Delta H_1 + 3(\Delta H_2) + 6(\Delta H_3) - \Delta H_4$

$= -1527$ kJ/mol

Question Id : 69112155

55. 19.5 g of fluoro acetic acid (molar mass 78 g mol^{-1}) is dissolved in 500 g of water at 298 K . The depression in the freezing point of water was 1°C. What is K_a of fluoro acetic acid ? (For water, $K_f = 1.86\,K\,kg\,mol^{-1}$). Assume molarity and molality to have same values.

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(1) 10^{-6} (2) 4×10^{-4} (3) 3×10^{-5} (4) 3×10^{-3}

Ans. Official answer NTA (4)

Sol. $m = \frac{\frac{19.5}{78}}{0.5} = 0.5 mol/kg$

$\Delta T_f = iK_f m$

$1 = i \times 1.86 \times 0.5$

$i = 1.0753 = 1 + (2-1)\alpha$

$\alpha = 0.0753$

$ka = \frac{c\alpha^2}{1-\alpha} \approx c\alpha^2$

$ka = 0.5 \times (0.0753)^2 = 3\times10^{-3}$

Question Id : 69112156

56. The solubility product constants of Ag_2CrO_4 and AgBr are 32x and 4y respectively at 298 K .

The value of $\left(\frac{\text{molarity of } Ag_2CrO_4}{\text{molarity of AgBr}}\right)$ can be expressed as :

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(1) $\frac{2\sqrt[3]{x}}{y}$ (2) $2\sqrt{\frac{x}{y}}$ (3) $\sqrt{\frac{x}{y}}$ (4) $\frac{\sqrt[3]{x}}{\sqrt{y}}$

Ans. Official answer NTA (4)

Sol. $Ag_2CrO_4 \rightleftharpoons 2Ag^+ + CrO_4^{2-}$

$\alpha s_1 \quad s_1$

$Ksp = 4s_1^3 = 32x$

$s_1 = 2\sqrt[3]{x}$

$AgBr \rightleftharpoons Ag^+ + Br^-$

$s_2 \quad s_2$

$Ksp = s_2^2 = 4y$

$s_2 = 2\sqrt{y}$

$\frac{s_1}{s_2} = \frac{\sqrt[3]{x}}{\sqrt{y}}$

Question Id : 69112157

57. An electrochemical cell is constructed using half cells in the direction of spontaneous change

$Fe(OH)_2(s) + 2e^- \rightarrow Fe(s) + 2OH^-(aq)$ $\quad E^\theta = -0.88\,V$

and $AgBr(s) + e^- \rightarrow Ag(s) + Br^-(aq)$ $\quad E^\theta = +0.07\,V$

Which of the following option is correct ?

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(1) Overall reaction $Fe(s) + 2OH^-(aq) + 2AgBr(s) \rightleftharpoons Fe(OH)_2(s) + 2Ag(s) + 2Br^-(aq)$

(2) $E^\theta_{cell} = -0.95\,V$

(3) Fe is reduced in the electrochemical cell

(4) E^θ_{cell} is an extensive property

Ans. Official answer NTA (1)

Sol. For spontaneous cell

Cathode : $AgBr(s) + e^- \longrightarrow Ag(s) + Br^-(aq)$

Anode : $Fe(s) + 2OH^-(aq) \longrightarrow Fe(OH)_2(s) + 2e^-$

$E°_{cell} = E°_C - E°_A$

$= 0.07 - (-0.88) = +0.95V$

Cell Rxn :

$Fe(s) + 2OH^-(aq) + 2AgBr(s) \longrightarrow Fe(OH)_2(s) + 2Ag(s) + 2Br^-(aq)$

Question Id : 69112158

58. $t_{100\%}$ is the time required for the 100% completion of the reaction while $t_{1/2}$ is the time required for 50 % of the reaction to be completed. Which of the following option correctly represents the relation between $t_{100\%}$ and $t_{1/2}$ for zero and first order reactions respectively ?

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(1) $t_{100\%} = (t_{1/2})^2$ and $t_{100\%} = (t_{1/2})^{-\infty}$

(2) $t_{100\%} = 2t_{1/2}$ and $t_{100\%} = (t_{1/2})^{\infty}$

(3) $t_{100\%} = 2t_{1/2}$ and $t_{100\%} = (2t_{1/2})^2$

(4) $t_{100\%} = (t_{1/2})^{\infty}$ and $t_{100\%} = 2t_{1/2}$

Ans. Official answer NTA (2)

Sol. Zero order : $[A]_0 - [A]_t = kt$

$$t_{100\%} = \frac{[A]_0}{k}, t_{50\%} = \frac{[A]_0}{2k}$$

$$\Rightarrow t_{100\%} = 2t_{\frac{1}{2}}$$

1st order : $[A]_t = [A]_0 e^{-kt}$ (1st order never completes)

$$t_{100\%} = \infty \text{ or } \left(t_{\frac{1}{2}}\right)^{\infty}$$

Question Id : 69112159

59. Given below are two statements:

Statement (I): The first ionisation enthalpy of the elements Na, Mg, Cl and Ar follows the order Na > Mg > Cl > Ar.

Statement (II) : Among Ca, Al, Fe and B , the third ionisation enthalpy is very high for Ca . 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 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 but Statement II is true

Ans. Official answer NTA (4)

Sol. Statement I : Incorrect

IE : Na < Mg < Cl < Ar

Statement II : Correct

Ca – [Ar] $4s^2$

Ca^{2+} – [Ar]

IE_3 very high due to stable configuration

Question Id : 69112160

60. Given below are two statements:

Statement (I): Oxidising power of halogens decreases in the order $F_2 > Cl_2 > Br_2 > I_2$, which is the basis of "Layer test".

Statement (II): "Layer test" to identify Br_2 and I_2 in aqueous solution involves the oxidation of bromide or iodide into Br_2 or I_2 respectively with Cl_2, which is a type of displacement redox reaction.

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 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 but Statement II is true

Ans. Official answer NTA (1)

Sol. Statement I : True

Oxidisng Power : $F_2 > Cl_2 > Br_2 > I_2$

Statement II : True

$Cl_2 + Br^- \rightarrow \underset{\text{(Brown)}}{Br_2} + Cl^-$

$Cl_2 + I^- \rightarrow \underset{\text{(violet)}}{I_2} + Cl^-$

Displacement Redox reaction

Question Id : 69112161

61. Which of the following sets includes all the species that will change the orange colour of $K_2Cr_2O_7$ in acidic medium?

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(1) $Fe^{2+}, Sn^{2+}, I^-, S^{2-}$

(2) $S^{2-}, Fe^{3+}, I^-, C_2O_4^{2-}$

(3) $Fe^{2+}, NO_2^-, SO_2, Sn^{4+}$

(4) $Fe^{3+}, SO_4^{2-}, S^{2-}, Sn^{4+}$

Ans. Official answer NTA (1)

Sol. Fe^{3+}, Sn^{4+}, SO_4^{2-} these are already in their maximum oxidation state and will not react with $K_2Cr_2O_7$.

Question Id : 69112162

62. Match List - I with List - II.

List - I	List - II
Chromium (III) Complexes (en = ethylene diamine)	$\Delta_0\left(cm^{-1}\right)$
A. $\left[Cr(CN)_6\right]^{3-}$	I.15,060
B. $\left[CrF_6\right]^{3-}$	II.17,400
C. $\left[Cr\left(H_2O\right)_6\right]^{3+}$	III. 22,300
D. $\left[Cr(en)_3\right]^{3+}$	IV. 26,600

Choose the correct answer from the options given below :

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(1) A-I, B-II, C-III, D-IV

(2) A-II, B-III, C-IV, D-I

(3) A-III, B-IV, C-I, D-II

(4) A-IV, B-I, C-II, D-III

Ans. Official answer NTA (4)

Sol. $\Delta\alpha$ Ligand strength

$\Delta : F^- < H_2O < en < CN^-$

Question Id : 69112163

63. Given below are two statements:

Statement (I) : 1,2,3-Trihydroxypropane can be separated from water by simple distillation.

Statement (II) : An azeotropic mixture cannot be separated by fractional distillation.

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 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 but Statement II is true

Ans. Official answer NTA (4)

Sol. 1,2,3 trihydroxy propane (Glycerol) has very high BP (290ºC) and decomposes at or below its BP.
$\therefore$ cannot be separated by simple distillation.

69112164 Question

64. Given below are two statements:
Statement (I) : Benzyl chloride reacts faster in S_N1 mechanism than ethyl chloride.
Statement (II) : Ethyl carbocation intermediate is less stabilized by hyperconjugation than benzyl carbocation by resonance.
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 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 but Statement II is true

Ans. Official answer NTA (1)

Sol. In S_N1 we look for stability of carbocation rate of $S_N1 \propto$ stability of carbocation

$Ph-\overset{\oplus}{C}H_2 > CH_3\overset{\oplus}{C}H$

(Resonance stabilised)

Question Id : 69112165

65. In IUPAC nomenclature, the correct order of decreasing priority of functional group is :

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(1) $-CONH_2, >C=O, -CHO, -NH_2, -C\equiv C-$

(2) $-CONH_2, -COOCH_3, -CHO, -NH_2, -OH$

(3) $-CONH_2, -CHO, >C=O, -NH_2, -C\equiv C-$

(4) $-CONH_2, -CHO, -CN, -NH_2, -C\equiv C-$

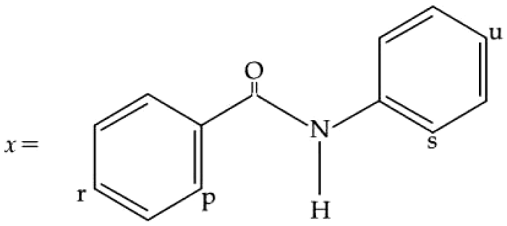
Ans. Official answer NTA (3)

Sol. Conceptual

$$-\overset{O}{\overset{\|}{C}}-NH_2 > -\overset{O}{\overset{\|}{C}}-H > -\overset{O}{\overset{\|}{C}}- > NH_2 > -C\equiv C-$$

Question Id : 69112166

66. For the given molecule, "*x*", the preferred site for the attack of the electrophile is :



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(1) Predominantly at "r"

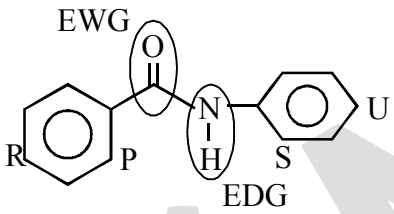
(2) "r" and "u"

(3) "p" and "s"

(4) Predominantly at "u"

Ans. Official answer NTA (4)

Sol.



EDG increases rate of electrophilic addition

→ EDG are generally ortho-para directing & major product is predominanfly formed at (P) position (U)

Question Id : 69112167

67. Match List - I with List - II.

List - I	List - II
Mixture of Compounds	Reagent used to distinguish
A. Diethyl amine + Ethyl amine	I. Bromine water
B. Acetaldehyde + Acetone	II. $CHCl_3 + KOH, \Delta$
C. Ethanol + Phenol	III. Neutral $FeCl_3$
D. Benzoic acid + Cinnamic acid	IV. Ammonical silver nitrate

Choose the correct answer from the options given below :

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(1) A-IV, B-II, C-I, D-III

(2) A-IV, B-II, C-III, D-I

(3) A-II, B-IV, C-I, D-III (4) A-II, B-IV, C-III, D-I

Ans. Official answer NTA (D)

Sol. (A) $\underset{2^\circ \text{ Amine}}{CH_3-CH_2-NH-CH_2-CH_3}$

$\underset{1^\circ \text{ Amine}}{CH_3-CH_2-NH_2} \rightarrow +ve\ CHCl_3+KOH,\Delta$

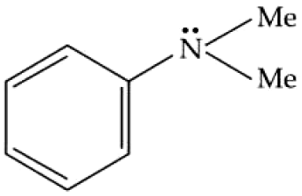
(B) $CH_3-\overset{O}{\overset{||}{C}}-H \rightarrow +ve$ Tollen's test

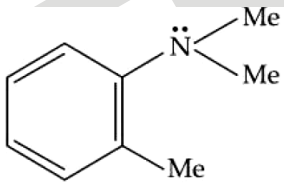
(C) Phenol $\rightarrow$ +ve neutral $FeCl_3$ test

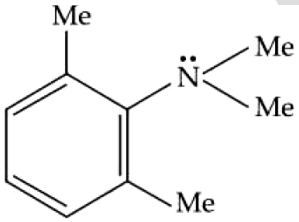
(D) $Ph-CH=CH-COOH \rightarrow +ve$ Bromine water test.

Question Id : 69112168

68. Consider the three aromatic molecules (P, Q and R) whose structures have been given below :

P. 

Q. 

R. 

The correct order regarding the reactivity of these compounds with $Ph-\underset{(+)}{N}\equiv NCl^{(-)}$ optimum but slightly acidic medium is :

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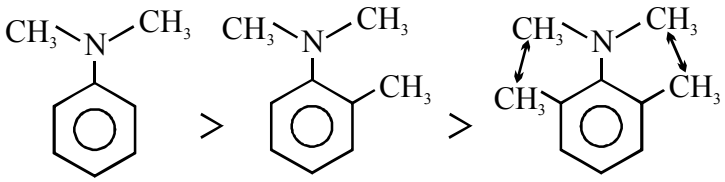
(1) P > Q > R (2) R > P > Q (3) R > Q > P (4) P > R > Q

Ans. Official answer NTA (A)

Sol. Rate of electrophilic aromatic substitution

$\propto \frac{EDG}{EWG}$



Steric inhibition
of resonance

Question Id : 69112169

69. Match List - I with List - II.

List - I Vitamin	List - II Name
A. Vitamin B_1	I. Pyridoxine
B. Vitamin B_2	II. Ascorbic acid
C. Vitamin B_6	III. Thiamine
D. Vitamin C	IV. Riboflavin

Choose the correct answer from the options given below :

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(1) A-II, B-I, C-III, D-IV (2) A-IV, B-III, C-II, D-I

(3) A-III, B-IV, C-I, D-II (4) A-I, B-III, C-II, D-IV

Ans. Official answer NTA (C)

Sol. $B_1 \rightarrow$ Thiamine

$B_2 \rightarrow$ Riboflavin

$B_6 \rightarrow$ Pyridoxine

$C \rightarrow$ Ascorbic acid

Question Id : 69112170

70. A salt with few drops of conc. HCl gives apple green colour in flame test. The group precipitate of the salt is dissolved in acetic acid and treated with K_2CrO_4 to give yellow precipitate. When the sodium carbonate extract of the salt solution is heated with conc. HNO_3 and ammonium molybdate, it resulted a canary yellow precipitate. The cation and anion present in the salt are respectively,

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(1) Ca^{2+} and SO_4^{2-} (2) Ba^{2+} and PO_4^{3-} (3) Mn^{2+} and PO_4^{3-} (4) Ba^{2+} and SO_4^{2-}

Ans. Official answer NTA (2)

Sol. Apple green = Ba^{2+}

$Ba^{2+} + CrO_4^{2-} \rightarrow BaCrO_4 \downarrow$

(Yellow)

$PO_4^{3-} + (NH_4)_2MoO_4 + HNO_3 \rightarrow (NH_4)_3PO_4 \cdot 12MoO_3 \downarrow$

(Canary yellow)

SECTION – B

Question Id : 69112171

71. 5.33 g of $CrCl_3 \cdot 6H_2O$, which is a 1 : 3 electrolyte, is dissolved in water and is passed through a cation exchanger. The chloride ions in the eluted solution, on treatment with $AgNO_3$ results in 8.61 g of AgCl . The ratio of moles of complex reacted and moles of AgCl formed is _____ $\times 10^{-2}$. (Nearest integer)

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Ans. Official answer NTA (33)

Sol. moles of $CrCl_3 \cdot 6H_2O = \frac{5.33}{266.5} = 0.02$

moles of $AgCl = \frac{8.61}{143.5} = 0.06$

Ratio $= \frac{0.02}{0.06} = \frac{1}{3} \approx 0.3333$

$= 33.33 \times 10^{-2} \approx 33 \times 10^{-2}$

Question Id : 69112172

72. Consider the isomers of hydrocarbon with molecular formula C_5H_{10}. These isomers do not decolourise $KMnO_4$ solution. These isomers are subjected to chlorination with chlorine in presence of light to give monochloro compounds. The total number of monochloro compounds (structural isomers only) formed is _____.

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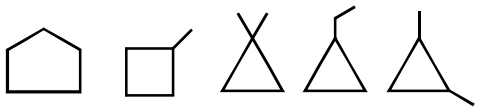
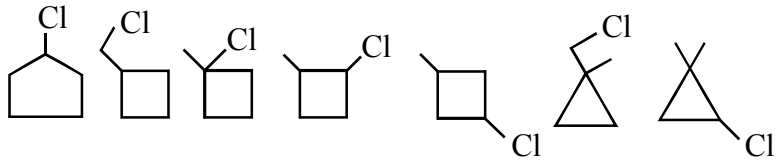
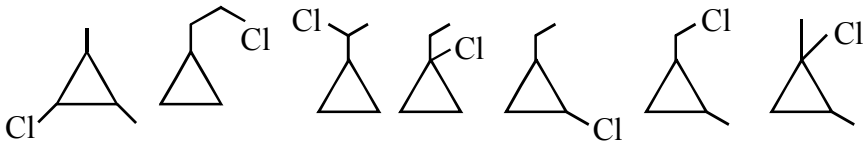
Ans. Official answer NTA (14)

Sol. $C_5H_{10} \rightarrow$ do not decolovrise $KMnO_4$. Which means they are cyclic compound.

DU = 1

Isomers of $C_5H_{10} \rightarrow$ 

Monochlorination products → 



Question Id : 69112173

73. One mole of an alkane (x) requires 8 mole oxygen for complete combustion. Sum of number of carbon and hydrogen atoms in the alkane (x)_____.

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Ans. Official answer NTA (17)

Sol. $C_nH_{2n+2}+\left(\frac{3n+1}{2}\right)O_2 \rightarrow nCO_2+(n+1)H_2$

$\frac{3n+1}{2}=8$

$n = 5$

So $\rightarrow C_5H_{12}$

Total = 5 + 12 = 17

Question Id : 69112174

74. For reaction $A \rightarrow P$, rate constant $k = 1.5\times10^3\ s^{-1}$ at 27°C

If activation energy for the above reaction is 60 kJ mol^{-1}, then the temperature (in °C) at which rate constant, $k = 4.5\times10^3\ s^{-1}$ is _____. (Nearest integer)

Given : $\log 2 = 0.30, \log 3 = 0.48, R = 8.3\ J\ K^{-1}\ mol^{-1}, \ln 10 = 2.3$

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Ans. Official answer NTA (41)

Sol. $\in a = 60000\ J\ mol^{-1}$

$K_1 = 1.5 \times 10^3\ s^{-1}$

$T_1 = 300\ K$

$K_2 = 4.5 \times 10^3\ s^{-1}$

$T_2 = ?$

$\log\left(\frac{K_2}{K_1}\right)=\frac{\in a}{2.303R}\left(\frac{1}{T_1}-\frac{1}{T_2}\right)$

T2 = 314.43 – 273.15

$= 41.28°C \approx 41$

Question Id : 69112175

75. At the transition temperature T, $A \rightleftharpoons B$ and $\Delta G^0 = 105 - 35\log$ where A and B are two states of substance X. The transition temperature in °C when pressure is 1 atm is _____.

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Ans. Official answer NTA (727)

Sol. At the transition Temp (T)

$\Delta G° = 0$

$105 - 35 \log T = 0$

$T = 1000\ K = 727°C$