JEE Main January 2026

Question Paper With Text Solution

23 January | Shift-2

CHEMISTRY

MATRIX

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

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JEE MAIN JANUARY 2026 | 23 JANUARY SHIFT-2

SECTION – A

Question ID : 444792511

51. Identify the **CORRECT** set of details from the following :

A. $[Co(NH_3)_6]^{3+}$: Inner orbital complex; d^2sp^3 hybridized

B. $[MnCl_6]^{3-}$: Outer orbital complex; sp^3d^2 hybridized

C. $[CoF_6]^{3-}$: Outer orbital complex; d^2sp^3 hybridized

D. $[FeF_6]^{3-}$: Outer orbital complex; sp^3d^2 hybridized

E. $[Ni(CN)_4]^{2-}$: Inner orbital complex; sp^3 hybridized

Choose the correct answer from the options given below :

क

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

Ans. Official answer NTA (3)

Sol.

Question ID : 444792519

52. Both human DNA and RNA are chiral molecules. The chirality in DNA and RNA arised due to the presence of

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(1) L–sugar component
(2) Base unit
(3) D–sugar component
(4) Chiral phosphate unit

Ans. Official answer NTA (3)

Sol.

Question ID : 444792505

53.

Consider the above electrochemical cell where a metal electrode (M) is undergoing redox reaction by forming M^+ ($M \rightarrow M^+ + e^-$). The cation M^+ is present in two different concentrations c_1 and c_2 as shown above. Which of the following statement is correct for generating a positive cell potential ?

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(1) If c_1 is present at anode, then $c_1 > c_2$.
(2) If c_1 is present at anode, then $c_1 = c_2$.
(3) If c_1 is present at cathode, then $c_1 > c_2$.
(4) If c_1 is present at cathode, then $c_1 < c_2$.

Ans. Official answer NTA (3)

Sol.

Question ID : 444792509

54. Elements X and Y belong to Group 15. The difference between the electronegativity values of 'X' and phosphorus is higher than that of the difference between phosphorus and 'Y'. 'X' & 'Y' are respectively

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(1) Bi & N (2) N & As (3) As & Sb (4) As & Bi

Ans. Official answer NTA (2)

Sol.

Question ID : 444792503

55. Which statements are **NOT TRUE** about XeO_2F_2 ?

A. It has a see-saw shape.

B. Xe has 5 electron pairs in its valence shell in XeO_2F_2.

C. The O–Xe–O bond angle is close to 180º.

D. The F–Xe–F bond angle is close to 180º.

E. Xe has 16 valence electrons in XeO_2F_2.

Choose the correct answer from the options given below :

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

Ans. Official answer NTA (4)

Sol.

Question ID : 444792508

56. Given below are two statements :

Statement I : The second ionisation enthalpy of Na is larger than the corresponding ionisation enthalpy of Mg.

Statement II : The ionic radius of O^{2-} is larger than that of F^{-}.

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 false.
(3) Both statement I and statement II are true.
(4) Statement I is true but statement II is false.

Ans. Official answer NTA (3)

Sol.

Question ID : 444792510

57. The oxidation state of chromium in the final product formed in the reaction between KI and acidified $K_2Cr_2O_7$ solution is

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(1) +3 (2) +2 (3) +6 (4) +4

Ans. Official answer NTA (1)

Sol.

Question ID : 444792504

58. It is noticed that Pb^{2+} is more stable than Pb^{4+} but Sn^{2+} is less stable than Sn^{4+}.

Observe the following reactions.

$PbO_2 + Pb \rightarrow 2PbO; \Delta_rG^o(1)$

$SnO_2 + Sn \rightarrow 2SnO; \Delta_rG^o(2)$

Identify the correct set from the following.

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(1) $\Delta_rG^o(1) < 0; \Delta_rG^o(2) > 0$
(2) $\Delta_rG^o(1) > 0; \Delta_rG^o(2) > 0$
(3) $\Delta_rG^o(1) < 0; \Delta_rG^o(2) < 0$
(4) $\Delta_rG^o(1) > 0; \Delta_rG^o(2) < 0$

Ans. Official answer NTA (1)

Sol.

Question ID : 444792501

59. The work function of two metals (M_A and M_B) are in the 1 : 2 ratio. When these metals are exposed to photons of energy 6 eV, the kinetic energy of liberated electrons of $M_A : M_B$ is in the ratio of 2.642 : 1. The work function (in eV) of M_A and M_B are respectively.

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(1) 2.3, 4.6 (2) 1.4, 2.8 (3) 3.1, 6.2 (4) 1.5, 3.0

Ans. Official answer NTA (1)

Sol.

Question ID : 444792502

60. Identify the INCORRECT statements from the following :

A. Notation $^{24}_{12}Mg$ represents 24 protons and 12 neutrons.

B. Wavelength of a radiation of frequency $4.5 \times 10^{15}\ s^{-1}$ is 6.7×10^{-8} m.

C. One radiation has wavelength = λ_1 (900 nm) and energy = E_1. Other radiation has wavelength = λ_2 (300 nm) and energy = E_2. $E_1 : E_2 = 3 : 1$.

D. Number of photons of light of wavelength 2000 pm that provides 1 J of energy is 1.006×10^{16}.

Choose the correct answer from the options given below :

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

Ans. Official answer NTA (1)

Sol.

Question ID : 444792515

61. Which of the following statements are **TRUE** about Haloform reaction ?

A. Sodium hypochlorite reacts with KI to give KOI.

B. KOI is a reducing agent.

C. α, β–unsaturated methylketone $\left(CH_3-CH=CH-\overset{\overset{O}{||}}{C}-CH_3\right)$ will give iodoform reaction.

D. Isopropyl alcohol will not give iodoform test.

E. Methanoic acid will give positive iodoform test.

Choose the correct answer from the options given below :

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(1) A & C only (2) A, B & C only

(3) A, C & E only (4) B, D & E only

Ans. Official answer NTA (1)

Sol.

Question ID : 444792514

62.

Identify (P).

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(1)

(2)

(3)

(4)

Ans. Official answer NTA (1)

Sol.

Question ID : 444792518

63. A student has been given a compound "x" of molecular formula–C_6H_7N. 'x' is sparingly soluble in water. However, on addition of dilute mineral acid, 'x' becomes soluble in water. 'x' when treated with $CHCl_3$ and KOH (alc.), 'y' is produced. 'y' has a specific unpleasant smell. On treatment with benzenesulphonyl chloride, 'x' gives a compound 'z' which is soluble in alkali. The number of different "H" atoms present in 'z' is :-

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(1) 8 (2) 4 (3) 5 (4) 7

Ans. Official answer NTA (4)

Sol.

Question ID : 444792516

64. A mixed ether (P), when heated with excess of hot concentrated hydrogen iodide produces two different alkyl iodides which when treated with aq. NaOH give compounds (Q) and (R). Both (Q) and (R) give yellow precipitate with NaOI. Identify the mixed ether (P) :

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(1)

(2)

(3)

(4)

Ans. Official answer NTA (4)

Sol.

Question ID : 444792520

65. Iodoform test can differentiate between

A. Methanol and Ethanol

B. CH_3COOH and CH_3CH_2COOH

C. Cyclohexene and cyclohexanone

D. Diethyl ether and Pentan–3–one

E. Anisole and acetone

Choose the correct answer from the options given below :

क

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

Ans. Official answer NTA (1)

Sol.

Question ID : 444792512

66. In Carius method 0.2425 g of an organic compound gave 0.5253 g silver chloride. The percentage of chlorine in the organic compound is

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(1) 37.57%
(2) 34.79%
(3) 53.58%
(4) 87.65%

Ans. Official answer NTA (3)

Sol.

Question ID : 444792506

67.

Given above is the concentration vs time plot for a dissociation reaction : $A \rightarrow nB$.

Based on the data of the initial phase of the reaction (initial 10 min), the value of n is _____ .

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(1) 2 (2) 3 (3) 5 (4) 4

Ans. Official answer NTA (2)

Sol.

Question ID : 444792513

68. Given below are two statements :

Statement I : $(CH_3)_3\overset{\oplus}{C}$ is more stable than $\overset{\oplus}{C}H_3$ as nine hyperconjugation interactions are possible in $(CH_3)_3\overset{\oplus}{C}$.

Statement II : $\overset{\oplus}{C}H_3$ is less stable than $(CH_3)_3\overset{\oplus}{C}$ as only three hyperconjugation interactions are possible in $\overset{\oplus}{C}H_3$.

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

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

Ans. Official answer NTA (1)

Sol.

Question ID : 444792507

69. Observe the following reactions at T(K).

I. A $\rightarrow$ products

II. $5Br^-(aq) + BrO_3^-(aq) + 6H^+(aq) \rightarrow 3Br_2(aq) + 3H_2O(l)$

Both the reactions are started at 10.00 am. The rates of these reactions at 10.10 am are same. The value of $-\frac{\Delta[Br^-]}{\Delta t}$ at 10.10 am is 2×10^{-4} mol L^{-1} min^{-1}. The concentration of A at 10.10 am is 10^{-2} mol L^{-1}. What is the first order rate constant (in min^{-1}) of reaction I ?

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

Ans. Official answer NTA (3)

Sol.

Question ID : 444792517

70. Given below are two statements :

Statement I :

can be synthesized from

using simpler reagents in the order (i) Acidic $KMnO_4$, (ii) Ammonia, (iii) Bromine and alkali

Statement II :

can be converted into

using reagents in the order (i) Bromine–H_2O (ii) $NaNO_2$/HCl (0 – 5ºC) (iii) Aq. H_3PO_2.

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

क

(1) Both statement I and Statement II are true

(2) Statement I is true but Statement II is false.

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

(4) Both statement I and statement II are false.

Ans. Official answer NTA (1)

Sol.

SECTION – B

Question ID : 444792523

71. 200 cc of $x \times 10^{-3}$ M potassium dichromate is required to oxidise 750 cc of 0.6 M Mohr's salt solution in acidic medium.

Here x = _____ .

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Ans. Official answer NTA (375)

Sol.

Question ID : 444792525

72. Two liquids A and B form an ideal solution. At 320 K, the vapour pressure for the solution, containing 3 mol of A and 1 mol of B is 500 mm Hg. At the same temperature, if 1 mol of A is further added to this solution, vapour pressure of the solution increases by 20 mm Hg. Vapour pressure (in mm Hg) of B in pure state is _____ . (Nearest integer)

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Ans. Official answer NTA (200)

Sol.

Question ID : 444792521

73. Total number of unpaired electrons present in the central metal atoms/ions of $[Ni(CO)_4]$, $[NiCl_4]^{2-}$, $[PtCl_2(NH_3)_2]$, $[Ni(CN)_4]^{2-}$ and $[Pt(CN)_4]^{2-}$ is _____ .

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Ans. Official answer NTA (2)

Sol.

Question ID : 444792522

74. Consider the following reaction of benzene.

In compound (Q), the percentage of oxygen is _____ %. (Nearest integer)

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Ans. Official answer NTA (10)

Sol.

Question ID : 444792524

75. $X_2(g) + Y_2(g) \rightleftharpoons 2Z(g)$

$X_2(g)$ and $Y_2(g)$ are adeed to a 1 L flask and it is found that the system attains the above equilibrium at T(K) with the number of moles of $X_2(g)$, $Y_2(g)$ and Z(g) being 3, 3 and 9 mol respectively (equilibrium moles). Under this condition of equilibrium, 10 mol of Z(g) is added to the flask and the temperature is maintained at T(K). Then the number of moles of Z(g) in the flask when the new equilibrium is established is _____. (Nearest integer)

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Ans. Official answer NTA (15)

Sol.