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PREVIOUS YEAR PAPER · 2023

OLYMPIAD · STAGE I

NSEC

National Standard Examination in Chemistry

2023

Question paper with official answer key

60	216	120 min	31
Questions	Maximum marks	Time	Paper code

Question paper and official answer key: Indian Association of Physics Teachers (IAPT), NSEC 2023, paper code 31.
Solutions and notes: Zigyan. This booklet is not an IAPT publication.

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AIR 168	AIR 811
	99.95 percentile



Sulokya Bibhuty

3 YEARS CLASSROOM

JEE ADVANCED 2026	JEE MAIN 2026
AIR 1,315	AIR 1,095
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OLYMPIAD RESULTS

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CHEMISTRY

- Sulokya Bibhuty — 3 Years Classroom
- Anay Gupta — 3 Years Classroom
- Akshat Khator — 3 Years Classroom
- Harshit Goyal — 4 Years Classroom
- Hardik Sharma — 3 Years Classroom
- Aarush Kumar — 1 Year Classroom

PHYSICS

- Sulokya Bibhuty — 3 Years Classroom
- Saksham Bishnoi — 4 Years Classroom

ASTRONOMY

- Sulokya Bibhuty — 3 Years Classroom

MATHEMATICS (IOQM)

- Priyanshi — 4 Years Classroom

Saksham Bishnoi qualified the Chemistry Olympiad twice and was selected for the Orientation-cum-Selection Camp at HBCSE, Mumbai.

16 selections	16 of 35	AIR 168
in JEE Advanced 2026	students of the batch selected	best JEE Advanced rank

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Given in the question paper

Useful constants

Charge of electron, $e = 1.602 \times 10^{-19} C$
Mass of electron, $m_e = 9.1 \times 10^{-31} kg$
Planck's constant, $h = 6.63 \times 10^{-34} J\ s$
Speed of light, $c = 3.0 \times 10^{8} ms^{-1}$
Avogadro constant, $N_A = 6.022 \times 10^{23} mol^{-1}$
Faraday constant $F = 96500\ C\ mol^{-1}$
Molar gas constant, $R = 0.082\ L\ atm\ mol^{-1} K^{-1}$
$= 8.314\ J\ mol^{-1} K^{-1}$

PART A-1 · ONE CORRECT OPTION

Q. 1 – 48 · +3 for a correct answer, –1 for a wrong one

1. The ligand with which the homoleptic octahedral complex of Co^{3+} will be most stable is:

(A) Ethylenediamine tetra acetate ion
(B) Dien (N-(2-aminoethyl)-1,2-ethanediamine)
(C) Ethane-1,2-diamine
(D) Ammonia

2. Which of the following properties may have positive values of ΔH?

(i) Lattice enthalpy
(ii) Hydration enthalpy
(iii) Electron gain enthalpy for noble gases
(iv) Ionisation enthalpy

(A) (i) and (ii)
(B) (iii) and (iv)
(C) Only (iv)
(D) (ii), (iii) and (iv)

3. The correct IUPAC name of potassium permanganate is:

(A) potassium tetraoxomanganate(VI)
(B) potassium tetraoxidopermanganate(VII)
(C) potassium tetraoxidomanganese(VII)
(D) potassium tetraoxidomanganate(VII)

4. Which of the following statements is true with respect to sodium salts of oxoanions of phosphorus NaH_2PO_2 and Na_2HPO_3

(A) NaH_2PO_2 is reducing and Na_2HPO_3 is oxidizing
(B) NaH_2PO_2 is more reducing than Na_2HPO_3
(C) NaH_2PO_2 is more oxidizing than Na_2HPO_3
(D) NaH_2PO_2 is oxidizing and Na_2HPO_3 is reducing

5. The fluoride/s of xenon, XeF_n (n = 2 or 4 or 6), which on complete hydrolysis gives back xenon as one of the products, is/are_____.

I. XeF_2

II. XeF_4

III. XeF_6

(A) II only (B) I and II (C) III only (D) I, II and III

6. If an element after oganesson (Og, atomic number 118 and electronic configuration [Rn] $5f^{14}$ $6d^{10}$ $7s^2$ $7p^6$) was discovered, in which of the following orbital, will the 119th electron be accommodated?

(A) 7d (B) 6f (C) 8s (D) 5g

7. The number of 'two-center-two electron' and 'three-center-two electron' bonds in $[Al(BH_4)_3]$ are respectively

(A) twelve and zero (B) twelve and three (C) six and six (D) nine and three

8. Identify the correct matching of the following oxides in column **M** with their property in column **N**:

M	N
(i) Aluminium trioxide	(p) Acidic oxide
(ii) Calcium oxide	(q) Basic oxide
(iii) Arsenic pentoxide	(r) Amphoteric oxide

(A) (i)-(p), (ii)-(q), (iii)-(r) (B) (i)-(q), (ii)-(r), (iii)-(p)
(C) (i)-(r), (ii)-(q), (iii)-(p) (D) (i)-(r), (ii)-(p), (iii)-(q)

9. In each of the following reactions, role of water is:

(i) $H_2O + HCl \rightarrow H_3O^+ + Cl^-$

(ii) $6H_2O + Mg^{2+} \rightarrow [Mg(H_2O)_6]^{2+}$

(iii) $2H_2O + 2F_2 \rightarrow 4\,HF + O_2$

(A) (i) oxidant; (ii) reductant; (iii) base (B) (i) reductant; (ii) oxidant; (iii) base
(C) (i) base; (ii) base; (iii) reductant (D) (i) acid; (ii) base; (iii) reductant

10. The correct order of the following oxidizing agents in basic aqueous medium is:

$CrO_4^{2-}/\ Cr^{3+}$ $E^0 = -0.11$ V

$FeO_4^{2-}/\ Fe^{3+}$ $E^0 = +0.72$ V

$MnO_4^{2-}/\ Mn^{3+}$ $E^0 = +0.46$ V

(A) $[CrO_4]^{2-} > [FeO_4]^{2-} > [MnO_4]^{2-}$ (B) $[FeO_4]^{2-} > [MnO_4]^{2-} > [CrO_4]^{2-}$
(C) $[CrO_4]^{2-} > [MnO_4]^{2-} > [FeO_4]^{2-}$ (D) $[MnO_4]^{2-} > [FeO_4]^{2-} > [CrO_4]^{2-}$

11. The correct order of ionic radii of Rb^+, Br^-, Sr^{2+} and Se^{2-} is

(A) $Rb^+ < Br^- < Sr^{2+} < Se^{2-}$ (B) $Sr^{2+} < Rb^+ < Br^- < Se^{2-}$

(C) $Se^{2-} < Br^- < Sr^{2+} < Rb^+$ (D) $Se^{2-} < Sr^{2+} < Rb^+ < Br^-$

12. Consider the following statements:

(i) Calcination is carried out in absence of air below the melting point of the ore

(ii) Roasting and calcination are carried out in presence of flux

(iii) Calcination is carried out in limited supply of air above the melting point of the ore

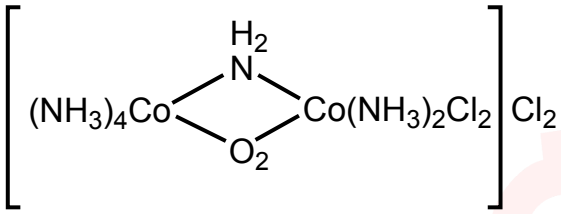
(iv) Roasting is carried out in air below the melting point of ore

The correct set of statements is

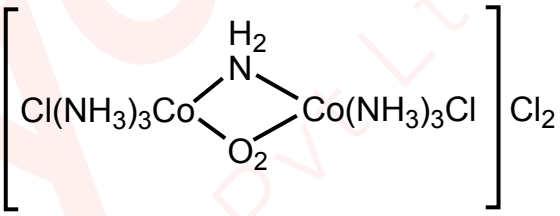
(A) (i) and (iv) (B) (ii) and (iii)

(C) (i), (iii) and (iv) (D) (iii) and (iv)

13. The cobalt complexes (I) and (II) given below are examples of



(I)



(II)

(A) linkage isomers (B) coordination isomers

(C) ligand isomers (D) coordination position isomers

14. The magnetic moment (in units of BM) of copper in $[Cu(H_2O)_4]^{2+}$ and $[Cu(NH_3)_4]^{2+}$ respectively is:

(A) 1.73 and 0 (B) 1.73 and 1.73 (C) 2.83 and 2.83 (D) 0 and 2.83

15. In qualitative inorganic analysis of a water-soluble salt mixture (salt AB + salt XY) both the cations were identified as sulphides. In the tests for anions sodium carbonate extract when treated with $AgNO_3$ gave yellowish precipitate soluble with difficulty in NH_4OH while the other anion can be confirmed with brown ring test. (Given K_{sp} for AS = 1×10^{-44} and XS = 1.4×10^{-24}).

Identify the INCORRECT statement about the analysis.

(A) H_2S can be used under appropriate conditions of pH to separate and identify the cations.

(B) Cation A will be precipitated under acidic condition as the concentration of sulphides ions required is low.

(C) The anions are NO_3^- and Cl^-.

(D) Cation X will be precipitated as sulphides under alkaline condition, as the concentration of sulphides ions required is very high.

16. The correct statement about the solubilities of Group 2 hydroxides is:

(A) The solubilities increase because lattice energy increases as we go down Group 2

(B) The solubilities increase because lattice energy decreases as we go down Group 2

(C) The solubilities decrease because atomic size increases as we go down Group 2

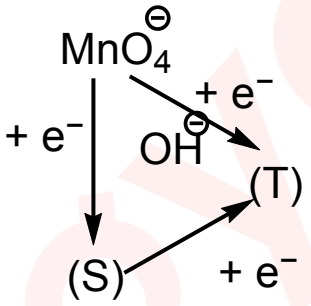
(D) The solubilities decrease because lattice energy decreases as we go down Group 2

17. A solution of $CuSO_4.5H_2O$ in methanol has $[Cu^{2+}]$ = 1.00 mg per 1000 g of methanol. The molarity of Cu^{2+} in this solution is Y × 10^{-5} mol L^{-1}.Y is :

(Given- density of methanol = 0.792 g mL^{-1})

(A) 1.57 (B) 5.04 (C) 1.25 (D) 3.99

18. Following is the reaction flow chart for manganese oxidocomplexes under different alkaline pH conditions. Compounds (**S**) and (**T**) respectively are:



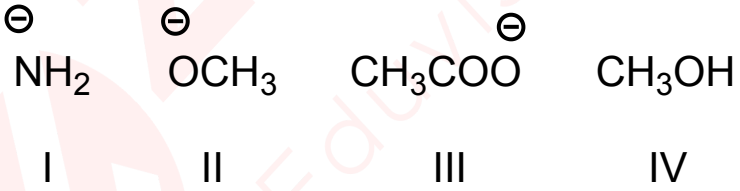
(A) S = $MnO(OH)_2$; T = $Mn(OH)_2$

(B) S = MnO_2; T = MnO(OH)

(C) S = MnO_4^{2-}; T = MnO(OH)

(D) S = MnO_4^{2-}; T = MnO_2

19. The correct order of relative strength for the following nucleophilic species is:



(A) IV > III > II > I

(B) II > III > IV > I

(C) I > II > IV > III

(D) I > II > III > IV

20. The product obtained on reaction of optically pure 1-bromo-1-phenyl ethane with CH_3OH, is:

(A) phenyl ethene.

(B) 1-methoxy-1-phenyl ethane with inverted configuration only.

(C) 1-methoxy-1-phenyl ethane with retention of configuration.

(D) a racemic mixture of 1-methoxy-1-phenyl ethane.

21. An alkane [X] contains five 1°, two 2°, one 3° and one 4° carbon atoms. The IUPAC name of [X] is:

(A) 2,4,4-trimethylhexane

(B) 3,5-dimethylheptane

(C) 2,4-dimethylheptane

(D) 4,4-dimethylheptane

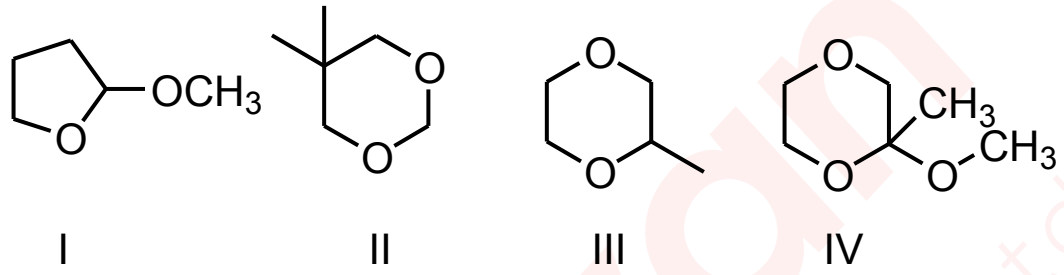
22. The number of isomeric alkenes with molecular formula C_5H_{10} is (taking stereoisomers into account):

(A) 4 (B) 5 (C) 6 (D) 7

23. At 0° C, 1 equivalent bromine is added to 2,4-hexadiene to produce 4,5-dibromo-2-hexene and its isomer 'X'. 'X' is:

(A) 5,5-dibromo-2-hexene
(B) 2,5-dibromo-3-hexene
(C) 2,2-dibromo-3-hexene
(D) 2,3-dibromo-4-hexene

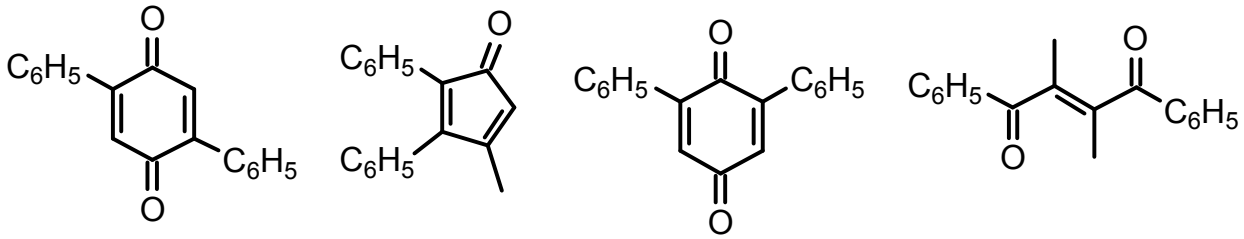
24. Which of the following is/are example/s of an acetal?



I II III IV

(A) I and II (B) III and IV (C) Only IV (D) I, II and III

25. The compound which can be produced by double aldol condensation of 1-phenyl-1,2-propanedione:



P Q R S

(A) P (B) Q (C) R (D) S

26. 2,2-Dimethyl-1,3-propanediol is formed by heating 2-methylpropanal with an excess of formaldehyde and $Ca(OH)_2$. The sequence of reactions taking place in this synthesis is:

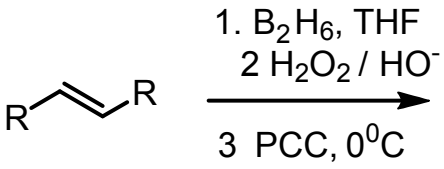
(A) dehydrogenation to 2-methyl-2-propenal followed by addition of formaldehyde.
(B) dehydrogenation to penta-2,3-diene followed by addition of formaldehyde.
(C) a crossed aldol reaction followed by a crossed Cannizzaro reaction.
(D) a crossed Cannizzaro reaction followed by a crossed aldol reaction.

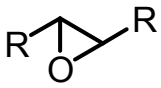
27. Number of different types of dipeptides produced using a mixture of glycine and L-valine, and number of optically active dipeptides formed in this mixture will be:

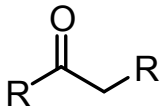
(A) Four dipeptides, all optically active
(B) Two dipeptides, all optically active
(C) Four dipeptides, three optically active
(D) Two dipeptides, none optically active

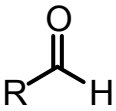
28. Predict the major product in the following reaction.

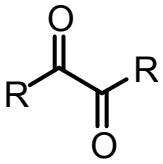
PCC is pyridinium chlorochromate



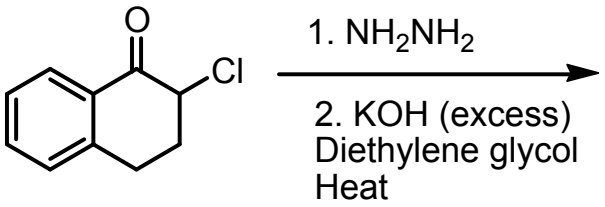
(A) 

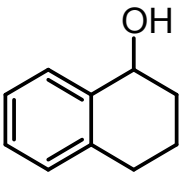
(B) 

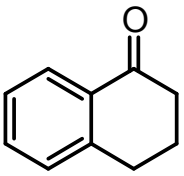
(C) 

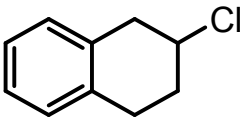
(D) 

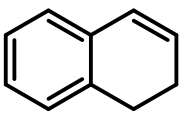
29. Find out the product in the following reaction.



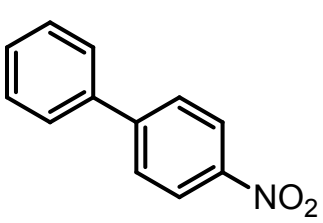
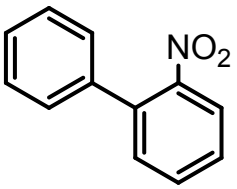
(A) 

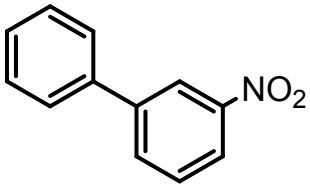
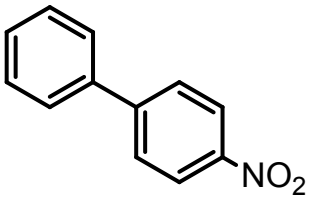
(B) 

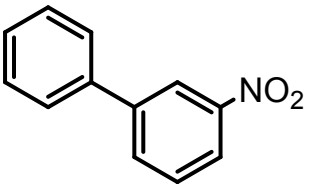
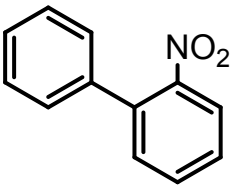
(C) 

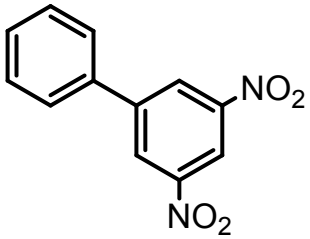
(D) 

30. The product/s obtained on reaction of biphenyl (Ph-Ph) with nitrating mixture ($HNO_3 + H_2SO_4$) is/are:

(A)  and 

(B)  and 

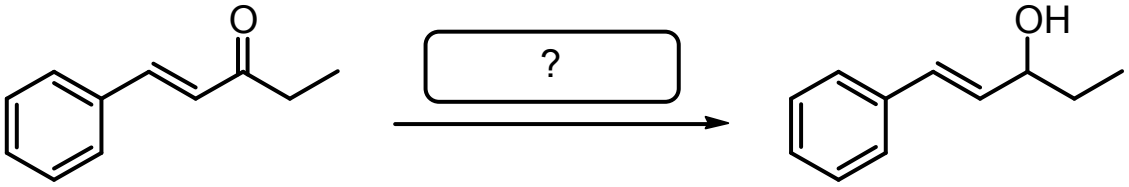
(C)  and 

(D) 

31. Chlorination of propane gives four dichloro products. One of them is optically active. The number of trichloro products possible from the optically active dichloro product is (excluding stereoisomers):

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

32. The suitable reagent for the following transformation is:



(A) Na / liq. NH_3 (B) H_2, Pd/C (C) $LiAlH_4$ (D) Zn-Hg, HCl, heat

33. Column **A** represents a set of functional groups and Column **B** their respective electronic effects.

[EDG: Electron donating group and EWG: Electron withdrawing group]

The correct match is:

Column **A** Column **B**

(A) $-NH_2$, -COCl, $-SO_3H$, -COOH ; *m*-directing, EWG, activating, *o/p*-directing

(B) -X, $-NHCOCH_3$, -CHO, $-CH_3$; *o/p* directing, EDG, *m*-directing, activating

(C) -COCl, $-COCH_3$, $-NH_2$, -CN ; EDG, EWG, deactivating, *m*-directing

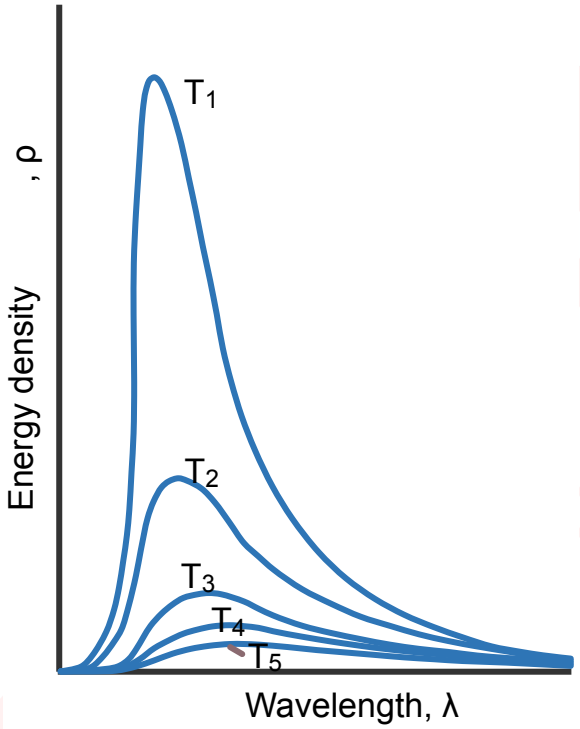
(D) $-SO_3H$, $-NH_2$, $-OCH_3$, $-CONH_2$; activating, deactivating, EWG, EWG

34. The correct order of reactivity of -CHO, -COR, -COOR, -$CONR_2$ groups toward MeMgI in ether is:

(A) -$CONR_2$ > -COOR > -COR > -CHO
(B) -CHO > -COR > -COOR > -$CONR_2$
(C) -$CONR_2$ > -CHO > -COR > -COOR
(D) -CHO > -$CONR_2$ > -COOR > -COR

35. The plots of energy density (energy per unit area) vs wavelength for blackbody radiation at various temperatures is given below.

The correct option among the following is:



(i) $T_1 > T_2 > T_3 > T_4 > T_5$

(ii) As temperature increases, the wavelength at which the intensity is maximum shifts towards the higher energy regions of the electromagnetic spectrum.

(iii) Radiations of all wave lengths are emitted, absorbed, reflected, and refracted by the black body.

(iv) The total energy density increases as the temperature is decreased.

(A) (i) and (ii)
(B) (ii) and (iii)
(C) (i), (iii) and (iv)
(D) (ii), (iii) and (iv)

36. A student adds 'x' g of iron (Fe) powder to dil. HCl and measures the work done by the reaction between HCl and the added Fe to be 1000 J. If the experiment was conducted at a constant pressure of 1 atm at 27°C, mass of Fe powder added is:

(A) 22.4 g
(B) 2.24 g
(C) 11.2 g
(D) 1.12 g

37. Antacids are medicines that temporarily neutralize the acid in the stomach and prevent heartburns. The volume of an antacid syrup containing 2.9 g of $Mg(OH)_2$ per 100 mL to be given to a patient whose stomach contains 2 L of gastric juice with HCl concentration of 6.0×10^{-3} M is :

(Molar mass of $Mg(OH)_2$ = 58.0 g mol^{-1})

(A) 4.0 mL
(B) 7.8 mL
(C) 12.0 mL
(D) 120 mL

38. A half-cell reaction represented by (i) as given below

$Fe(OH)_2(s) + 2e^- \rightarrow Fe(s) + 2OH^-(aq)$ $E^\ominus = -0.9$ V (i)

takes place in two different electrochemical cells, I and II, in which the other half cell reactions are (ii) and (iii) respectively:

$Al^{3+}(aq) + 3e^- \rightarrow Al(s)$ $E^\ominus = -1.7$ V (ii)

$AgBr(s) + e^- \rightarrow Ag(s) + Br^-(aq)$ $E^\ominus = -0.07$ V (iii)

The correct option that represents the redox reactions in cells I and II is:

(A) Fe is oxidised in cell I; Fe is oxidised in cell II

(B) Fe is oxidised in cell I; Fe is reduced in cell II

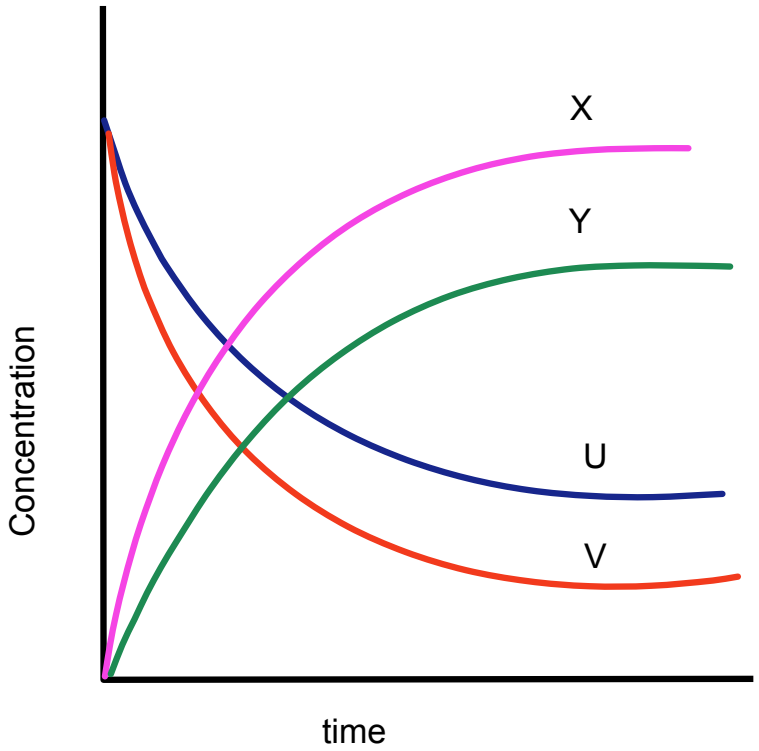
(C) Fe is reduced in cell I; Fe is reduced in cell II

(D) Fe is reduced in cell I; Fe is oxidised in cell II

39. The following are the concentration vs time plots of the reactants and products represented by the reaction

$L(g) + 2\,M(g) \rightarrow N(g) + 3\,O(g)$

The curves that represent M(g) and N(g) qualitatively are respectively



(A) X, Y (B) Y, U (C) V, Y (D) U, X

40. The current produced due to photoelectric effect

(A) increases with the increase of frequency of the incident radiation.

(B) increases with the increase in intensity of the incident radiation.

(C) decreases with time of irradiation.

(D) is independent of the intensity of incident radiation.

41. The property of radiation that is not different at various regions of the electromagnetic spectrum is:

(A) energy (B) frequency (C) velocity (D) wavelength

42. Among the following, the correct statements about the compressibility factor (Z) of real gases are:

(i) If Z < 1, intermolecular repulsive forces are more dominant.

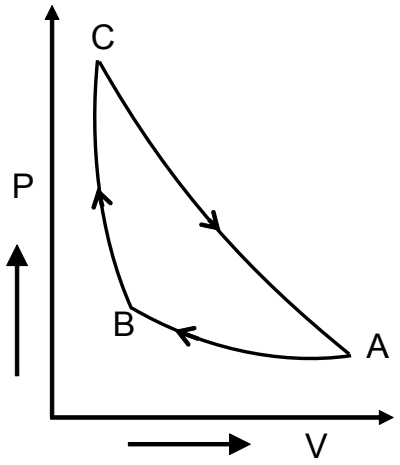
(ii) If Z < 1, intermolecular attractive forces are more dominant.

(iii) If Z > 1, intermolecular repulsive forces are more dominant.

(iv) If Z >1, intermolecular attractive forces are more dominant.

(A) (i) and (iv) (B) (i) and (iii) (C) (ii) and (iv) (D) (ii) and (iii)

43. The figure represents the processes AB, BC and CA undertaken by a certain mass of an ideal gas. Along the path AB, the gas is isothermally compressed with release of 800 J heat to the surroundings. It is then compressed adiabatically along the path BC and the work done is 500 J. The gas then returns to the state A along path CA and absorbs 100 J heat from the surroundings. The work done by the gas along the path CA is:



(A) – 300 J (B) – 900 J (C) – 600 J (D) – 400 J

44. Two flasks I and II of equal volume are evacuated and connected by a tube of negligible volume fitted with a stopcock. They are then placed in two different constant temperature baths of 250 K and 750 K respectively. 20 moles of an ideal gas are introduced into the system of these flasks through the stopcock. When the system reaches equilibrium, the ratio of the moles of the gas in flasks I and II is:

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

45. When a certain amount of a univalent salt AB (molar mass = 54 g mol^{-1}) was dissolved in 0.1 dm^3 of water, the relative lowering of the vapour pressure was found to be 3.55%. The molality of the resulting solution is:

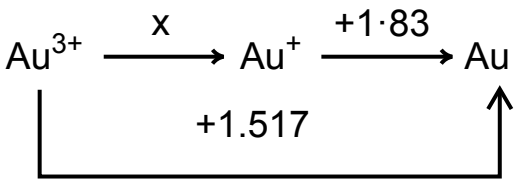
(Assume complete dissociation of the salt under given condition. Density of water = 1 g cm^{-3})

(A) 0.5 m (B) 1.0 m (C) 2.0 m (D) 4.0 m

46. The rate constant values for the decay of radioisotopes X and Y, used in radio-medicine are 0.05 h^{-1} and 0.025 h^{-1} respectively. In a hospital, at a time 't_0' the activity of a sample of X was found to be twice that of Y. The activities of the two radioisotopes will be approximately equal when the time elapsed is:

(A) twice the half-life of Y
(B) twice the half-life of X
(C) equal to the half-life of X
(D) equal to ½ the half-life of Y

47. Latimer diagrams are the compact representations of electrochemical equilibria in substances of multiple oxidation states. The value of the potential, x, in the Latimer diagram of gold (at pH = 1.0) is:



(A) 2.72 V (B) 3.18 V (C) −3.18 V (D) 1.36 V

48. Electrolysis of aqueous $CuSO_4$ (0.1 M) was carried out in two cells I and II. In I, the electrodes are of Cu and in II they were of Pt. As the electrolysis proceeds pH of the electrolyte solution will:

(A) decrease in II and remain the same in I
(B) remain the same in both I and II
(C) increase in both I and II
(D) increase in I and decrease in II

PART A-2 · ONE OR MORE CORRECT OPTIONS

Q. 49 – 60 · 6 marks only if all correct options are marked · no negative marking

49. Choose the correct statement(s) regarding zeolites:

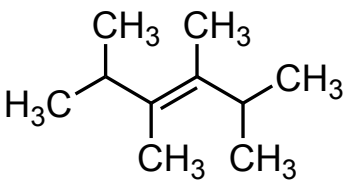
(A) Silicon atoms are replaced by aluminium atoms in the zeolites.
(B) The pores and cavities of the zeolites as well as size and shape of reactant decides the reactions taking place in the zeolites.
(C) The cracking of hydrocarbons and isomerisation reactions are catalyzed by zeolites in the petrochemical industries.
(D) Zeolites act as molecular sieves and can separate the molecules of different sizes.

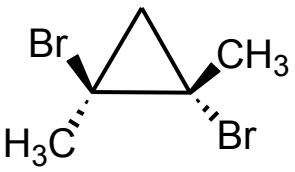
50. Crystalline iron(III) nitrate nonahydrate, $Fe(NO_3)_3.9H_2O$, has a very pale violet colour. When added to water, the crystals dissolve to form a brown solution. Treatment of this brown solution with concentrated nitric acid yields a very pale violet solution while treatment with HCl yields a yellow solution.

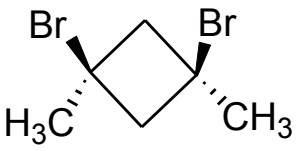
Identify the correct statements regarding the above observations.

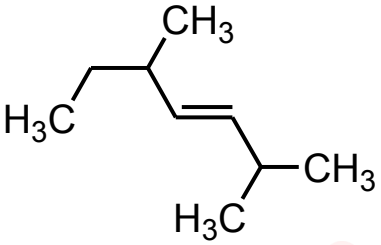
(A) The brown colour is due to $[Fe(OH)(H_2O)_5]^{2+}$, $[Fe(OH)_2(H_2O)_4]^{+}$
(B) Violet colour is due to $[Fe(H_2O)_6]^{3+}$ and yellow colour due to $[FeCl_4]^{-}$
(C) Addition of HNO_3 shifts the equilibrium $[Fe(H_2O)_6]^{3+} + H_2O \rightleftharpoons [Fe(OH)(H_2O)_5]^{2+} + H_3O^{+}$ to left giving pale violet colour
(D) Addition of HNO_3 shifts the equilibrium $[Fe(H_2O)_6]^{3+} + H_2O \rightleftharpoons [Fe(OH)(H_2O)_5]^{2+} + H_3O^{+}$ to right giving violet colour

51. The optically active compounds from the following are:

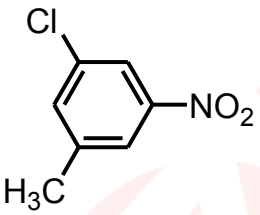
(A) 

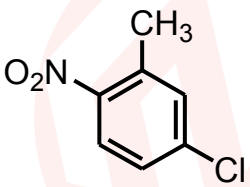
(B) 

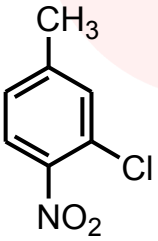
(C) 

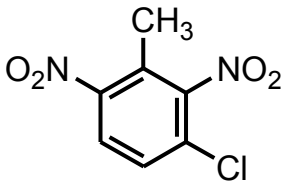
(D) 

52. 3-chlorotoluene is reacted with a mixture of conc. H_2SO_4 and HNO_3. The product/s formed is/are:

(A) 

(B) 

(C) 

(D) 

53. 2,4,6-trinitrophenol is more acidic than phenol. Identify the correct statement(s)

(A) pK_a for 2,4,6-trinitrophenol is less than that of phenol.

(B) phenol is stabilized by intramolecular π hydrogen bonding.

(C) The conjugate base of 2,4,6-trinitrophenol delocalizes the negative charge on the oxygen atom to a very large extent.

(D) The conjugate base of phenol delocalizes the negative charge to a greater extent than the conjugate base of 2,4,6-trinitrophenol.

54. The correct statements for 1,3-butadiene from following are:

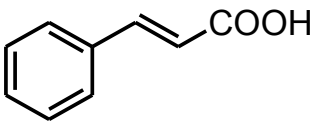
(A) Molar addition of Br_2 yields only 1,4-dibromo-2-butene as the major product when the reaction is performed for longer time period

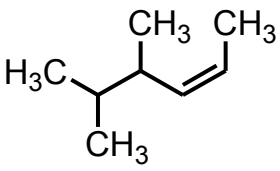
(B) Molar addition of Br_2 yields only 1,2-dibromo-2-butene for longer time period

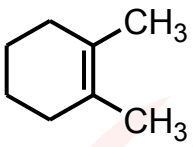
(C) $C_1 - C_2$ and $C_3 - C_4$ bonds are slightly longer than a C=C bond

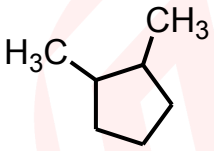
(D) $C_2 - C_3$ single bond is slightly shorter than a C – C bond

55. Which of the following representations will exhibit *cis-trans* isomerism?

(A) 

(B) 

(C) 

(D) 

56. For an elementary dimerization reaction of the type $2R \rightarrow R_2$, the value of the steric factor was found to be 2.5. This indicates that

(A) the experimentally obtained rate is 2.5 times faster than the theoretical rate.

(B) ratio of the number of collisions calculated from collision theory and that actually take place is 1: 2.5.

(C) the activation energy of the reaction is the same for both the experimental and calculated values.

(D) the molecules of reactant R may be of some complex structure.

57. The correct statement/s among the following is/are:

(A) The charge on the diffused layer of AgI colloidal solution by the addition of few drops of dilute aqueous solution of KI to an aqueous solution of $AgNO_3$ is negative.

(B) The charge on the diffused layer of AgI colloidal solution by the addition of few drops of dilute aqueous solution of $AgNO_3$ to an aqueous solution of KI is positive.

(C) When the ionic strength of a colloidal solution is increased, thickness of the double layer is increased, and the colloid gets precipitated.

(D) When the ionic strength of a colloidal solution is increased, thickness of the double layer is decreased, and the colloid gets precipitated.

58. In reverse osmosis the flow of solvent across semi permeable membrane occurs

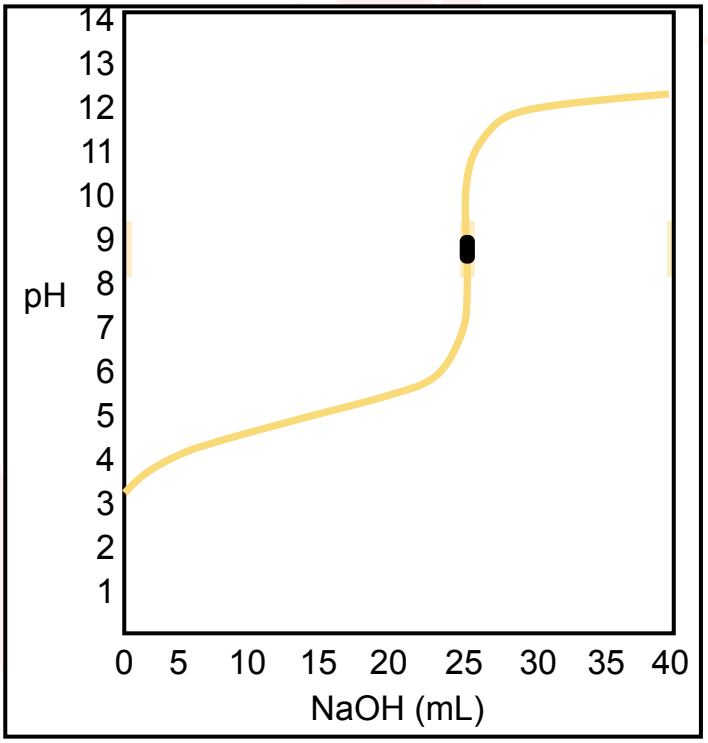
(A) when hydrostatic pressure is greater than osmotic pressure

(B) when hydrostatic pressure is lower than osmotic pressure

(C) from higher concentrated solution to lower concentrated solution

(D) from lower concentrated solution to higher concentrated solution

59. Given below is the plot of pH vs volume of NaOH added in an acid-base titration. The correct statement/s among the following is/are:



(A) Before the equivalence point, a series of buffer solutions determine the pH.

(B) The graph represents the titration of a strong acid with NaOH.

(C) At the equivalence point, hydrolysis of the anion of the acid determines the pH.

(D) After the equivalence point acid/salt buffer solution determines the pH.

60. The correct statement/s among the following is/are:

(A) The probability density (ψ^2) for a hydrogen atom is zero at r = 0.

(B) In an atom, orbitals with the same quantum number have different energies.

(C) The energy of a given orbital with same principal quantum number decreases as the atomic number 'Z', increases.

(D) For a given atomic number, the configuration having the maximum number of parallel spins is of the lowest energy than any other arrangement arising from the same configuration.

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Given in the question paper

PERIODIC TABLE OF ELEMENT

1 **H** Hydrogen 1																	2 **He** Helium 4
2 **Li** Lithium 3	3 **Be** Beryllium 9											5 **B** Boron 11	6 **C** Carbon 12	7 **N** Nitrogen 14	8 **O** Oxygen 16	9 **F** Fluorine 19	10 **Ne** Neon 20
11 **Na** Sodium 23	12 **Mg** Magnesium 24											13 **Al** Aluminium 27	14 **Si** Silicon 28	15 **P** Phosphorus 31	16 **S** Sulfur 32	17 **Cl** Chlorine 35.5	18 **H** Argon 40
19 **K** Potassium 39	20 **Ca** Calcium 40	21 **Sc** Scandium 45	22 **Ti** Titanium 48	23 **V** Vanadium 51	24 **Cr** Chromium 52	25 **Mn** Manganese 55	26 **Fe** Iron 56	27 **Co** Cobalt 59	28 **Ni** Nickel 59	29 **Cu** Copper 64	30 **Zn** Zinc 65	31 **Ga** Gallium 70	32 **Ge** Germanium 73	33 **As** Arsenic 75	34 **Se** Selenium 79	35 **Br** Bromine 80	36 **Kr** Krypton 84
37 **Rb** Rubidium 86	38 **Sr** Strontium 88	39 **Y** Yttrium 89	40 **Zr** Zirconium 91	41 **Nb** Niobium 93	42 **Nb** Niobium 96	43 **Tc** Technetium 98	44 **Ru** Ruthenium 101	45 **Rh** Rhodium 103	46 **Pd** Palladium 106	47 **Ag** Silver 108	48 **Cd** Cadmium 112	48 **In** Indium 115	50 **Sn** Tin 119	51 **Sb** Antimony 122	52 **Te** Tellurium 128	53 **I** Iodine 127	54 **Xe** Xenon 131
55 **Cs** Cesium 133	56 **Ba** Barium 137	57 **La** Lanthanum 139	72 **Hf** Hafnium 179	73 **Ta** Tantalum 181	74 **W** Tungsten 184	75 **Re** Rhenium 186	76 **Os** Osmium 190	77 **Ir** Iridium 192	78 **Pt** Platinum 195	79 **Au** Gold 197	80 **Hg** Mercury 201	81 **Ti** Thallium 204	82 **Pb** Lead 207	83 **Bi** Bismuth 209	84 **Po** Polonium 210	85 **At** Astatine 210	86 **Rn** Radon 222
87 **Fr** Francium 223	88 **Ra** Radium 226	89 **Ac** Actinium 227	104 **Unq** Unnilquadium 257	105 **Unp** Unnilpentium 260	106 **Unh** Unnilhexium 263	107 **Uns** Unnilseptium 262	108 **Uno** Unniloctium 265	109 **Une** Unnilennium 266									

← Proton number
← Symbol
← Name of element
← Relative atomic mass

58 **Ce** Cerium 140	59 **Pr** Praseodymium 141	60 **Nd** Neodymium 144	61 **Pm** Promethium 147	62 **Sm** Samarium 150	63 **Eu** Europium 152	64 **Gd** Gadolinium 157	65 **Tb** Terbium 159	66 **Dy** Dysprosium 136	67 **Ho** Holmium 165	68 **Er** Erbium 167	69 **Tm** Thulium 169	70 **Yb** Ytterbium 173	71 **Lu** Lutetium 175
90 **Th** Thorium 232	91 **Pa** Proactinium 231	92 **U** Uranium 238	93 **Np** Neptunium 237	94 **Pu** Plutonium 244	95 **Am** Americium 243	96 **Cm** Curium 247	97 **Bk** Berkerium 247	98 **Cf** Californium 249	99 **Es** Einsteinium 254	100 **Fm** Fermium 253	101 **Md** Mendelevium 256	102 **No** Nobelium 254	103 **Lr** Lawrencium 257

ANSWER KEY

NSEC 2023 · PAPER CODE 31

60
QUESTIONS · 216 MARKS

IAPT final answer key for paper code 31. ★ marks an answer given as per Zigyan.

1	(A)	2	(B)★	3	(D)	4	(B)	5	(B)
6	(C)	7	(C)	8	(C)	9	(C)	10	(B)
11	(B)	12	(A)	13	(D)	14	(B)	15	(C)
16	(B)	17	(C)	18	(D)	19	(D)	20	(D)
21	(A)	22	(C)	23	(B)	24	(A)	25	(A)
26	(C)	27	(C)	28	(B)	29	(D)	30	(A)
31	(C)	32	(C)	33	(B)	34	(B)	35	(A)
36	(A)	37	(C)	38	(D)	39	(C)	40	(B)
41	(C)	42	(D)	43	(C)★	44	(C)	45	(B)
46	(B)	47	(D)	48	(A)	49	(A), (B), (C), (D)	50	(A), (B), (C)
51	(B), (D)	52	(B), (C)★	53	(A), (C)	54	(A), (C), (D)	55	(A), (B), (D)
56	(A), (C)★	57	(A), (B), (D)	58	(A), (C)	59	(A), (C)	60	(C), (D)

★ Answers as per Zigyan

- **Q2** — As per Zigyan: (B); IAPT key (B).
- **Q43** — As per Zigyan: (C); IAPT key (C).
- **Q52** — As per Zigyan: (B), (C); IAPT key (B), (C), (D).
- **Q56** — As per Zigyan: (A), (C); IAPT key (C), (D).

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OLYMPIADS · 2026

Olympiad results



TOP ACHIEVEMENT · CHEMISTRY

Qualified the Chemistry Olympiad twice, and selected for the HBCSE camp.

Saksham Bishnoi reached the national stage of the Chemistry Olympiad in two consecutive years and was selected for the Orientation-cum-Selection Camp at HBCSE, Mumbai. 4 Years Classroom - the same student who took AIR 168 in JEE Advanced 2026.

Qualified twice | HBCSE selection camp | Only student from Faridabad

Above MAS means above the **Minimum Admissible Score**: clearing it puts a student in the national band for their subject. It is a real threshold, not a participation marker.

CHEMISTRY · ABOVE MAS



Sulokya Bibhuty
Class XII
3 Years Classroom
Above MAS



Anay Gupta
Class XI
3 Years Classroom
Above MAS



Akshat Khator
Class XI
3 Years Classroom
Above MAS



Harshit Goyal
Class XII
4 Years Classroom
Above MAS



Hardik Sharma
Class XI
3 Years Classroom
Above MAS



Aarush Kumar
Class XII
1 Year Classroom
Above MAS

PHYSICS · ASTRONOMY · MATHEMATICS

PHYSICS



Sulokya Bibhuty
Class XII
3 Years Classroom
Above MAS

PHYSICS



Saksham Bishnoi
Class XII
4 Years Classroom
Above MAS

ASTRONOMY



Sulokya Bibhuty
Class XI
3 Years Classroom
Above MAS

MATHEMATICS · IOQM



Priyanshi
Class XI
4 Years Classroom
IOQM Qualifier

OLYMPIADS WE PREPARE STUDENTS FOR

NSEP	NSEC	NSEB	NSEA	IOQM	NSEJS
Physics	Chemistry	Biology	Astronomy	Mathematics	Class X and below

The olympiad pathway starts in Class 8.

NSEJS is open to Class 10 and below - the habit of staying with one hard problem is the one JEE Advanced rewards.

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RESULTS · 2021 – 2026

Our toppers, year by year

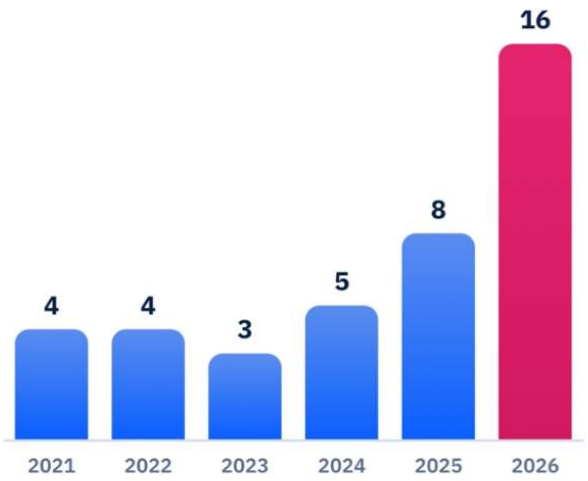
40
JEE Advanced selections in 6 years

AIR 168
best rank — Saksham Bishnoi, 2026

16 of 35
students selected, JEE Advanced 2026

14 of 35
above 98 percentile, JEE Main 2026

JEE ADVANCED SELECTIONS PER YEAR



BEST RANK EACH YEAR

YEAR	JEE ADVANCED	JEE MAIN
2026	**Saksham Bishnoi** AIR 168 · 4 Years Classroom	**Saksham Bishnoi** AIR 811 · 99.95 %ile
2025	**Chakshu** AIR 4,233 · 2 Years Classroom	**Chakshu** AIR 8,538 · 99.44 %ile
2024	**Harshit** AIR 777 · 2 Years Classroom	**Harshit** AIR 1,473 · 99.91 %ile
2023	**Aditya Jain** AIR 2,373 · 2 Years Classroom	**Aditya Jain** AIR 2,503 · 99.79 %ile
2022	**Rachit Sharma** AIR 698 · 1 Year Classroom	**Rachit Sharma** AIR 1,016 · 99.90 %ile
2021	**Sparsh Mittal** AIR 2,237 · 1 Year Classroom	**Sparsh Mittal** AIR 1,562

JEE ADVANCED 2026 — THIRTEEN NAMED SELECTIONS



Saksham Bishnoi
AIR 168
4 Years Classroom



Sulokya Bibhuty
AIR 1,315
3 Years Classroom



Aarush
AIR 2,699
1 Year Classroom



Manishka
AIR 2,869
4 Years Classroom



Oojit Kumar
AIR 5,765
4 Years Classroom



Harshit Goyal
AIR 6,407
4 Years Classroom



Pranab Sharma
AIR 6,750
3 Years Classroom



Aditya Dhar
AIR 15,183
3 Years Classroom



Arpit Anshuman
AIR 19,308
4 Years Classroom



Lokesh
AIR 22,857
3 Years Classroom



Arjun
AIR 24,674
3 Years Classroom



Sanyam Gulyani
AIR 25,123
1 Year Classroom



Saket
AIR 27,628
3 Years Classroom

Sixteen students of the 2026 batch were selected in JEE Advanced; the thirteen above are named with their All India Rank.

JEE MAIN 2026 — TOP SIX, WITH PERCENTILE



Saksham Bishnoi
AIR 811
99.95 %ile
4 Years Classroom



Sulokya Bibhuty
AIR 1,095
99.94 %ile
3 Years Classroom



Harshit Goyal
AIR 2,662
99.83 %ile
4 Years Classroom



Manishka
AIR 4,817
99.70 %ile
4 Years Classroom



Oojit Kumar
AIR 5,040
99.69 %ile
4 Years Classroom



Aarush
AIR 5,276
99.67 %ile
1 Year Classroom

14 of the 35 students in the 2026 batch scored above the 98th percentile in JEE Main.

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