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PREVIOUS YEAR PAPER · 2019

OLYMPIAD · STAGE I

NSEC

National Standard Examination in Chemistry

2019

Question paper with official answer key

80	240	120 min	31
Questions	Maximum marks	Time	Paper code

Question paper and official answer key: Indian Association of Physics Teachers (IAPT), NSEC 2019, 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
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OLYMPIAD RESULTS

Above the Minimum Admissible Score - the national band for the subject

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

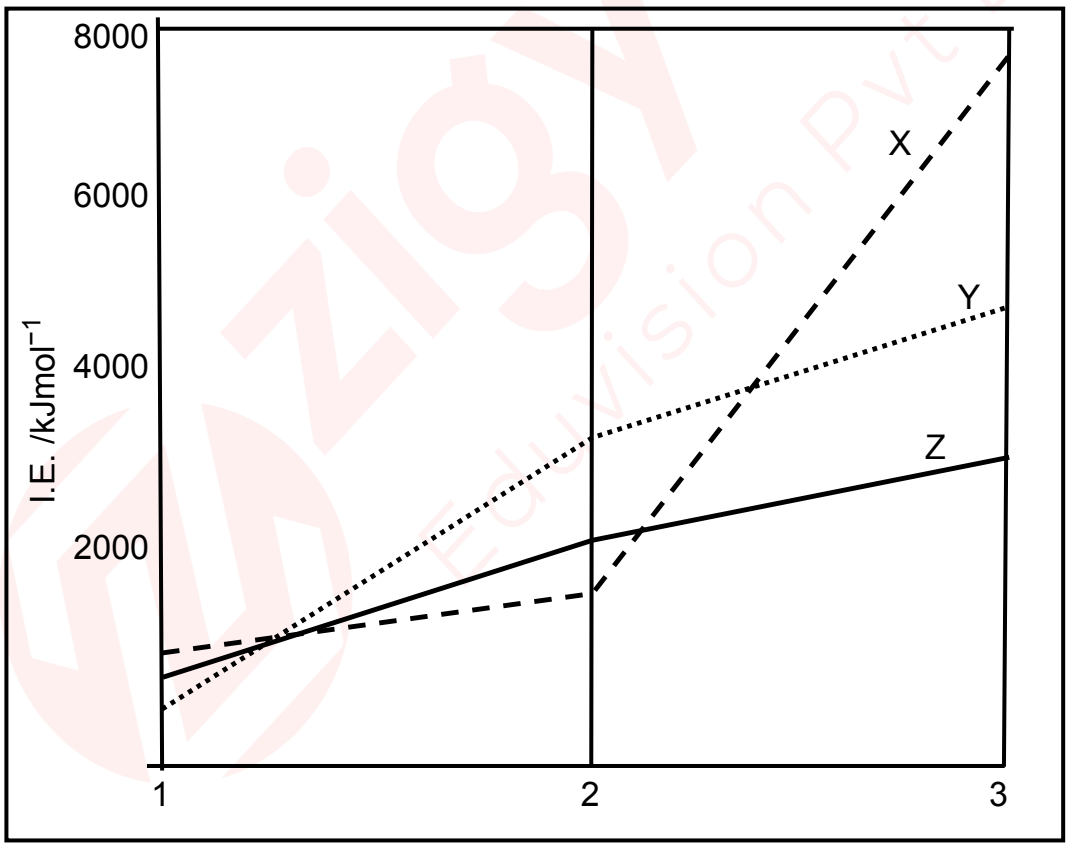
Useful constants

Charge of electron, $e = 1.602 \times 10^{-19} C$
Mass of electron, $m_e = 9.1 \times 10^{-31} kg$
Planck's constant, $h = 6.626 \times 10^{-34} J\,s$
Speed of light, $c = 3.0 \times 10^{8} ms^{-1}$
Avogadro constant, $N_A = 6.022 \times 10^{23} mol^{-1}$
Molar gas constant, $R = 0.082\, L\,atm\,mol^{-1}K^{-1}$
$= 8.314\, J\,mol^{-1}\,K^{-1}$
Faraday's constant, $\mathrm{F} = 96487\ C\ mol^{-1}$

PART A-1 · ONE CORRECT OPTION

Q. 1 – 80 · +3 for a correct answer, –1 for a wrong one

1. The following qualitative plots depict the first, second and third ionization energies (I.E.) of Mg, Al and K. Among the following, the correct match of I.E. and the metal is



(A) X-Al ; Y-Mg ; Z-K
(B) X-Mg ; Y-Al ; Z-K
(C) X-Mg ; Y-K ; Z-Al
(D) X-Al; Y-K; Z-Mg

2. A solid comprises of three types of elements, 'P', 'Q' and 'R'. 'P' forms an FCC lattice in which 'Q' and 'R' occupy all the tetrahedral voids and half the octahedral voids respectively. The molecular formula of the solid is

(A) P_2Q_4R (B) PQ_2R_4 (C) P_4Q_2R (D) P_4QR

3. The set in which all the species are diamagnetic is

(A) B_2, O_2, NO

(B) O_2, O_2^+, CO

(C) N_2, O_2^-, CN^-

(D) C_2, O_2^{2-}, NO^+

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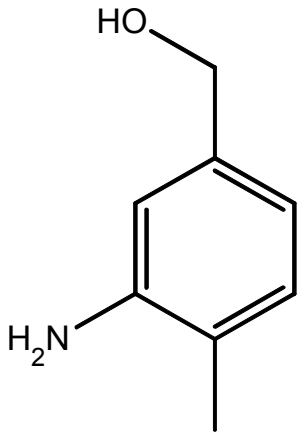
4. The structure of compound 'X' ($C_8H_{11}NO$) based on the following tests and observations is

Reagent/s	Observation
Neutral $FeCl_3$	No coloration
Lucas reagent	Turbidity
$NaNO_2$/HCl at 273 K	Yellow oil

(A)



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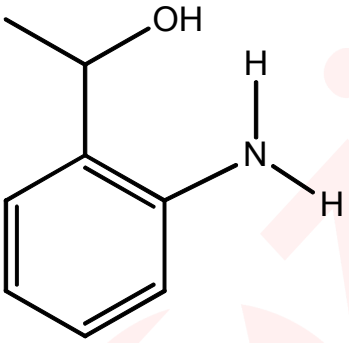

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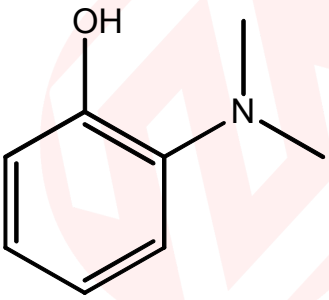
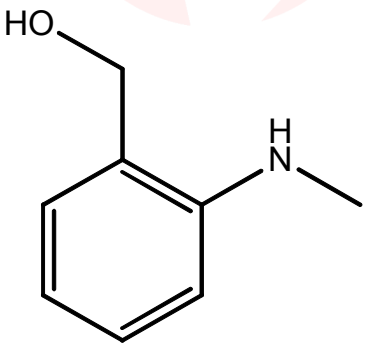
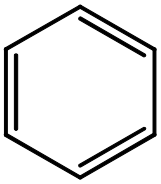
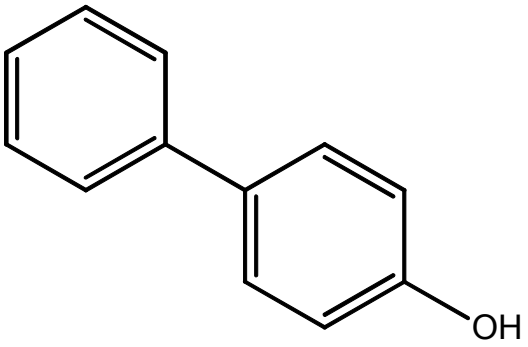


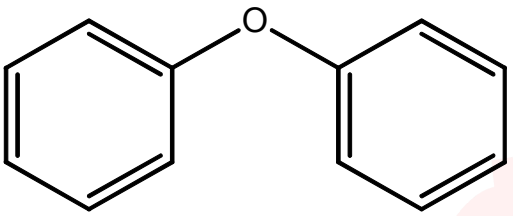
(D)

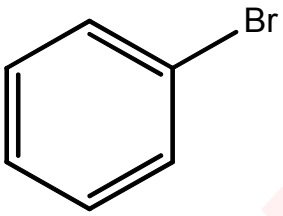


5. Reaction of C_6H_5MgBr with phenol gives

(A) 

(B) 

(C) 

(D) 

6. The work done (kJ) in the irreversible isothermal compression of 2.0 moles of an ideal gas from 1 bar to 100 bar at 25°C at constant external pressure of 500 bar is

(A) 2452 (B) 490 (C) 2486 (D) – 490

7. The power and wavelength emitted by a laser pointer commonly used in Power Point presentations are 1.0 mW and 670 nm respectively. Number of photons emitted by this pointer during a presentation of 5 minutes is

(A) 1.01×10^{9} (B) 1.01×10^{21} (C) 1.6×10^{16} (D) 1.01×10^{18}

8. The number of stereoisomers is maximum for

(A) $[Co(en)_3]^{3+}$ (B) $[Co(en)_2ClBr]^{+}$

(C) $[Co(NH_3)_4Cl_2]^{+}$ (D) $[Co(NH_3)_4ClBr]^{+}$

9. Which of the following is NOT correct about hydrides?

I. Saline hydrides are stoichiometric and metallic hydrides are non-stoichiometric

II. BeH_2 is monomeric whereas MgH_2 is polymeric

III. Hydrides of the elements of Group 13 are electron deficient and those of Group15 are electron rich

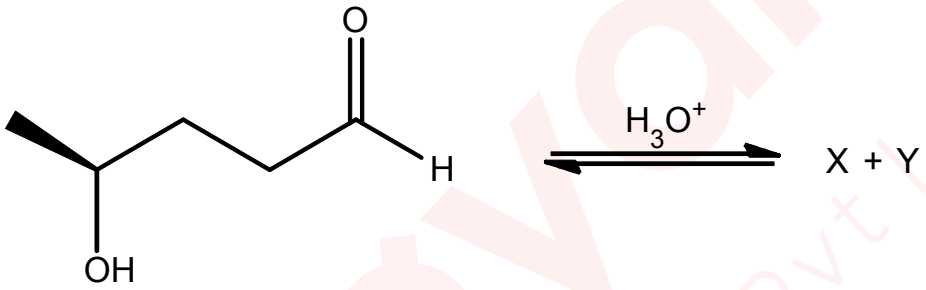
IV. NaH reacts with water and liberates H_2 whereas B_2H_6 does not react with water

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

10. Atropine ($C_{17}H_{23}O_3N$) is a naturally occurring compound used to treat certain types of poisoning. The degree of unsaturation in atropine is

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

11. The compounds 'X' and 'Y' formed in the following reaction are



(A) hemiacetals with identical physical and chemical properties
(B) acetals with identical physical and chemical properties
(C) hemiacetals with different physical and chemical properties
(D) acetals with different physical and chemical properties

12. In which of the following, is a new C-C bond formed in the product?

I. $CH_3CHO \xrightarrow{\text{dil. NaOH}}$

II. $CH_3MgCl + C_2H_5OH \xrightarrow{\text{heat}}$

III. $CO_2 + CH_3MgBr \xrightarrow{H_3O^+}$

IV. $C_2H_2 + NaNH_2 \xrightarrow{CH_3Br}$

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

13. Aqueous solution of slaked lime, $Ca(OH)_2$, is extensively used in municipal waste water treatment. Maximum pH possible in an aqueous solution of slaked lime is

(K_{sp} of $Ca(OH)_2 = 5.5 \times 10^{-6}$)

(A) 1.66 (B) 8.14 (C) 12.04 (D) 12.34

14. An electron present in the third excited state of a H atom returns to the first excited state and then to the ground state. If λ_1 and λ_2 are the wavelengths of light emitted in these two transitions respectively, $\lambda_1 : \lambda_2$ is

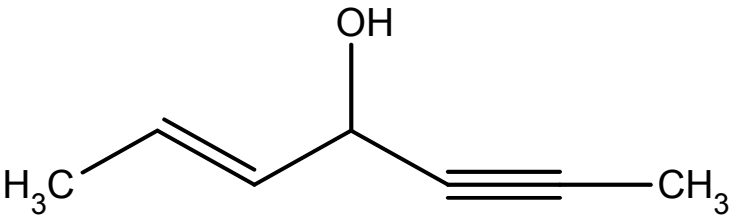
(A) 4:1 (B) 5: 9 (C) 3: 1 (D) 2:1

15. $MnCl_2.4H_2O$ (molar mass =198 g mol^{-1}) when dissolved in water forms a complex of Mn^{2+}. An aqueous solution containing 0.400 g of $MnCl_2.4H_2O$ was passed through a column of a cation exchange resin and the acid solution coming out was neutralized with 10 mL of 0.20 M NaOH. The formula of the complex formed is

(A) $[Mn(H_2O)_4Cl_2]$ (B) $[Mn(H_2O)_6]Cl_2$

(C) $[Mn(H_2O)_5Cl]Cl$ (D) $Na[Mn(H_2O)_3Cl_3]$

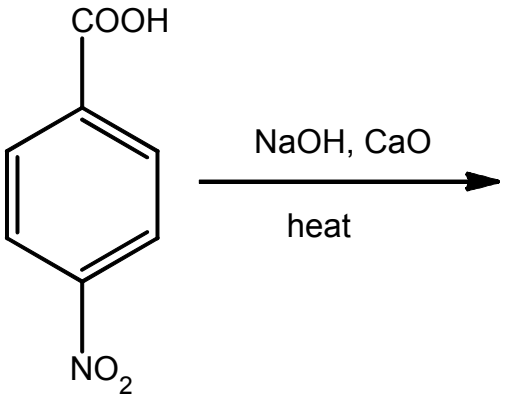
16. IUPAC name of the following molecule is

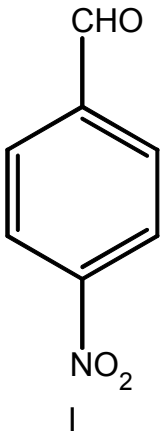


(A) 4-hydroxyhept2-en-5-yne (B) hept-2-en-5-yn-4-ol

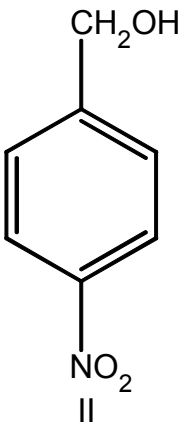
(C) hept-5-en-2-yn-4-ol (D) 4-hydroxyhept-5-en-2-yne

17. The product/s of the following reaction is/are

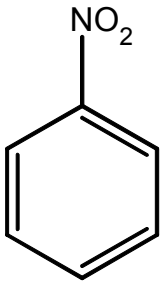




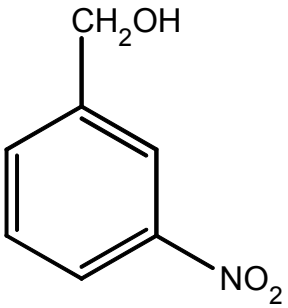
I



II



III



IV

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

18. The percentage dissociation of 0.08 M aqueous acetic acid solution at 25°C is

(K_a of acetic acid at 25°C = 1.8×10^{-5})

(A) 2. 92 (B) 1.5 (C) 1.2 (D) 4.8

19. For which of the following processes, carried out in free space, energy will be absorbed?

I. Separating an electron from an electron

II. Removing an electron from a neutral atom

III. Separating a proton from a proton

IV. Separating an electron from a proton

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

20. Decay of radioisotopes follows first order kinetics. Radioisotope U^{238} undergoes decay to a stable isotope, Th^{234}. The ratio of the number of atoms of U^{238} to that of Th^{234} after *three* half lives is

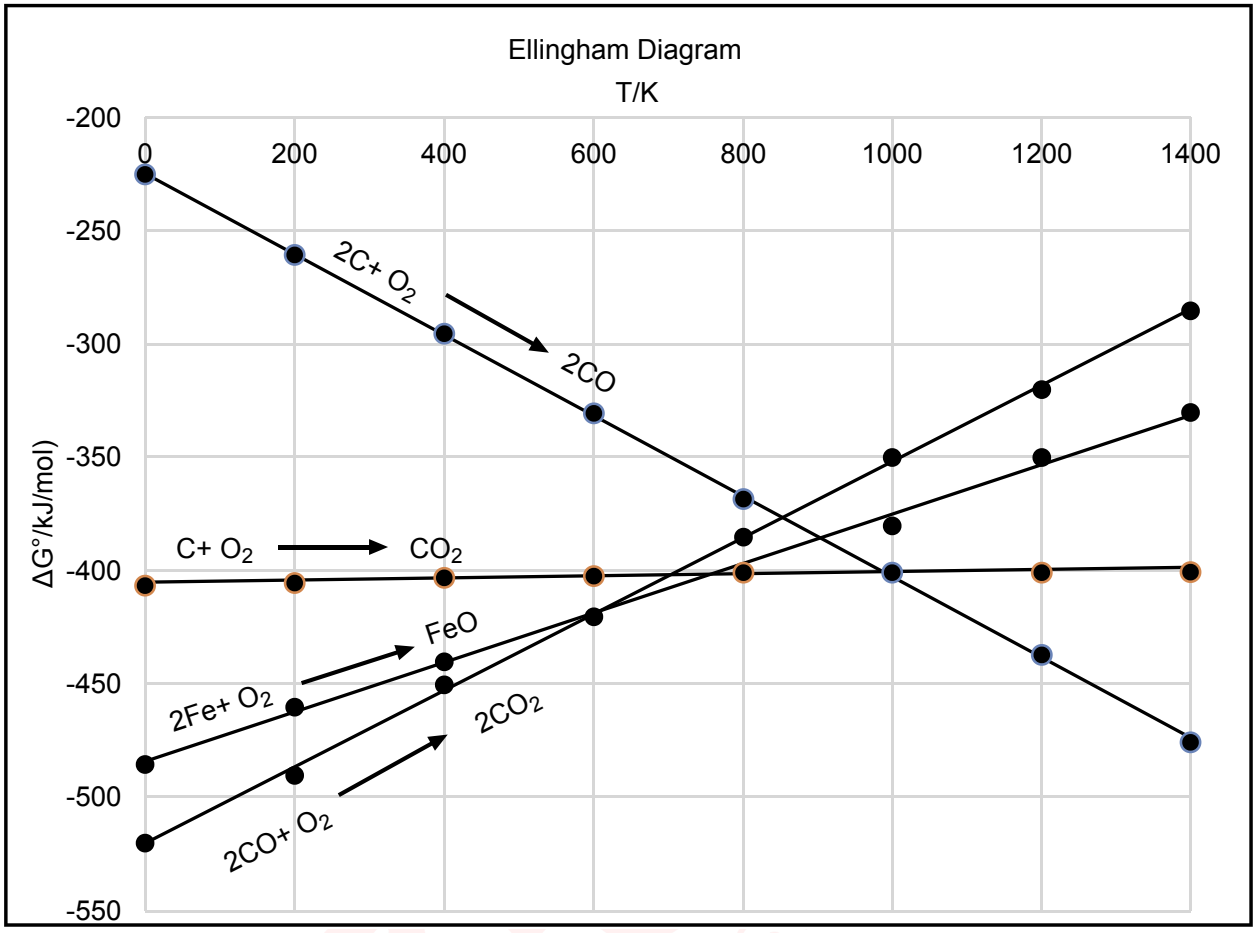
(A) 1/3 (B) 3/4 (C) 1/4 (D) 1/7

21. Myoglobin, (Mb), an oxygen storage protein, contains 0.34 % Fe by mass and in each molecule of myoglobin one ion of Fe is present. Molar mass of Mb (g mol^{-1}) is (Molar mass of Fe = 55.845 g mol^{-1})

(A) 16407 (B) 164206 (C) 16425 (D) 164250

22. The following Ellingham diagram depicts the oxidation of 'C', 'CO' and 'Fe'.

Which of the following is correct?



I. FeO can be reduced by C below 600 K

II. FeO can be reduced by CO below 600 K

III. FeO can be reduced by C above 1000 K

IV. FeO can be reduced by CO above 1000 K

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

23. N^{3-}, F^{-}, Na^{+} and Mg^{2+} have the same number of electrons. Which of them will have the smallest and the largest ionic radii respectively?

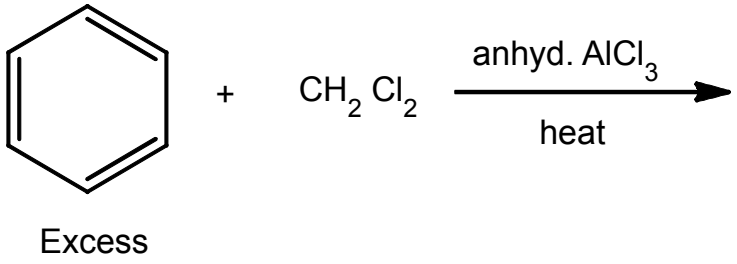
(A) Mg^{2+} and N^{3-} (B) Mg^{2+} and Na^{+} (C) N^{3-} and Na^{+} (D) F^{-} and N^{3-}

24. The reaction of 2,4-hexadiene with *one* equivalent of bromine at 0°C gives a mixture of two compounds 'X' and 'Y'. If 'X' is 4,5-dibromohex-2-ene, 'Y' is

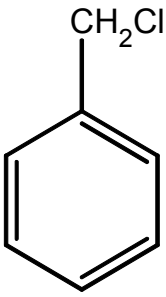
(A) 2,5-dibromohex-2-ene (B) 2,5-dibromohex-3-ene

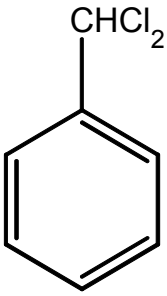
(C) 2,3-dibromohex-3-ene (D) 3,4- dibromohex-3-ene

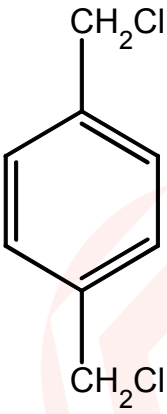
25. The major product of the following reaction is

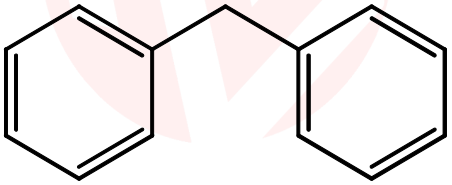


Excess

(A) 

(B) 

(C) 

(D) 

26. The kinetic energy of the photoelectrons ejected by a metal surface increased from 0.6 eV to 0.9 eV when the energy of the incident photons was increased by 20 %. The work function of the metal is

(A) 0.66 eV (B) 0.72 eV (C) 0.90 eV (D) 0.30 eV

27. An electrochemical cell was constructed with Fe^{2+}/Fe and Cd^{2+}/Cd at 25°C with initial concentrations of $[Fe^{2+}] = 0.800$ M and $[Cd^{2+}] = 0.250$ M. The EMF of the cell when $[Cd^{2+}]$ becomes 0.100 M is

Half cell	E^0 (V)
$Fe^{2+}(aq) / Fe(s)$	– 0.44
$Cd^{2+}(aq) / Cd(s)$	– 0.40

(A) 0.013 V (B) 0.011 V (C) 0.051 V (D) 0.022 V

28. The alkene ligand (π -C_2R_4) is both a 'σ' donor and a 'π' acceptor, similar to the CO ligand in metal carbonyls, and exhibits synergic bonding with metals. Correct order of C-C bond length in $K[PtCl_3(\pi$ -$C_2R_4)]$ complexes in which R = H, F or CN is

(A) H > F > CN (B) H > CN > F (C) CN > F > H (D) F > H > CN

29. The correct order of CFSE among $[Zn(NH_3)_4]^{2+}$, $[Co(NH_3)_6]^{2+}$ and $[Co(NH_3)_6]^{3+}$ is

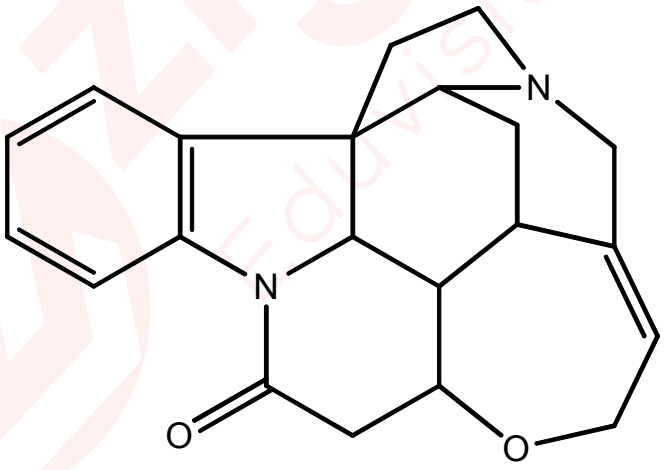
(A) $[Co(NH_3)_6]^{3+} > [Co(NH_3)_6]^{2+} > [Zn(NH_3)_4]^{2+}$

(B) $[Zn(NH_3)_4]^{2+} > [Co(NH_3)_6]^{2+} > [Co(NH_3)_6]^{3+}$

(C) $[Co(NH_3)_6]^{3+} > [Zn(NH_3)_4]^{2+} > [Co(NH_3)_6]^{2+}$

(D) $[Co(NH_3)_6]^{2+} > [Co(NH_3)_6]^{3+} > [Zn(NH_3)_4]^{2+}$

30. The number of asymmetric carbon atoms in strychnine, whose structure given below is

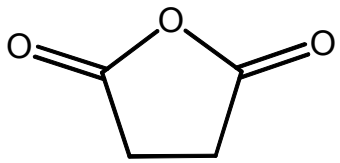


Strychnine

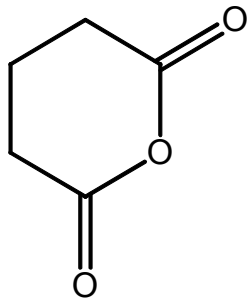
(A) 5 (B) 4 (C) 6 (D) 7

31. When acid 'X' is heated to 230°C, along with CO_2 and H_2O, a compound 'Y' is formed. If 'X' is $HOOC(CH_2)_2CH(COOH)_2$, the structure of 'Y' is

(A) $HOOC(CH_2)_3COOH$

(B) 

(C) $CH_3CH_2CH(COOH)_2$

(D) 

32. Number of products formed (ignoring stereoisomerism) in the monochlorination of ethylcyclohexane is

(A) 6 (B) 8 (C) 5 (D) 4

33. Molten NaCl is electrolysed for 35 minutes with a current of 3.50 A at 40°C and 1 bar pressure. Volume of chlorine gas evolved in this electrolysis is

(A) 0.016 L (B) 0.98 L (C) 9.8 L (D) 1.96 L

34. A balance having a precision of 0.001 g was used to measure a mass of a sample of about 15 g. The number of significant figures to be reported in this measurement is

(A) 2 (B) 3 (C) 5 (D) 1

35. Which of the following pairs of compounds can be stable while retaining the identity of each compound in the pair over a period of time?

I. $FeCl_3$, $SnCl_2$

II.$HgCl_2$, $SnCl_2$

III. $FeCl_2$, $SnCl_2$

IV. $FeCl_3$, KI

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

36. Which of the following is correct about the isoelectronic species, Li^+ and H^- ?

I. H^- is larger in size than Li^+

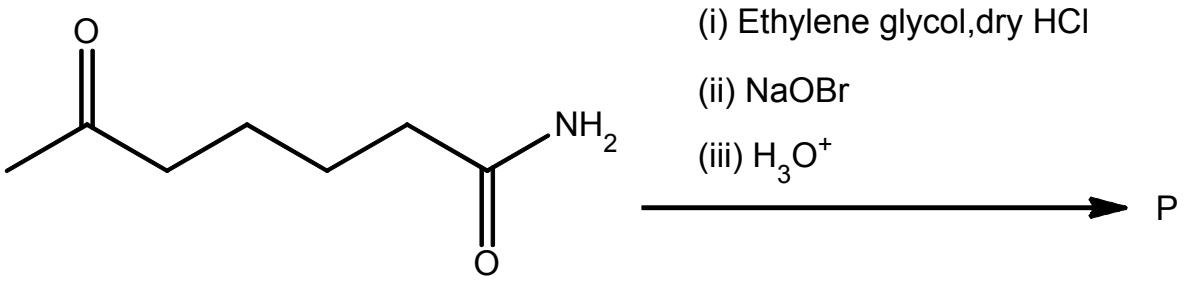
II. Li^+ is a better reducing agent than H^-

III. It requires more energy to remove an electron from H^- than from Li^+

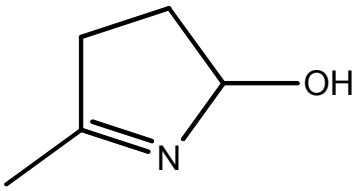
IV. The chemical properties of the two ions are the same

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

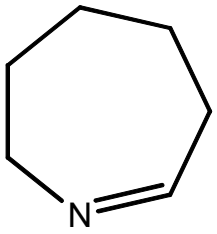
37. The major product 'P' formed in the following sequence of reactions is



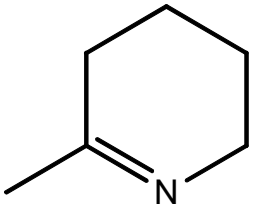
(A)



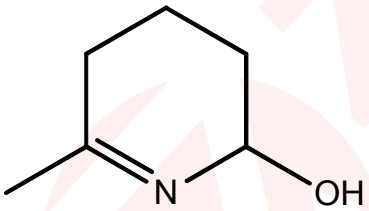
(B)



(C)



(D)



38. Sodium lauryl sulphate (SLS) is a surface active agent, which is adsorbed on water surface. The number of molecules of SLS that can be adsorbed on the surface of a spherical water droplet of diameter 3.5 mm is

(effective area of one molecule of SLS = 4.18 nm^2)

(A) 9.20×10^{12} (B) 9.20×10^{18} (C) 1.15×10^{12} (D) 3.68×10^{13}

39. The reaction $xX(g) \rightleftharpoons yY(g) + zZ(g)$ was carried out at a certain temperature with an initial pressure of X= 30 bar. Initially 'Y' and 'Z' were not present. If the equilibrium partial pressures of 'X', 'Y' and 'Z' are 20, 5 and 10 bar respectively x: y: z is

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

40. The unit of Planck's constant, 'h', is the same as that of

(A) angular momentum (B) energy (C) wavelength (D) frequency

41. A commercial sample of oleum ($H_2S_2O_7$) labeled as '106.5 % oleum' contains 6.5 g of water. The percentage of free SO_3 in this oleum sample is

(A) 2.88 (B) 28.8 (C) 0.029 (D) 0.28

42. Among the following, the complex ion/s that will have a magnetic moment of 2.82 B.M. is /are

I. $[Ni(CO)_4]$

II. $[NiCl_4]^{2-}$

III. $[Ni(H_2O)_6]^{2+}$

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

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

43. A suboxide of carbon, C_3O_2, has a linear structure. Which of the following is correct about C_3O_2?

I. Oxidation state of all three C atoms is +2

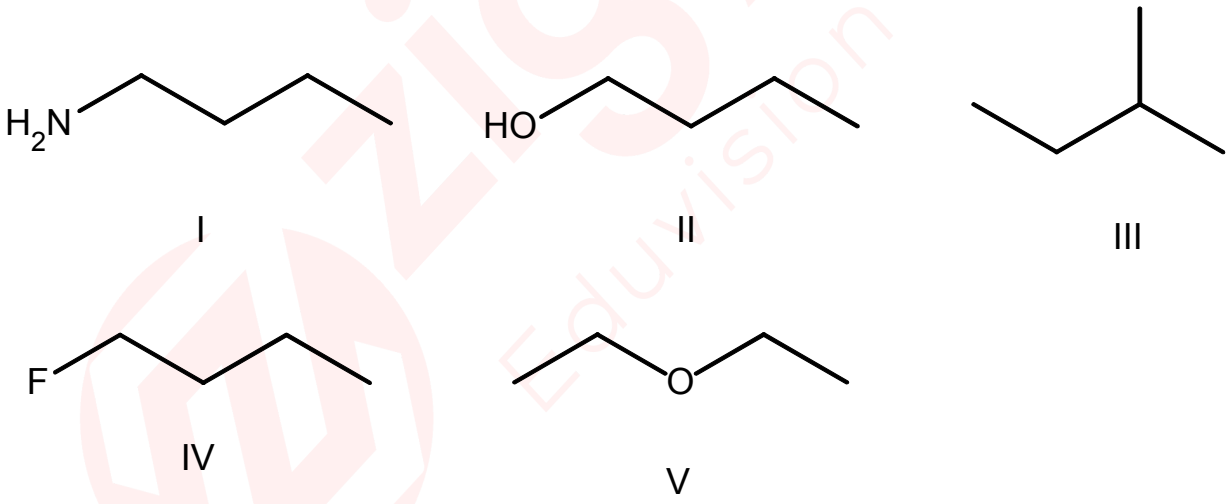
II. Oxidation state of the central C atom is zero

III. The molecule contains 4 σ and 4 π bonds

IV. Hybridization of the central carbon atom is sp^2

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

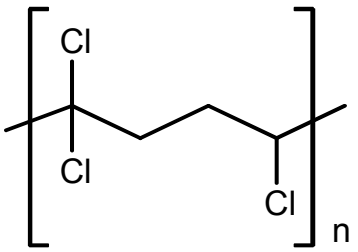
44. Among the following, the compounds with highest and lowest boiling points respectively are



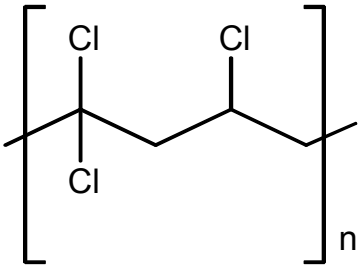
(A) I and III (B) II and III (C) I and IV (D) II and V

45. Saran wrap, a polymer used in food packaging is a copolymer of 1, 1-dichloroethene and vinyl chloride. In the chain initiation step, 1, 1-dichloroethene generates a free radical which reacts with vinyl chloride. Structure of Saran wrap is

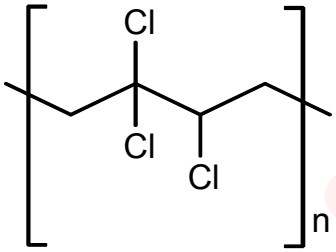
(A)



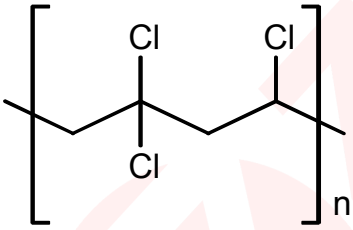
(B)



(C)



(D)



46. At 25°C K_a of HPO_4^{2-} and HSO_3^- are 4.8 x10^{-13} and 6.3x 10^{-8} respectively. Which of the following is correct?

(A) HPO_4^{2-} is a stronger acid than HSO_3^- and PO_4^{3-} is a weaker base than SO_3^{2-}

(B) HPO_4^{2-} is a weaker acid than HSO_3^- and PO_4^{3-} is a weaker base than SO_3^{2-}

(C) HPO_4^{2-} is a weaker acid than HSO_3^- and PO_4^{3-} is a stronger base than SO_3^{2-}

(D) HPO_4^{2-} is a stronger acid than HSO_3^- and PO_4^{3-} is a stronger base than SO_3^{2-}

47. The change in internal energy (ΔU) for the reaction $H_2(g) + Br_2(g) \rightarrow 2HBr(l)$ when 2.0 moles each of Br_2 (g) and H_2 (g) react is

(H_2 (g) + Br_2 (g) → 2HBr (g); $\Delta H_{reaction}$ = – 109 kJ; ΔH_{vap} of HBr = 213 kJ mol^{-1})

(A) – 644 kJ (B) 644 kJ (C) – 322 kJ (D) – 1070 kJ

48. About sea water, which of the following statement/s is/are correct?

I. Frozen sea water melts at a lower temperature than pure ice

II. Boiling point of sea water increases as it evaporates

III. Sea water boils at a lower temperature than fresh water

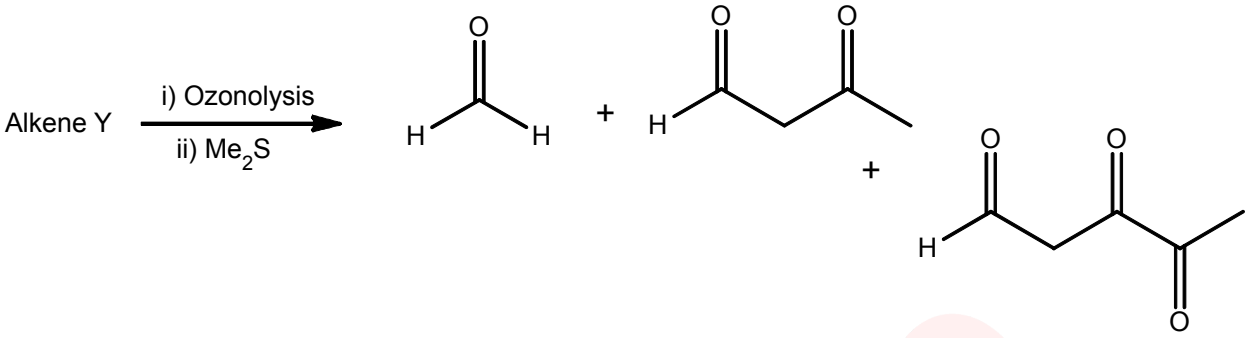
IV. Density of sea water at STP is same as that of fresh water

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

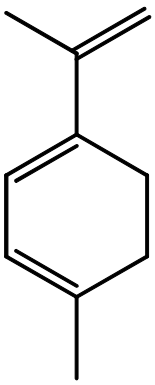
49. Which of the following species has *one* lone pair of electrons on the central atom?

(A) ClF_3 (B) I_3^- (C) I_3^+ (D) SF_4

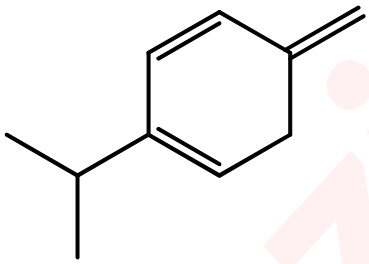
50. The alkene 'Y' in the following reaction is



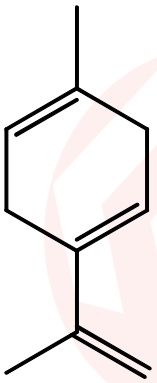
(A)



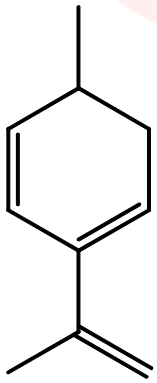
(B)



(C)

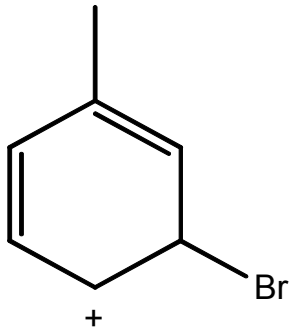


(D)

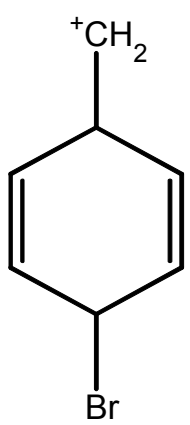


51. The structure that represents the major intermediate formed in the bromination of toluene is

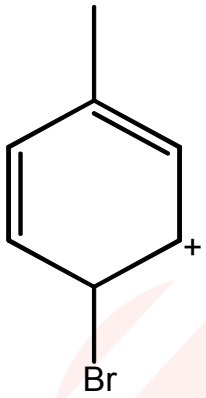
(A)



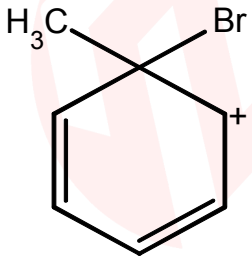
(B)



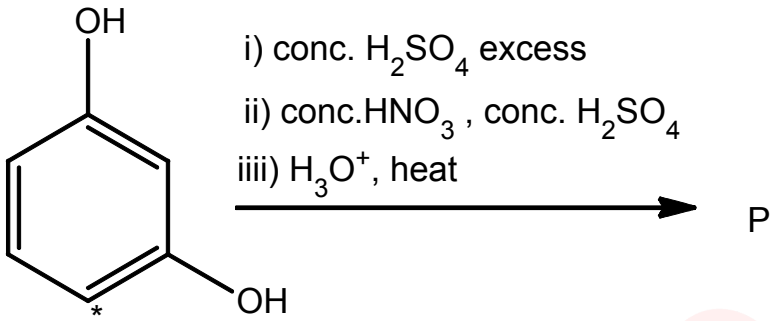
(C)



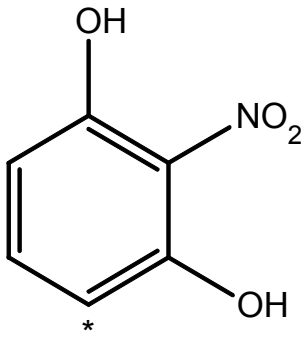
(D)



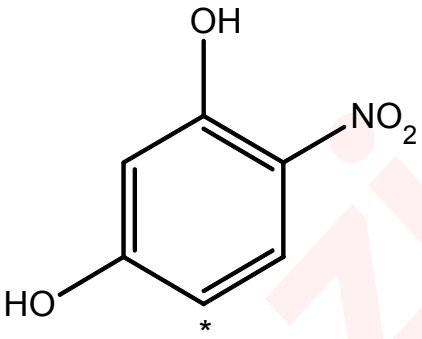
52. The major product 'P' formed in the following reaction is (* denotes radioactive carbon)



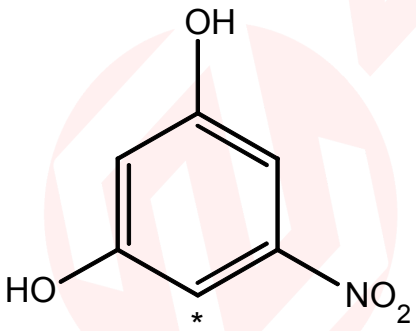
(A)



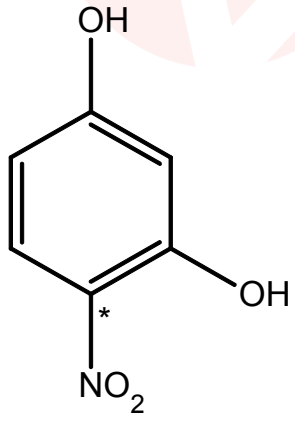
(B)



(C)



(D)



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53. If the standard electrode potentials of Fe^{3+}/Fe and Fe^{2+}/Fe are – 0.04V and – 0.44 V respectively, then that of Fe^{3+}/Fe^{2+} is

(A) 0.76 V (B) – 0.76 V (C) 0.40 V (D) – 0.40 V

54. Given below is the data for the reaction $2NO(g) \rightleftharpoons N_2(g) + O_2(g)$

where 'k_f' and 'k_b' are rate constants of the forward and reverse reactions respectively

Temperature (K)	k_f ($mol^{-1}\ dm^3\ s^{-1}$)	k_b ($mol^{-1}\ dm^3\ s^{-1}$)
1400	0.20	1.1×10^{-6}
1500	1.3	1.4×10^{-5}

The reaction is

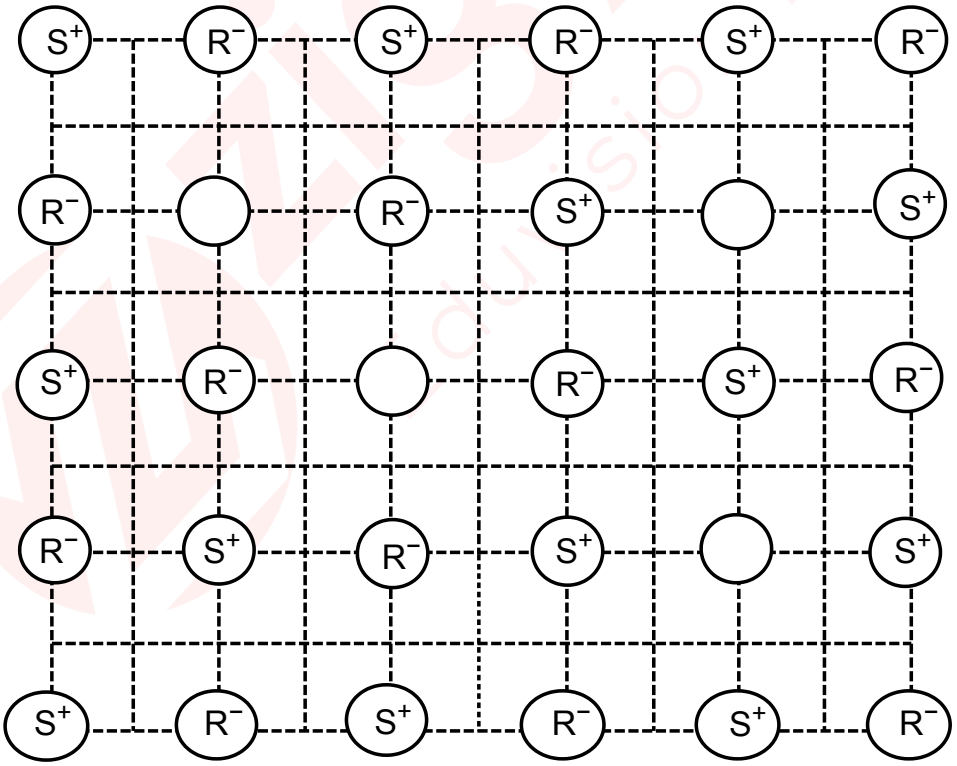
(A) exothermic and K_{eq} at 1400 K = 3.79×10^{-6}

(B) endothermic and K_{eq} at 1400 K = 2.63×10^{-5}

(C) exothermic and K_{eq} at 1400 K = 1.8×10^{5}

(D) endothermic and K_{eq} at 1500 K = 9.28×10^{-4}

55. The crystal defect indicated in the diagram below is



(A) Frenkel defect (B) Schottky defect

(C) Frenkel and Schottky defects (D) Interstitial defect

56. In solid state, PCl_5 exists as $[PCl_4]^+ [PCl_6]^-$. The hybridization of P atoms in this solid is/are

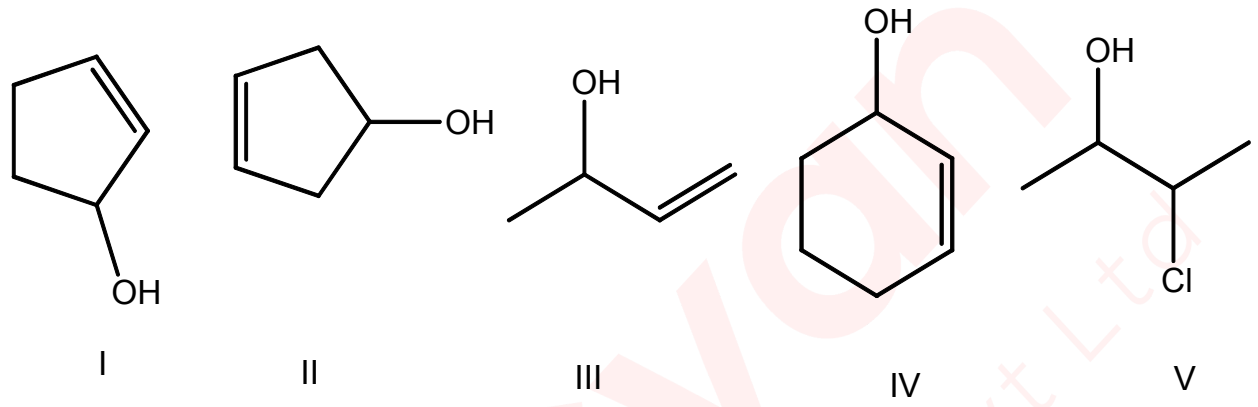
(A) sp^3d ($d = d_{x^2-y^2}$)

(B) sp^3d ($d = d_{z^2}$)

(C) sp^3 and sp^3d^2 ($d = d_{x^2-y^2}, d_{z^2}$)

(D) sp^3d and dsp^3 ($d = d_{z^2}$)

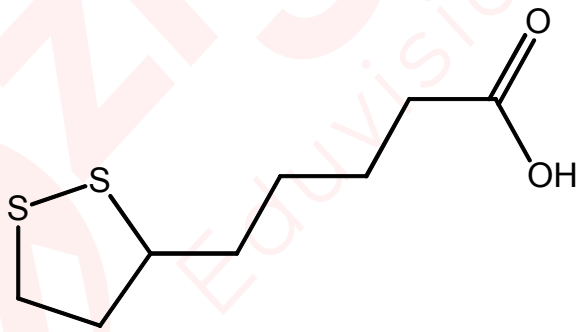
57. Which of the following compounds have chiral carbon atom/s?



I II III IV V

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

58. Lipoic acid with the following structure is a growth factor required by many organisms. Percentages of 'S' and 'O' in lipoic acid respectively are (atomic masses of 'S' and 'O' are 32.065 g mol^{-1} and 15.999 g mol^{-1} respectively)



Lipoic acid

(A) 33.03, 16.48 (B) 31.11 , 18.24 (C) 31.11 ,15.52 (D) 31.42 , 15.68

59. Among the halides NCl_3 (I), PCl_3 (II) and $AsCl_3$ (III), more than one type of acid in aqueous solution is formed with

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

60. A helium cylinder in which the volume of gas = 2.24 L at STP (1 atm, 273 K) developed a leak and when the leak was plugged the pressure in the cylinder was seen to have dropped to 550 mm of Hg. The number of moles of He gas that had escaped due to this leak is

(A) 0.028 (B) 0.072 (C) 0.972 (D) 0.099

61. The anhydride of HNO_3 is

(A) NO (B) NO_2 (C) N_2O (D) N_2O_5

62. An excess of aqueous ammonia is added to three different flasks (F_1, F_2, F_3) containing aqueous solutions of $CuSO_4$, $Fe_2(SO_4)_3$ and $NiSO_4$ respectively. Which of the following is correct about this addition?

I. A precipitate will be formed in all three flasks

II. Ammonia acts as a base as well as a ligand exchange reagent in F_1 and F_3

III. A soluble complex of NH_3 and the metal ion is formed in F_1 and F_3

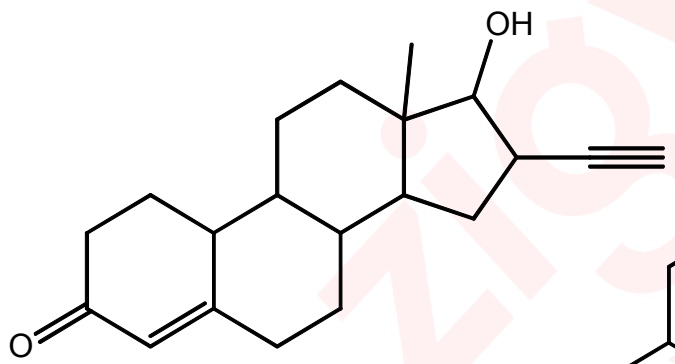
IV. A precipitate will be formed only in F_2

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

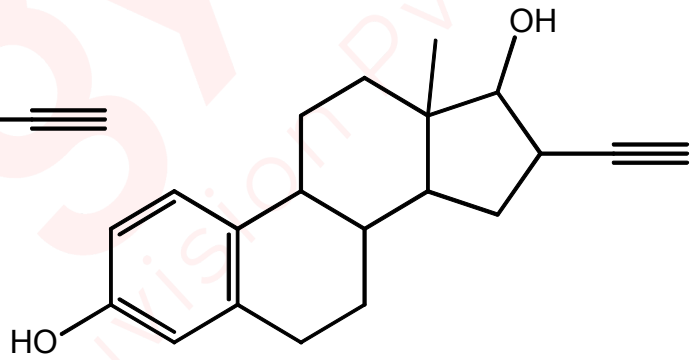
63. The mass (g) of NaCl that has to be dissolved to reduce the vapour pressure of 100 g of water by 10 % (Molar mass of NaCl = 58.5 g mol^{-1}) is

(A) 36.11 g (B) 17.54 g (C) 81.25 g (D) 3.61 g

64. The reagent/s that can be used to separate norethindrone and novestrol from their mixture is/are



Norethindrone



Novestrol

I. HCl

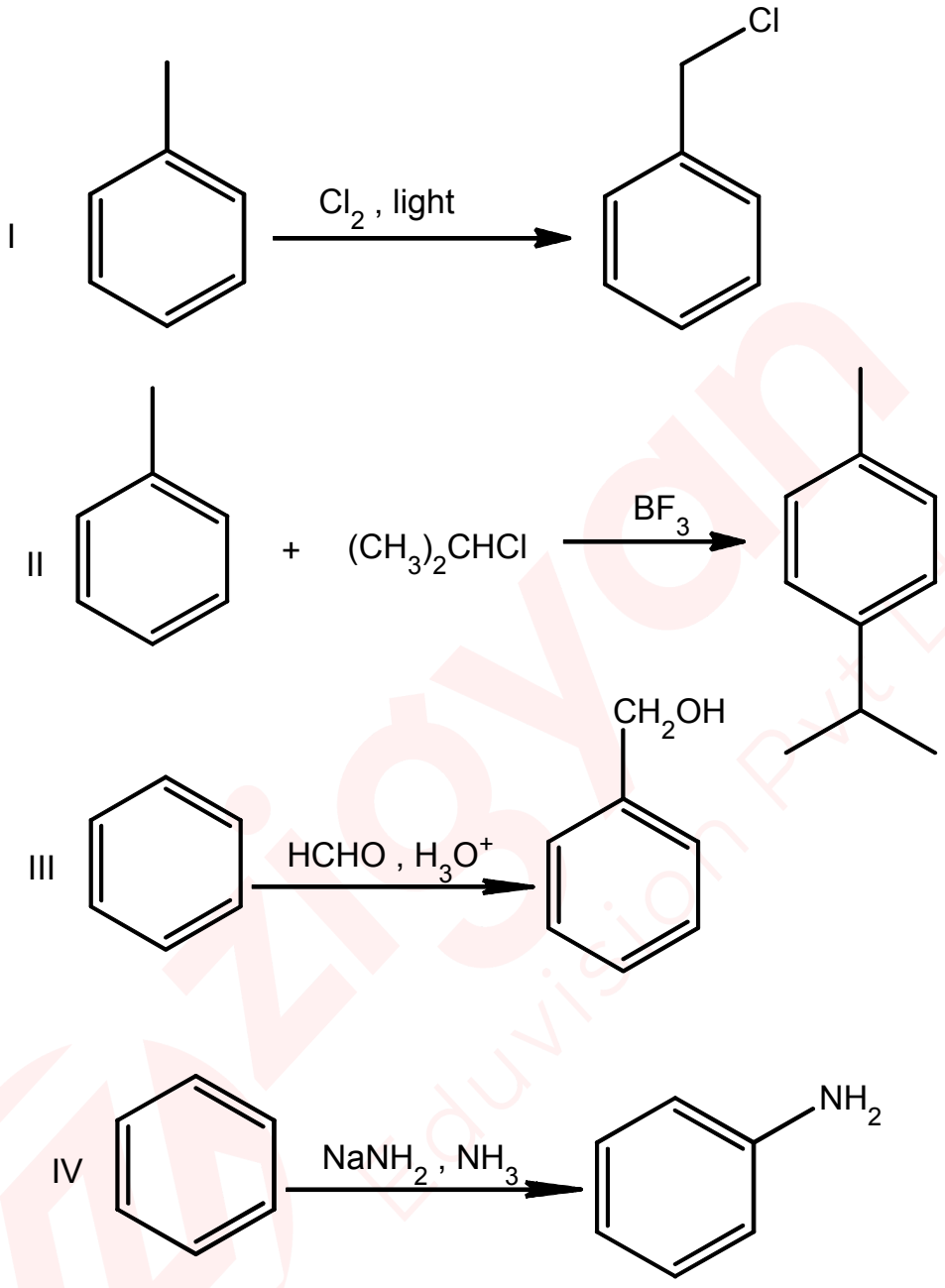
II. NaOH

III. $NaHCO_3$

IV. $NaNH_2$

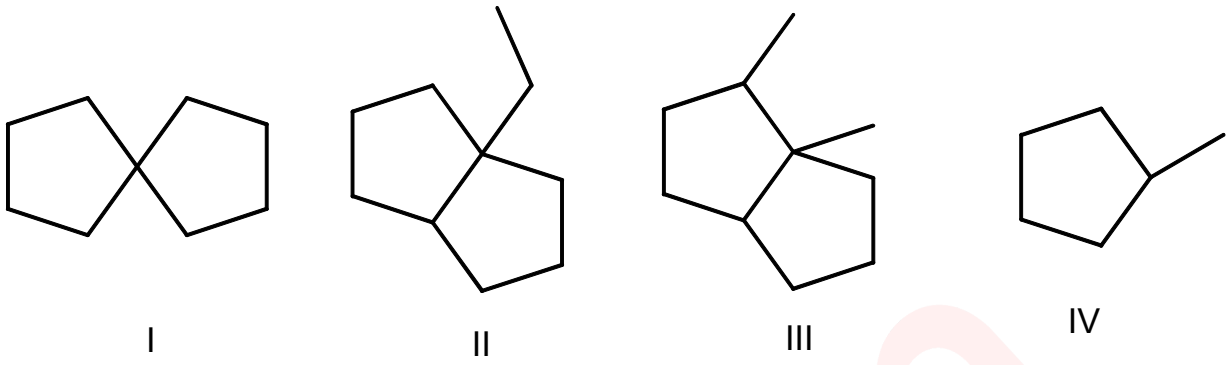
(A) III (B) I and IV (C) I,II and III (D) II

65. Which of the following is/are electrophilic aromatic substitution reaction/s?



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

66. All *four* types of carbon (1°,2°,3° and 4°) are present in



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

67. The normal boiling point and ΔH_{vap} of a liquid 'X' are 400 K and 40 kJ mol^{-1} respectively. Assuming ΔH_{vap} to be constant, which of the following is correct?

I. $\Delta S_{vap} > 100$ J K^{-1} mol^{-1} at 400 K and 0.5 atm

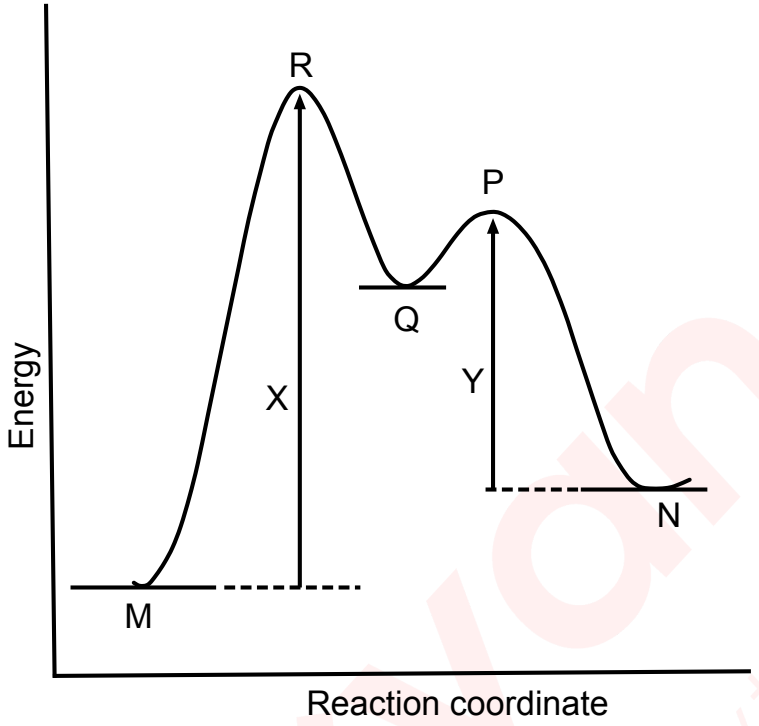
II. $\Delta S_{vap} < 100$ J K^{-1} mol^{-1} at 400 K and 1 atm

III. $\Delta S_{vap} < 100$ J K^{-1} mol^{-1} at 400 K and 2 atm

IV. $\Delta S_{vap} = 100$ kJ K^{-1} mol^{-1} at 400 K and 1 atm

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

68. About the energy level diagram given below, which of the following statement/s is/are correct?



I. The reaction is of two steps and 'R' is an intermediate

II. The reaction is exothermic and step 2 is rate determining

III. 'Q' is an intermediate and 'R' is the transition state for the reaction M → Q

IV. 'P' is the transition state for the reaction Q → N

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

69. Mercury is highly hazardous and hence its concentration is expressed in the units of ppb (micrograms of Hg present in 1 L of water). Permissible level of Hg in drinking water is 0.0335 ppb. Which of the following is an alternate representation of this concentration?

(A) 3.35×10^{-2} mg dm^{-3} (B) 3.35×10^{-5} mg dm^{-3}

(C) 3.35×10^{-5} mg m^{-3} (D) 3.35×10^{-4} g L^{-1}

70. Which of the following is correct?

I. Sodium (Na) is present as metal in nature

II. Na_2O_2 is paramagnetic

III. NaO_2 is paramagnetic

IV. Na reacts with N_2 to form Na_3N

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

71. The F– X– F bond angle is the smallest in (X is the central atom)

(A) CF_4 (B) NF_3 (C) OF_2 (D) XeF_5^-

72. The correct sequence of reactions which will yield 4-nitrobenzoic acid from benzene is

(A) CH_3Cl; HNO_3 /H_2SO_4; $KMnO_4/OH^-$

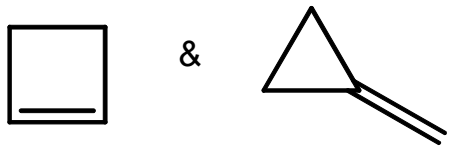
(B) HNO_3 /H_2SO_4; $CH_3Cl/AlCl_3$; $KMnO_4/OH^-$

(C) $CH_3Cl/AlCl_3$; $KMnO_4/OH^-$; HNO_3/H_2SO_4

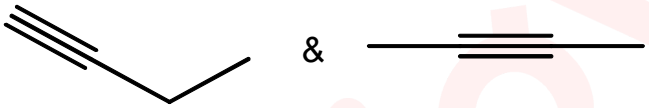
(D) $CH_3Cl/AlCl_3$; HNO_3 /H_2SO_4; $KMnO_4/OH^-$

73. Two isomeric hydrocarbons 'X' and 'Y' (C_4H_6), give the same product (C_4H_8O) on catalytic hydration with dilute acid. However, they form different products but with same molecular formula ($C_4H_6Br_4$) when treated with excess bromine.

'X' and 'Y' are

(A) 

(B) 

(C) 

(D) 

74. Morphine, a pain killer is basic with the molecular formula $C_{17}H_{19}NO_3$. The conjugate acid of morphine is

(A) $C_{17}H_{19}NO_3^+$ (B) $C_{17}H_{18}NO_3$ (C) $C_{17}H_{19}NO_3^-$ (D) $C_{17}H_{20}NO_3^+$

75. The correct IUPAC name of the compound, $[Pt(py)_4][Pt(Br)_4]$ is

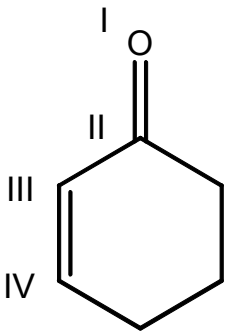
(A) tetrapyridineplatinum(II) tetrabromidoplatinate(II)

(B) tetrabromidoplatinum(IV) tetrapyridineplatinate(II)

(C) tetrabromidoplatinate(II) tetrapyridineplatinum(II)

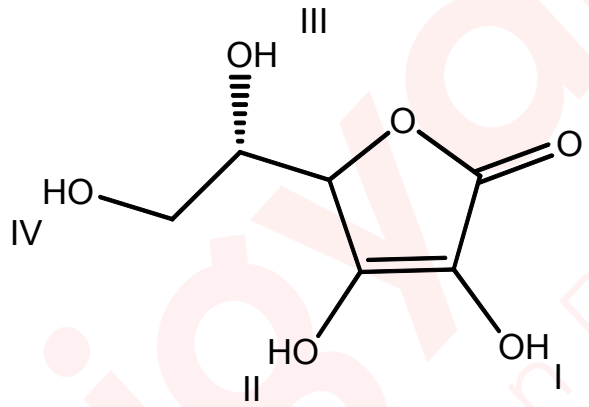
(D) tetrapyridineplatinum(IV) tetrabromidoplatinate(IV)

76. Which atom/s will have a δ^+ charge in the following molecule?



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

77. The most acidic hydrogen in the following molecule is



(A) I (B) II (C) III (D) IV

78. In which of the following species the octet rule is NOT obeyed?

I. I_3^-

II. N_2O

III. OF_2

IV. NO^+

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

79. The volume of *one* drop of aqueous solution from an eyedropper is approximately 0.05 mL. One such drop of 0.2 M HCl is added to 100 mL of distilled water. The pH of the resulting solution will be

(A) 4.0 (B) 7.0 (C) 3.0 (D) 5.5

80. 2.0 moles of an ideal gas expands isothermally (27°C) and reversibly from a pressure of 1 bar to 10 bar. The heaviest mass that can be lifted through a height of 10 m by the work of this expansion is

(A) 50.8 kg (B) 50.8 g (C) 117.1 kg (D) 117.1 g

ANSWER KEY

NSEC 2019 · PAPER CODE 31

80
QUESTIONS · 240 MARKS

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

1	(C)	2	(A)	3	(D)	4	(D)	5	(A)
6	(A)	7	(D)	8	(B)	9	(D)	10	(A)
11	(C)	12	(A)	13	(D)	14	(A)	15	(C)
16	(B)	17	(C)	18	(B)	19	(B)	20	(D)★
21	(C)	22	(A)	23	(A)	24	(B)	25	(D)
26	(C)	27	(B)	28	(C)	29	(A)	30	(C)
31	(D)	32	(A)	33	(B)	34	(C)	35	(C)
36	(A)	37	(C)	38	(A)	39	(B)	40	(A)
41	(B)★	42	(C)	43	(B)	44	(B)	45	(D)★
46	(C)	47	–★	48	(B)	49	(D)	50	(C)
51	(C)	52	(A)	53	(A)	54	(C)	55	(B)
56	(C)	57	(B)	58	(C)	59	(D)	60	(A)
61	(D)	62	(D)	63	–★	64	(D)	65	(B)
66	(D)	67	(C)	68	(A)	69	(B)	70	(A)
71	(D)	72	(D)	73	(C)	74	(D)	75	(A)
76	(D)	77	(B)	78	(C)	79	(A)	80	(C)★

★ Answers as per Zigyan

- **Q20** — As per Zigyan: (D); IAPT key (D).
- **Q41** — As per Zigyan: (B); IAPT key (B).
- **Q45** — As per Zigyan: (D); IAPT key (D).
- **Q47** — As per Zigyan: no option is correct; dropped by IAPT.
- **Q63** — As per Zigyan: no option is correct; IAPT key (B).
- **Q80** — As per Zigyan: (C); dropped by IAPT.

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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.

Zigyan Eduvision Pvt. Ltd. · SCO No. 107, Sector 16, Faridabad 121002
0129-4048800 · +91 92115 38800 · info@zigyan.com

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RESULTS · 2021 – 2026

Our toppers, year by year

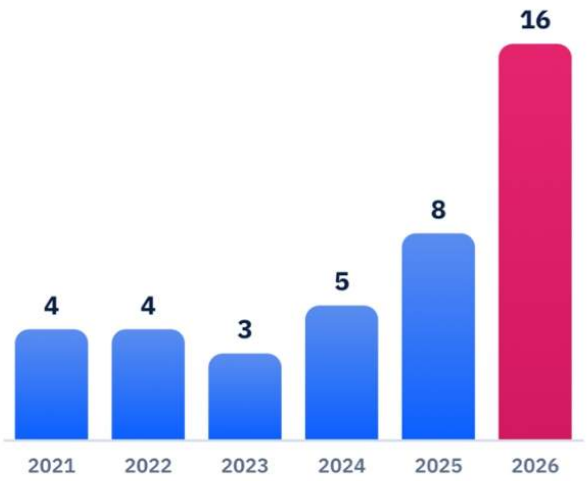
40
JEE Advanced selections in 6 years

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.

Zigyan Eduvision Pvt. Ltd. · SCO No. 107, Sector 16, Faridabad 121002
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