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PREVIOUS YEAR PAPER · 2026

OLYMPIAD · STAGE I

NSEC

National Standard Examination in Chemistry

2026

Question paper, Zigyan provisional answer key and Zigyan solutions

60	216	120 min	31
Questions	Maximum marks	Time	Paper code

Question paper: Indian Association of Physics Teachers (IAPT), NSEC 2026, paper code 31.
Answer key: Zigyan's own, PROVISIONAL (IAPT had not released its key when this booklet was made). Solutions: Zigyan. This booklet is not an IAPT publication.

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Sulokya Bibhuty

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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, $h = 6.63 \times 10^{-34}\,Js$

Speed of light, $c = 3.0 \times 10^{8}\,ms^{-1}$

Avogadro constant, $N_A = 6.022 \times 10^{23}\,mol^{-1}$

Faraday constant $F = 96500\,C\,mol^{-1}$

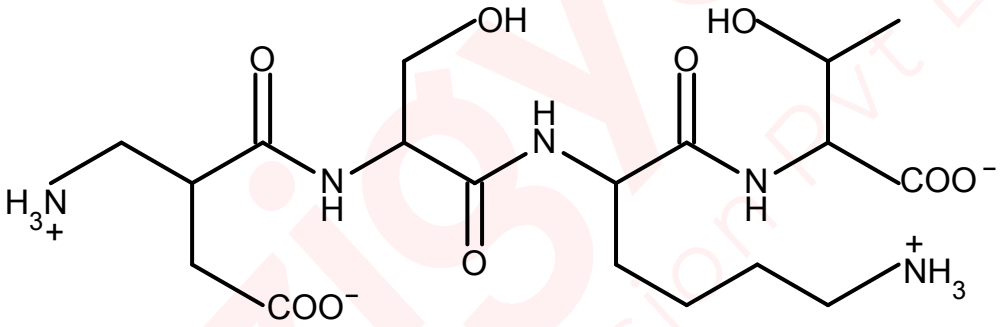
Molar gas constant, $R = 0.082\,L\,atm\,mol^{-1}\,K^{-1}$

$= 8.314\,J\,mol^{-1}\,K^{-1}$

PART A-1 · ONE CORRECT OPTION

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

1. The correct sequence of amino acids in the following given tetrapeptide is



(A) Asp, Lys, Ser, Thr

(B) Ser, Lys, Thr, Asp

(C) Asp, Ser, Lys, Thr

(D) Ser, Thr, Lys, Asp

Solution · Q1 **As per Zigyan: (C)**

The extra CH_2 between H_3N^+ and the first CH in the figure is treated as a drawing slip, and the first unit is read as Asp.

Side chains, from the N-terminus:

Residue 1: CH_2COO^- → Asp

Residue 2: CH_2OH → Ser

Residue 3: $(CH_2)_4NH_3^+$ → Lys

Residue 4: $CH(OH)CH_3$ → Thr

∴ Asp, Ser, Lys, Thr

Reference: NCERT Class XII Chemistry (Part II), Unit 10 'Biomolecules', section 10.2.1, Table 10.2: in these α-amino acids NH_2 sits on the CH carrying R; R is CH_2COOH (Asp), CH_2OH (Ser), $(CH_2)_4NH_2$ (Lys), $CH(OH)CH_3$ (Thr).

Check: Read from the H_3N^+ end, only (C) has Ser, Lys, Thr as residues two to four.

IAPT answer: not yet released | **Zigyan answer:** (C)

2. Mn^{2+} reacts with sodium bismuthate in acidic medium to a dark-coloured diamagnetic compound (A) which on heating at 513K gives another dark-coloured paramagnetic compound (B). Also, compound (A) reacts with thiosulphate ions to form a brown coloured, water insoluble compound (C). Identify compounds (A), (B) and (C)

(A) Compound A = $KMnO_4$, B = K_2MnO_4 and C = MnO_2

(B) Compound A = K_2MnO_4, B = $KMnO_4$ and C = Mn_2O_3

(C) Compound A = Mn_2O_3, B = K_2MnO_4 and C = Mn_3O_4

(D) Compound A = $KMnO_4$, B = Mn_3O_4 and C = MnO_2

Solution · Q2 **Answer: (A)**

In acidic medium:

$$2Mn^{2+} + 5NaBiO_3 + 14H^+ \rightarrow 2MnO_4^- + 5Bi^{3+} + 5Na^+ + 7H_2O$$

$$A = KMnO_4$$

Purple; Mn(VII) is d^0, so diamagnetic.

On heating at 513 K:

$$2KMnO_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$$

$$B = K_2MnO_4$$

Green; Mn(VI) is d^1, so paramagnetic.

With thiosulphate ions:

$$8MnO_4^- + 3S_2O_3^{2-} + H_2O \rightarrow 8MnO_2 + 6SO_4^{2-} + 2OH^-$$

$$C = MnO_2$$

Brown and insoluble in water.

IAPT answer: not yet released | **Zigyan answer:** (A)

3. The rate law for the gas phase reaction between 'A' and 'B' is given as rate = $k[A]^2[B]$. If in another experiment, [A] is reduced to one-third of its previous value, what change must be made to [B] so that the reaction rate becomes one-third of its initial value?

(A) Decrease B to one-third of its original value

(B) Keep B unchanged

(C) Increase B to 3 times its original value

(D) Increase B by a factor of 9

Solution · Q3 **Answer: (C)**

$$r = k[A]^2[B]$$

When [A] becomes [A]/3, suppose [B] becomes x[B].

$$r/3 = k([A]/3)^2(x[B])$$

$$\Rightarrow x/9 = 1/3$$

$$\Rightarrow x = 3$$

$\therefore$ [B] must be made 3 times its original value.

IAPT answer: not yet released | **Zigyan answer:** (C)

4. Bis(benzoylacetonato)beryllium(II) exists in two isomeric forms. Which of the following statement is correct?

(A) It is a square planar complex with a plane of symmetry.

(B) It is a tetrahedral complex with no plane of symmetry and the two forms are not superimposable on each other.

(C) It is a tetrahedral complex with a plane of symmetry and two forms are not superimposable on each other.

(D) It is an octahedral complex with a plane of symmetry.

Solution · Q4 **Answer: (B)**

Be^{2+} is sp^3 hybridised, so the complex is tetrahedral.

Benzoylacetonate is an unsymmetrical bidentate ligand, with C_6H_5 at one end and CH_3 at the other.

A tetrahedral $M(AB)_2$ complex has no plane or centre of symmetry.

$\therefore$ Its two forms are non-superimposable mirror images (enantiomers).

IAPT answer: not yet released | **Zigyan answer:** (B)

5. The ease of hydrolysis of borazine compared to benzene is mainly due to the:

(A) stronger π -bonding in borazine

(B) polar B-N bonds

(C) higher symmetry of borazine

(D) absence of lone pair of electrons

Solution · Q5 **Answer: (B)**

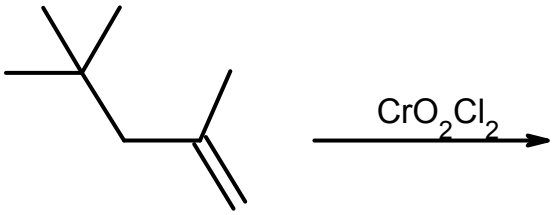
B–N bonds in borazine are polar: B is δ+ and N is δ–.

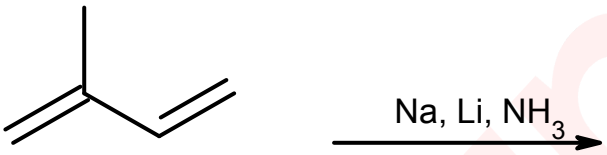
So water attacks the boron atom, and its H goes to nitrogen.

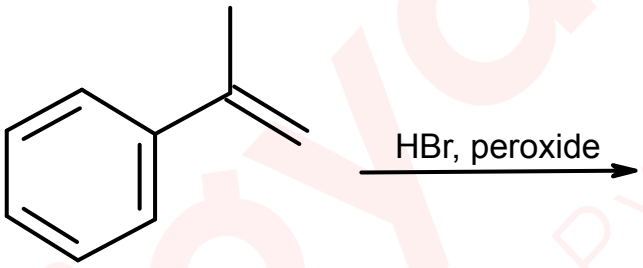
The C–C bonds of benzene are non-polar, so it is not hydrolysed in this way.

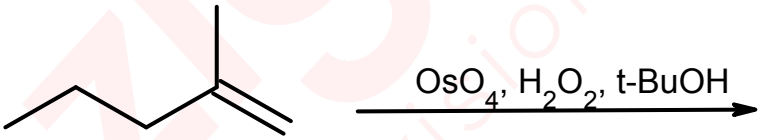
IAPT answer: not yet released | **Zigyan answer:** (B)

6. Examine the reaction/s **I, II, III** and **IV** given below.

I 

II 

III 

IV 

The reaction(s) that will produce chiral product(s) is/are:

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

Solution · Q6 **As per Zigyan: no option is correct**

I (oxidation to an aldehyde, after work-up):

$$(CH_3)_3CCH_2C(CH_3)=CH_2 \rightarrow (CH_3)_3CCH_2C^*H(CH_3)CHO$$

Chiral.

II (1,4-reduction):

$$CH_2=C(CH_3)CH=CH_2 \rightarrow CH_3C(CH_3)=CHCH_3$$

Achiral.

III (anti-Markovnikov addition):

$$C_6H_5C(CH_3)=CH_2 \rightarrow C_6H_5C^*H(CH_3)CH_2Br$$

Chiral.

IV (syn dihydroxylation):

$$C_3H_7C(CH_3)=CH_2 \rightarrow C_3H_7C^*(OH)(CH_3)CH_2OH$$

Chiral (racemic).

∴ I, III and IV give chiral products, but no option lists all three.

Reference: NCERT Class XI Chemistry (Part II), Unit 9 'Hydrocarbons', section 9.3.5: with a peroxide, HBr adds against Markovnikov's rule, so III puts Br on the end carbon.

Reference: OpenStax Organic Chemistry, section 8.7: OsO_4 hydroxylates an alkene to a 1,2-diol with syn stereochemistry (reaction IV).

Check: Products III and IV each have a carbon with four different groups. No option has both III and IV.

IAPT answer: not yet released | **Zigyan answer:** none of the options is correct

7. The correct option of intensive and extensive properties among the following are

	Property	I	II	III	IV
i	EMF	Intensive	Extensive	Intensive	Intensive
ii	ΔU	Extensive	Extensive	Extensive	Extensive
iii	Viscosity	Intensive	Intensive	Extensive	Extensive
iv	Specific surface area	Intensive	Extensive	Intensive	Extensive

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

Solution · Q7 **Answer: (C)**

EMF: intensive

ΔU: extensive

Viscosity: intensive

Specific surface area (area per unit mass): intensive

∴ Only column I matches all four.

IAPT answer: not yet released | **Zigyan answer:** (C)

8. A mixture of compounds A and B is present in a test tube. Fumes are seen when exposed to moist air. When a rod dipped in ammonium hydroxide is brought near the mouth of this test tube, the intensity of the fumes increases. On the addition of concentrated sulphuric acid, brown fumes are obtained which intensifies on the addition of copper turnings. A solution of the mixture in an HCl medium gives a black precipitate on passing H_2S, which does not dissolve in yellow ammonium sulphide. When the acid solution is diluted to a large extent, a white turbidity is obtained which disappears on the addition of a few drops of HCl. The acidic solution obtained after removing the black precipitate gives a white precipitate on the addition of ammonium hydroxide. The precipitate is soluble in NaOH. Identify the cations and anions in solution.

(A) Hg^{2+}, Cr^{3+}, NO_3^-, Br^- (B) Mn^{2+}, Fe^{3+}, NO_2^-, Cl^-

(C) Cr^{3+}, Cu^{2+}, Br^-, Cl^- (D) Bi^{3+}, Al^{3+}, NO_3^-, Cl^-

Solution · Q8 **Answer: (D)**

Fumes in moist air become denser near NH_4OH:

$HC\ell + NH_3 \rightarrow NH_4C\ell$

So $C\ell^-$ is present.

Brown NO_2 with conc. H_2SO_4, increasing with Cu turnings, shows NO_3^-.

The black sulphide, insoluble in yellow ammonium sulphide, belongs to group II A.

White turbidity on dilution, soluble in $HC\ell$, shows Bi^{3+}:

$BiC\ell_3 + H_2O \rightleftharpoons BiOC\ell\downarrow + 2HC\ell$

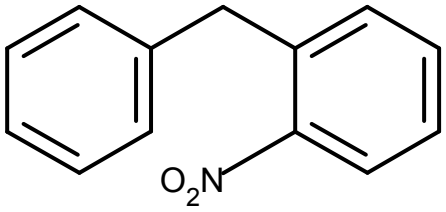
The white precipitate with NH_4OH is $A\ell(OH)_3$, which dissolves in NaOH:

$A\ell(OH)_3 + NaOH \rightarrow Na[A\ell(OH)_4]$

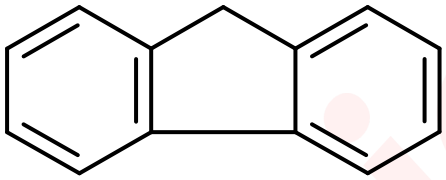
IAPT answer: not yet released | **Zigyan answer:** (D)

9. Compounds **I, II, III** and **IV**. On treating with a base, the compound that will give most stable carbanion is:

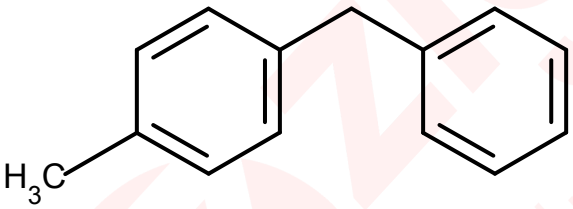
(A)



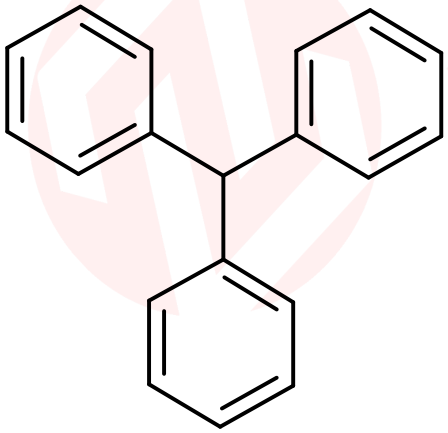
(B)



(C)



(D)



Solution · Q9 **As per Zigyan: (A)**

In (A), two rings and the ortho NO_2 group (–M) delocalise the charge, up to oxygen.

In (B), the anion is aromatic, but the charge stays on carbon atoms.

(C) and (D) have no electron-withdrawing group.

pK_a values in DMSO:

4-nitrotoluene 20.4, fluorene 22.6, Ph_3CH 30.6, Ph_2CH_2 32.3

An ortho NO_2 conjugates like a para one, and the second ring in (A) adds stability.

∴ (A) gives the most stable carbanion.

Reference: Reich, 'Equilibrium pKa Table (DMSO)', ACS Division of Organic Chemistry, Hydrocarbons page: 4-nitrotoluene 20.4, fluorene 22.6, Ph_3CH 30.6, Ph_2CH_2 32.3.

Check: There, a second phenyl lowers toluene's pKa from about 43 to 32.3. With ortho NO_2 acting like para, (A) is more acidic than fluorene.

IAPT answer: not yet released | **Zigyan answer:** (A)

10. An aqueous solution of ferrous alum and chrome alum is heated with excess sodium peroxide. The products obtained are

(A) Green precipitate and colourless supernatant
(B) Brown precipitate and yellow supernatant
(C) Brown precipitate and colourless supernatant
(D) Green precipitate and yellow supernatant

Solution · Q10 **Answer: (B)**

In water, Na_2O_2 gives NaOH and H_2O_2.

Iron is oxidised and precipitated:

$2Fe^{2+} + H_2O_2 + 4OH^- \rightarrow 2Fe(OH)_3\downarrow$

The precipitate is brown.

Chromium is oxidised to chromate:

$2Cr^{3+} + 3H_2O_2 + 10OH^- \rightarrow 2CrO_4^{2-} + 8H_2O$

Chromate stays in solution and is yellow.

IAPT answer: not yet released | **Zigyan answer:** (B)

11. Rank the following oxides in order of decreasing acidity in aqueous medium: Ga_2O_3, Al_2O_3, In_2O_3, Tl_2O, and B_2O_3.

(A) $Tl_2O > In_2O_3 > Ga_2O_3 > Al_2O_3 > B_2O_3$
(B) $Tl_2O > B_2O_3 > Al_2O_3 > In_2O_3 > Ga_2O_3$
(C) $Ga_2O_3 > In_2O_3 > Al_2O_3 > B_2O_3 > Tl_2O$
(D) $B_2O_3 > Al_2O_3 > Ga_2O_3 > In_2O_3 > Tl_2O$

Solution · Q11 **Answer: (D)**

Down group 13, metallic character rises and acidic character of the oxides falls.

B_2O_3: acidic

Al_2O_3, Ga_2O_3: amphoteric, close to each other

In_2O_3: basic

Tl_2O: strongly basic

The usual order, and the only option with B_2O_3 first and $T\ell_2O$ last:

$$B_2O_3 > A\ell_2O_3 > Ga_2O_3 > In_2O_3 > T\ell_2O$$

IAPT answer: not yet released | **Zigyan answer:** (D)

12. Which of the following is correct for the physisorption of N_2 on activated carbon at 77 K

(A) $\Delta H = 0 ; \Delta S < 0$ (B) $\Delta H < 0 ; \Delta S < 0$ (C) $\Delta H > 0 ; \Delta S < 0$ (D) $\Delta H = 0 ; \Delta S = 0$

Solution · Q12 **Answer: (B)**

N_2 molecules held on the surface lose freedom of movement.

$$\Rightarrow \Delta S < 0$$

Adsorption at 77 K is spontaneous:

$$\Delta G = \Delta H - T\Delta S < 0$$

$$\Rightarrow \Delta H < 0$$

Weak van der Waals attraction releases heat.

IAPT answer: not yet released | **Zigyan answer:** (B)

13. Consider the following statements regarding group 14 and 15 elements:

(i) Sn^{2+} is more stable than Sn^{4+} due to the inert pair effect

(ii) PbO_2 is a strong oxidizing agent, whereas SnO_2 is not

(iii) BiH_3 is less stable than NH_3 due to decreasing E–H bond strength down the group

(iv) Acidic character of oxides increases down group 14 due to increasing metallic character

Which of the above statements are correct?

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

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

Solution · Q13 **Answer: (B)**

(i) False: for tin the +4 state is more stable, and Sn^{2+} is a reducing agent.

(ii) True: Pb(IV) readily changes to Pb(II) due to the inert pair effect, while Sn(IV) is stable.

(iii) True: the E–H bond weakens from N to Bi.

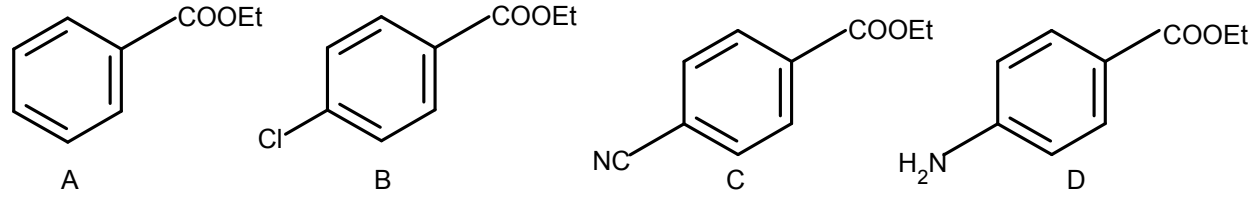
(iv) False: acidic character of the oxides decreases down group 14.

∴ Only (ii) and (iii) are correct.

IAPT answer: not yet released | **Zigyan answer:** (B)

14. Base catalyzed hydrolysis of esters is an irreversible reaction that involves nucleophilic addition followed by elimination of the alkoxide anion to give a carboxylic acid on acidic workup of the reaction.

The following esters; **A, B, C** and **D** are subjected to alkaline hydrolysis.



The highest and the lowest rate of hydrolysis of the above esters respectively are:

(A) A and D (B) B and D (C) C and D (D) B and C

Solution · Q14 **Answer: (C)**

OH^- attacks the carbonyl carbon in the slow step.

An electron-withdrawing para group increases the rate and an electron-donating group decreases it.

Order of rate:

$$C\ (-CN) > B\ (-C\ell) > A\ (-H) > D\ (-NH_2)$$

$\therefore$ Fastest is C and slowest is D.

IAPT answer: not yet released | **Zigyan answer:** (C)

15. Which of the following pair of complex ions has the longest and the shortest C–C bond, respectively?

(A) $K[Pt(Cl)_3(\pi\text{-}\ F_2C{=}CF_2)]$ and $K[Pt(Cl)_3(\pi\text{-}\ H_2C{=}CH_2)]$

(B) $K[Pt(Cl)_3(\pi\text{-}(CH_3)_2C{=}C(CH_3)_2)]$ and $K[Pt(Cl)_3(\pi\text{-}\ F_2C{=}CF_2)]$

(C) $K[Pt(Cl)_3(\pi\text{-}\ Cl_2C{=}CCl_2)]$ and $K[Pt(Cl)_3(\pi\text{-}\ F_2C{=}CF_2)]$

(D) $K[Pt(Cl)_3(\pi\text{-}(NC)_2C{=}C(CN)_2)]$ and $K[Pt(Cl)_3(\pi\text{-}(CH_3)_2C{=}C(CH_3)_2)]$

Solution · Q15 **Answer: (D)**

In the Dewar–Chatt–Duncanson model, back donation from Pt into the alkene π^* orbital lengthens the C–C bond.

Electron-withdrawing groups increase back donation; electron-donating groups reduce it.

$(NC)_2C{=}C(CN)_2$ is the strongest π-acceptor, so it has the longest C–C bond.

$(CH_3)_2C{=}C(CH_3)_2$ has electron-donating groups, so back donation is weak and the bond stays short.

IAPT answer: not yet released | **Zigyan answer:** (D)

16. Bond dissociation enthalpies of H_2, Br_2 and HBr are 436, 192 and 366 kJ mol^{-1} respectively. Enthalpy of formation of HBr is

(A) – 104 kJ mol^{-1} (B) 104 kJ mol^{-1} (C) 52 kJ mol^{-1} (D) – 52 kJ mol^{-1}

Solution · Q16 **Answer: (D)**

Br_2 is taken as a gas (its enthalpy of vaporisation is not given).

$1/2\ H_2 + 1/2\ Br_2 \rightarrow HBr$

Bond enthalpies broken minus bond enthalpy formed:

$$\Delta_f H = \frac{436}{2} + \frac{192}{2} - 366$$

$$\Rightarrow \Delta_f H = -52 \text{ kJ mol}^{-1}$$

IAPT answer: not yet released | **Zigyan answer:** (D)

17. Consider the following statements:

A. Fe^{3+} forms more stable complexes than La^{3+} with any given σ-donating ligand due to higher charge density.

B. Lanthanoid ions generally form complexes with lower coordination numbers than transition metal ions.

C. The stability of complexes of 5d elements is generally greater than their 3d analogues partly due to lanthanoid contraction.

D. EDTA is a tetradentate ligand and forms stable complexes with many transition metals and other cations

Identify the correct statements:

(A) A and C only (B) A and B only (C) B only (D) C and D only

Solution · Q17 **Answer: (A)**

A. True: Fe^{3+} is much smaller than La^{3+}, so its charge density is higher.

B. False: the large lanthanoid ions commonly show high coordination numbers such as 8 or 9.

C. True: after lanthanoid contraction, 5d ions are small for their nuclear charge and bind ligands strongly.

D. False: $EDTA^{4-}$ is hexadentate.

∴ Only A and C are correct.

IAPT answer: not yet released | **Zigyan answer:** (A)

18. 0.9 % (w/v) of saline is isotonic with human blood. For a certain application the osmotic pressure of the same saline solution is required to be decreased by 25 %. The osmotic pressure of 1.5 L of saline solution prepared for this purpose is close to

(A) 5.96 bar (B) 7.94 bar (C) 8.94 bar (D) 2.67 bar

Solution · Q18 **Answer: (A)**

Temperature is not given, so body temperature is taken.

$$T = 310 \text{ K}$$

Concentration of NaCℓ (0.9 g in 100 mL):

$$c = \frac{9}{58.44}$$

$$\Rightarrow c \approx 0.154 \text{ mol L}^{-1}$$

NaCℓ is fully ionised:

$$i = 2$$

$$\pi = icRT$$

$$\pi = 2 \times 0.154 \times 0.08314 \times 310$$

$$\Rightarrow \pi \approx 7.94 \text{ bar}$$

After a decrease of 25%:

$$\pi' = 0.75 \times 7.94$$

$$\Rightarrow \pi' \approx 5.96 \text{ bar}$$

The volume (1.5 L) does not change osmotic pressure.

IAPT answer: not yet released | **Zigyan answer:** (A)

19. Examine the reaction series **I, II, III** and **IV.**

I Chlorobenzene $\xrightarrow[\text{(ii) HCl}]{\text{(i) NaOH, 10 atm. 573-623 K}}$ P1 $\xrightarrow{\text{(i) Zn, }\Delta}$ P2 $\xrightarrow{\text{molar amount } Cl_2, \text{ Fe}}$ P3

II 1-cyclohexylpropan-2-ol $\xrightarrow{\text{red P, } Br_2}$ A1 $\xrightarrow{\text{excess } NH_3}$ A2 $\xrightarrow[\text{(ii) Ethanol}]{\text{(i) } NaNO_2\text{, HCl, 5°C}}$ A3

III Ethylbenzene $\xrightarrow[\text{(ii) } H_3O^+, \Delta]{\text{(i) } KMnO_4\text{, KOH}}$ Q1 $\xrightarrow{\text{NaOH, CaO, }\Delta}$ Q2 $\xrightarrow{\text{molar amount } C_2H_5Cl, \text{ anhy. } AlCl_3}$ Q3

IV 2-Butanone $\xrightarrow[\text{(ii) HCl}]{\text{(i) } CH_3MgBr\text{, ether}}$ R1 $\xrightarrow{\text{20\% } H_2SO_4, \text{ 373 K}}$ R2 $\xrightarrow[\text{(ii) Zn, } H_2O, \Delta]{\text{(i) } O_3, CCl_4}$ R3

The series of reactions amongst the above that regenerates the starting compound at the end will be:

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

Solution · Q19 **Answer: (B)**

I:

$C_6H_5C\ell \rightarrow C_6H_5OH \rightarrow C_6H_6 \rightarrow C_6H_5C\ell$

III:

$C_6H_5C_2H_5 \rightarrow C_6H_5COOH \rightarrow C_6H_6 \rightarrow C_6H_5C_2H_5$

Both return the starting compound.

IV:

$$CH_3COC_2H_5 \rightarrow (CH_3)_2C(OH)C_2H_5 \rightarrow (CH_3)_2C{=}CHCH_3$$

Ozonolysis of this alkene:

$$(CH_3)_2C{=}CHCH_3 \rightarrow CH_3COCH_3 + CH_3CHO$$

2-Butanone is not obtained.

II: the alkyl diazonium ion from A2 is unstable. Its carbocation gives mixed and rearranged products, not a clean return to the alcohol.

$\therefore$ Only I and III.

IAPT answer: not yet released | **Zigyan answer:** (B)

20. Identify the incorrect statement(s)

A. Complete hydrolysis of XeF_4 and XeF_6 gives XeO_3.

B. XeO_3 reacts with aqueous alkali to form hydrogen xenate ion, $HXeO_4^-$, which slowly disproportionate to give Xe and perxenate ion, XeO_6^{4-}.

C. The perxenate solutions are yellow in colour and are strong reducing agents.

D. XeF_4 and XeF_6 are square planar (dsp^2) and distorted octahedral (sp^3d^2) in shape, respectively.

Choose the option:

(A) A only (B) A and B (C) C and D (D) B, C and D

Solution · Q20 **Answer: (C)**

A is correct:

$XeF_6 + 3H_2O \rightarrow XeO_3 + 6HF$

$6XeF_4 + 12H_2O \rightarrow 4Xe + 2XeO_3 + 24HF + 3O_2$

B is correct:

$XeO_3 + OH^- \rightarrow HXeO_4^-$

$2HXeO_4^- + 2OH^- \rightarrow XeO_6^{4-} + Xe + O_2 + 2H_2O$

C is wrong: perxenates are powerful oxidising agents.

D is wrong: XeF_4 is sp^3d^2 (square planar) and XeF_6 is sp^3d^3 (distorted octahedral).

IAPT answer: not yet released | **Zigyan answer:** (C)

21. In Dumas method of estimation of nitrogen, 0.35 g of an organic compound gave 55 mL of nitrogen collected at 300 K temperature and 715 mm pressure. The percentage composition of nitrogen in the compound is:

(Aqueous tension at 300 K = 15 mm)

(A) 15.45 % (B) 16.45% (C) 17.45% (D) 14.45%

Solution · Q21 **Answer: (B)**

Pressure of dry nitrogen:

$$p = 715 - 15 = 700 \text{ mm}$$

Volume at STP:

$$V = \frac{700 \times 55 \times 273}{760 \times 300}$$

$$\Rightarrow V \approx 46.1 \text{ mL}$$

Mass of nitrogen:

$$m = \frac{28 \times 46.1}{22414}$$

$$\Rightarrow m \approx 0.05759 \text{ g}$$

Percentage of nitrogen:

$$\%N = \frac{0.05759}{0.35} \times 100$$

$$\Rightarrow \%N \approx 16.45$$

IAPT answer: not yet released | **Zigyan answer:** (B)

22. Identify the incorrect statement among the following:

(A) Among halogens, F_2 does not undergo disproportionation reactions.

(B) The correct order of stability is: HOCl > HOBr > HOI > HOF

(C) The correct order of acidity is: $HOClO_3 > HOClO_2 > HOClO > HOCl$

(D) The interhalogens AB_n undergo hydrolysis giving halide ions derived from the larger halogen and a hypohalite (when AB), halite (when AB_3), halate (when AB_5) and perhalate (when AB_7) anion derived from the smaller halogen. (A = larger halogen, B = Smaller halogen).

Solution · Q22 **Answer: (D)**

On hydrolysing AB_n, the smaller and more electronegative halogen B gives the halide ion.

The larger halogen A keeps its positive oxidation state in the oxoacid or oxoanion.

$I\ell + H_2O \rightarrow H\ell + HOI$

$BrF_5 + 3H_2O \rightarrow HBrO_3 + 5HF$

Statement (D) says the reverse, so it is incorrect.

IAPT answer: not yet released | **Zigyan answer:** (D)

23. Acetylene (C_2H_2) gas is generated when water is added to CaC_2 (calcium carbide). The mass of CaC_2 (97% pure) required to generate the gas to be stored in 50L cylinder at 27 °C and 101.3 kPa is

_____

[Given: C = 12 g/mol and Ca = 40 g/mol]

(A) 63 g (B) 134 g (C) 32 g (D) 99 g

Solution · Q23 **Answer: (B)**

$CaC_2 + 2H_2O \rightarrow C_2H_2 + Ca(OH)_2$

Moles of acetylene:

$$n = pV/RT$$

$$\Rightarrow n = \frac{101.3 \times 50}{8.314 \times 300}$$

$$\Rightarrow n \approx 2.03 \text{ mol}$$

One mole of CaC_2 (64 g) gives one mole of acetylene.

Mass of the 97% pure sample:

$$m = \frac{2.03 \times 64 \times 100}{97}$$

$$\Rightarrow m \approx 134 \text{ g}$$

IAPT answer: not yet released | **Zigyan answer:** (B)

24. Which of the following statement(s) is/are correct?

A. The oxidation states of S in Caro's acid and thiosulphate ion are +6 and +2, respectively.

B. In dithionic acid, there are four S=O, two S-OH groups and one S-S bond.

C. The SF_2 is angular, SF_4 is tetrahedral and SF_6 is octahedral in shape.

D. S is present in methionine and serine amino acids.

Choose the correct option:

(A) A only (B) A and B (C) C and D (D) B, C and D

Solution · Q24 **Answer: (B)**

A is true: H_2SO_5 has one peroxy link and S is +6. In $S_2O_3^{2-}$ the average state of S is +2.

B is true: dithionic acid is $HO–SO_2–SO_2–OH$.

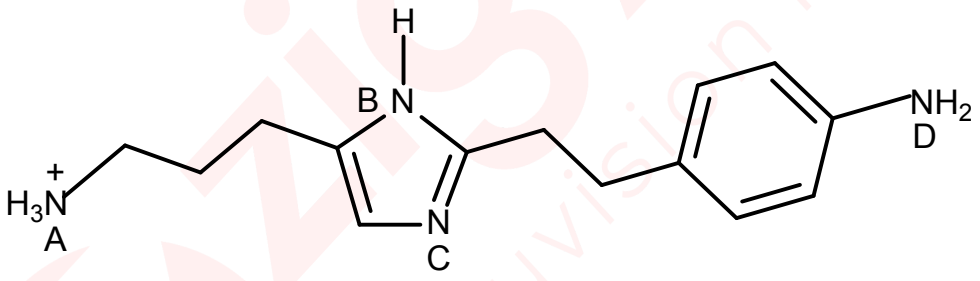
C is false: SF_4 has a see-saw shape.

D is false: serine has a $–CH_2OH$ side chain and no sulphur.

∴ A and B are correct.

IAPT answer: not yet released | **Zigyan answer:** (B)

25. The order of decreasing basic strength of the nitrogen atoms labelled as **A, B, C** and **D** in the following molecule is:



(A) B > C > D > A (B) C > D > B > A (C) B > D > A > C (D) C > A > B > D

Solution · Q25 **Answer: (B)**

A: $–NH_3^+$ has no lone pair, so it is least basic.

B: pyrrole type N; its lone pair is part of the aromatic sextet.

C: pyridine type N; its sp^2 lone pair is free, and the conjugate acid is resonance stabilised.

D: aniline type N; its lone pair is delocalised into the ring, yet it is more available than that of B.

∴ C > D > B > A

IAPT answer: not yet released | **Zigyan answer:** (B)

26. Consider the following statements about the halides of phosphorous.

A. PF_5, a colourless gas, is molecular and stereochemically non-rigid molecule and shows 'pseudorotation'.

B. PCl_5 is molecular in gas phase but ionic in the solid phase, $[PCl_4]^+ [PCl_6]^-$

C. Both PBr_5 and PI_5 are ionic in solid phase and exists as $[PBr_4]^+ [Br]^-$ and $[PI_4]^+ [I]^-$ respectively.

D. The mixed chlorofluorides, PCl_4F and PCl_3F_2 have F atoms in axial position(s).

Choose the correct option having all correct statements

(A) C and D (B) A, C and D (C) A, B and D (D) A, B, C and D

Solution · Q26 **As per Zigyan: (C)**

A: true; PF_5 shows pseudorotation.

B: true; solid $PC\ell_5$ is $[PC\ell_4]^+[PC\ell_6]^-$.

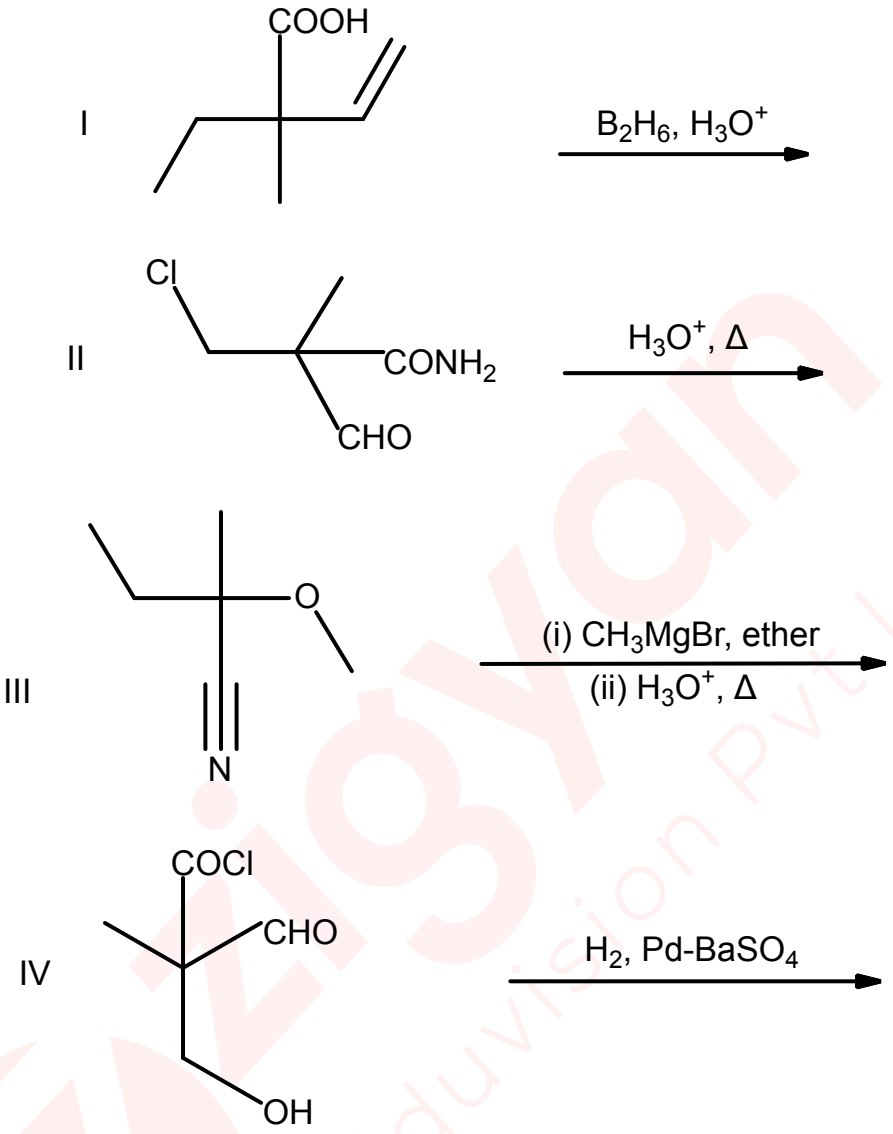
C: false; solid PBr_5 is $[PBr_4]^+Br^-$, but a solid $[PI_4]^+I^-$ has no confirmed structure.

D: true; the more electronegative F atoms occupy axial positions (Bent's rule).

Reference: University of Bristol, Molecule of the Month, January 2003 (S. Cotton, 'Arsenic Pentachloride'), 'How about PI5?': no one is sure PI_5 exists; by then, no report had confirmed the structure of the 1978 product.

IAPT answer: not yet released | **Zigyan answer:** (C)

27. Examine the following reactions



The reaction(s) in which an achiral product is/are obtained

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

Solution · Q27 **Answer: (D)**

I: B_2H_6 reduces –COOH to $–CH_2OH$ (C=C taken as retained).

The central carbon has four different groups, so the product is chiral.

II: the amide is hydrolysed to a β-oxo acid, which loses CO_2 on heating.

$C\ell CH_2CH(CH_3)CHO$

This is chiral.

III: Grignard addition and hydrolysis give a ketone.

$C_2H_5C(CH_3)(OCH_3)COCH_3$

This is chiral.

IV: Rosenmund reduction changes $–COC\ell$ to –CHO.

$HOCH_2C(CH_3)(CHO)_2$

Two identical groups make it achiral.

IAPT answer: not yet released | **Zigyan answer:** (D)

28. $Co^{2+}(aq)$ is pink in colour. When excess of HCl solution is added to its aqueous solution it becomes deep blue. The reason is

(A) Octahedral $[Co(H_2O)_6]^{2+}$ changed to tetrahedral $[CoCl_4]^{2-}$

(B) Octahedral $[Co(H_2O)_6]^{2+}$ changed to octahedral $[CoCl_6]^{4-}$

(C) Octahedral $[Co(H_2O)_6]^{2+}$ changed to octahedral $[Co(H_2O)_6]^{3+}$

(D) High spin octahedral $[Co(H_2O)_6]^{2+}$ changed to low spin octahedral $[Co(H_2O)_6]^{2+}$

Solution · Q28 **Answer: (A)**

Excess $C\ell^-$ replaces water:

$[Co(H_2O)_6]^{2+} + 4C\ell^- \rightleftharpoons [CoC\ell_4]^{2-} + 6H_2O$

Pink octahedral complex changes to deep blue tetrahedral complex.

IAPT answer: not yet released | **Zigyan answer:** (A)

29. Surface tension

(A) is an extensive property

(B) is numerically equal to surface energy

(C) has the units N m^{-2}

(D) is independent of intermolecular forces

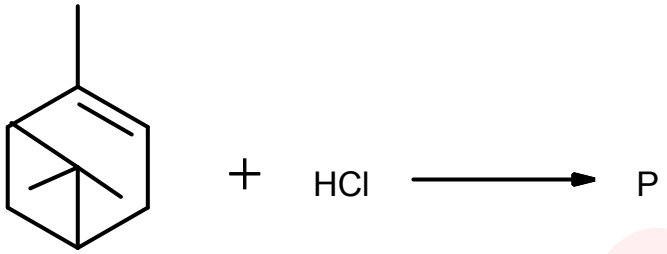
Solution · Q29 **Answer: (B)**

Surface tension is intensive, depends on intermolecular forces and has the unit N m^{-1}.

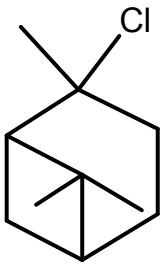
It is numerically equal to the surface energy per unit area.

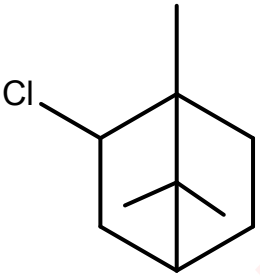
IAPT answer: not yet released | **Zigyan answer:** (B)

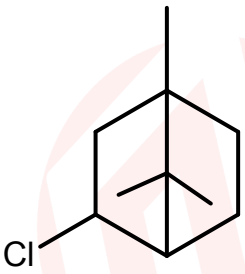
30. A carbocation intermediate is formed during dehydrohalogenation, and the intermediate is capable of structural rearrangements to give a more stable product. In the following reaction identify the product P.

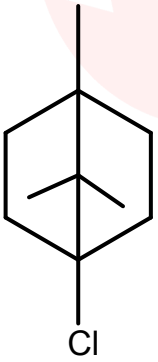


The product **P** is:

(A)


(B)


(C)


(D)


Solution · Q30 **Answer: (B)**

H^+ adds to C=C to give a tertiary carbocation.

A bond of the strained four-membered ring then shifts to the positive carbon (Wagner–Meerwein shift), forming a five-membered ring.

$C\ell^-$ then attacks to give bornyl chloride:

2-chloro-1,7,7-trimethylbicyclo[2.2.1]heptane

IAPT answer: not yet released | **Zigyan answer:** (B)

31. A Student sets up a galvanic cell as shown below and records its EMF as 0.71V.

(–) Mg (s) | $MgSO_4$ (1M aq.) || $Al_2(SO_4)_3$(1M aq.) | Al (s) (+)

While working with the cell, she accidently dropped some amount of $MgSO_4$ into the magnesium half-cell which readily dissolved. This caused EMF of the cell change to 0.698V. The quantity of $MgSO_4$ in g that fell into the Magnesium half-cell is closer to

[Given: E^0 Al = – 1.66 V and E^0 Mg = –2.37 V]

(A) 9.30 (B) 15.30 (C) 6.02 (D) 3.12

Solution · Q31 **As per Zigyan: (A)**

Cell reaction:

$3Mg + 2A\ell^{3+} \rightarrow 3Mg^{2+} + 2A\ell$

$$E^\circ_{cell} = -1.66 + 2.37 = 0.71\ V$$

The recorded EMF equals this value, so $[A\ell^{3+}]$ is taken as 1 M, not 2 M.

By the Nernst equation,

$$0.698 = 0.71 - \frac{0.059}{6}\log\left[Mg^{2+}\right]^3$$

$$\Rightarrow [Mg^{2+}] = 2.55\ M$$

The solution volume is not given. For 50 mL of solution (assumed),

$$m = (2.55 - 1) \times 0.050 \times 120.4 \approx 9.3\ g$$

Reference: NCERT Class XII Chemistry (Part I), Unit 2 'Electrochemistry', section 2.3: the Nernst equation relates EMF to ion concentrations.

Check: With 2.55 M, the EMF works back to 0.698 V. The extra 1.55 mol per litre is about 187 g per litre, so 9.30 g needs about 50 mL.

IAPT answer: not yet released | **Zigyan answer:** (A)

32. The structure of XeF_5^- does not resemble with:

A. Pentaiodide ion

B. Bromine pentafluoride

C. Iron pentacarbonyl

D. PCl_3F_2 (Both F are at axial positions)

Choose the correct option:

(A) A (B) A and C (C) B, C and D (D) A, B, C and D

Solution · Q32 **Answer: (D)**

XeF_5^- has 5 bond pairs and 2 lone pairs: pentagonal planar.

A: I_5^- is bent (V-shaped).

B: BrF_5 is square pyramidal.

C: $Fe(CO)_5$ is trigonal bipyramidal.

D: $PC\ell_3F_2$ is trigonal bipyramidal.

∴ none of A, B, C and D resembles it.

IAPT answer: not yet released | **Zigyan answer:** (D)

33. A solution containing 0.319 g of $CrCl_3.6H_2O$ was passed through a cation exchange resin and the liberated acid was titrated with a standard solution of NaOH. The neutralization required 19.0 mL of 0.125 N NaOH. Choose the correct structural formula of Cr(III) complex. (Molar mass of $CrCl_3.6H_2O$ = 266.35 g/mol)

(A) $[Cr(H_2O)_5Cl]Cl_2.H_2O$ (B) $[Cr(H_2O)_4Cl_2]Cl.2H_2O$

(C) $[Cr(H_2O)_3Cl_3].3H_2O$ (D) $[Cr(H_2O)_6]Cl_3$

Solution · Q33 **Answer: (A)**

Moles of the salt:

$$n = 0.319/266.35 = 1.198 \times 10^{-3} \text{ mol}$$

Moles of acid liberated:

$$n(H^+) = 19.0 \times 0.125 \times 10^{-3} = 2.375 \times 10^{-3} \text{ mol}$$

Ratio of the two:

$$2.375/1.198 \approx 2$$

So the complex cation has charge +2, with two $C\ell^-$ outside the sphere.

$[Cr(H_2O)_5C\ell]C\ell_2 \cdot H_2O$

IAPT answer: not yet released | **Zigyan answer:** (A)

34. The precipitate is formed when 20 mL of an aqueous solution of KI (1% (w/v) is mixed with 20 mL of an aqueous solution of 1.5% (w/v) Pb $(NO_3)_2$ solution. The number of anions present in the mixed solution are _____

(A) 4.0×10^{19} I^- ions

(B) 8.0×10^{19} NO_3^- ions

(C) 1.412×10^{20} I^- and 1.412×10^{20} NO_3^- ions

(D) 3.65×10^{20} NO_3^- ions

Solution · Q34 **As per Zigyan: no option is correct**

$$n(KI) = 0.20/166 = 1.20 \times 10^{-3} \text{ mol}$$

$$n[Pb(NO_3)_2] = 0.30/331.2 = 9.06 \times 10^{-4} \text{ mol}$$

$Pb^{2+} + 2I^- \rightarrow PbI_2\downarrow$

KI is limiting, so practically all I^- is precipitated, while NO_3^- is a spectator.

$$N(NO_3^-) = 2 \times 9.06 \times 10^{-4} \times 6.022 \times 10^{23}$$

$$\Rightarrow N = 1.09 \times 10^{21}$$

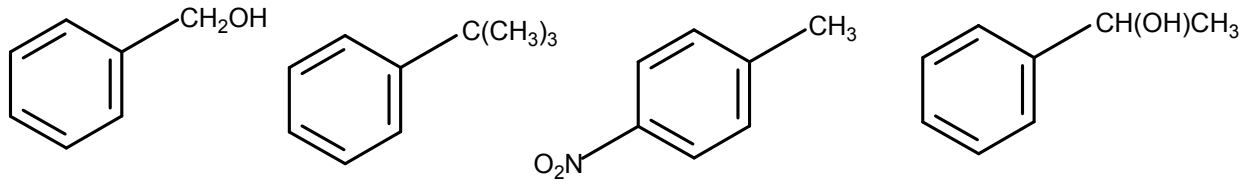
The value 3.65×10^{20} in (D) counts only the nitrate matching the excess Pb^{2+}.

No option gives the number of nitrate ions in solution.

Check: Charge balance after precipitation: K^+ (1.20×10^{-3} mol) plus leftover Pb^{2+} (twice 3.03×10^{-4} mol of charge) needs 1.81×10^{-3} mol of NO_3^-.

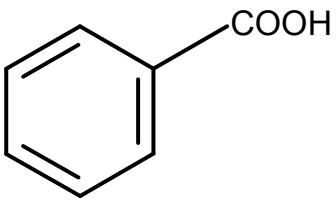
IAPT answer: not yet released | **Zigyan answer:** none of the options is correct

35. A mixture of the following organic compounds is oxidized using hot chromic acid.

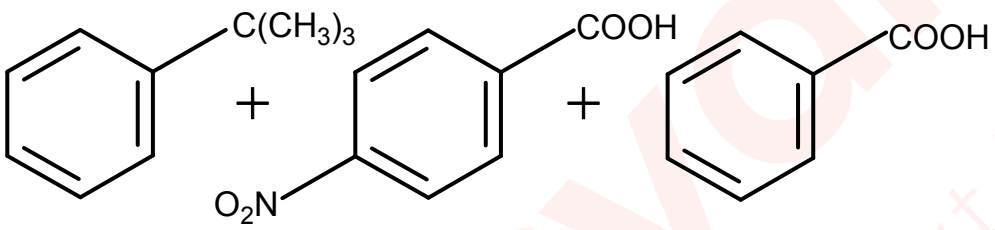


The reaction mixture contains:

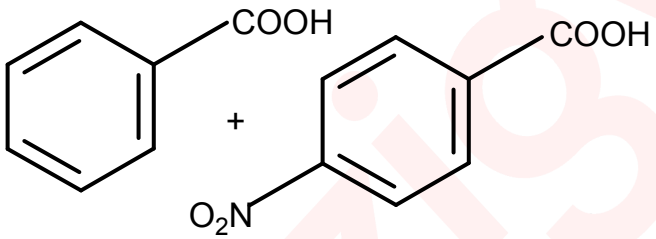
(A) only



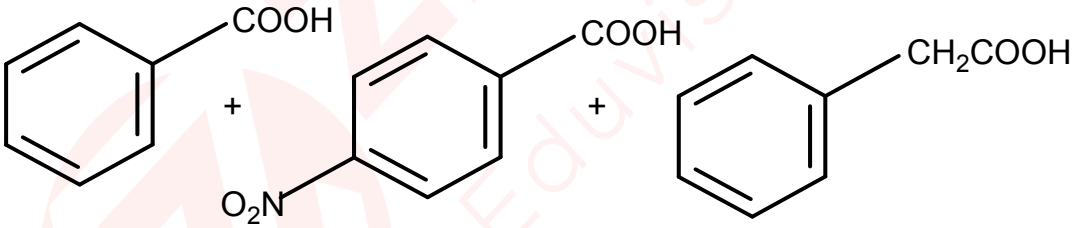
(B)



(C)



(D)



Solution · Q35 **Answer: (B)**

Hot chromic acid oxidises side chains having benzylic H to –COOH.

$C_6H_5CH_2OH \rightarrow C_6H_5COOH$

$p\text{-}O_2NC_6H_4CH_3 \rightarrow p\text{-}O_2NC_6H_4COOH$

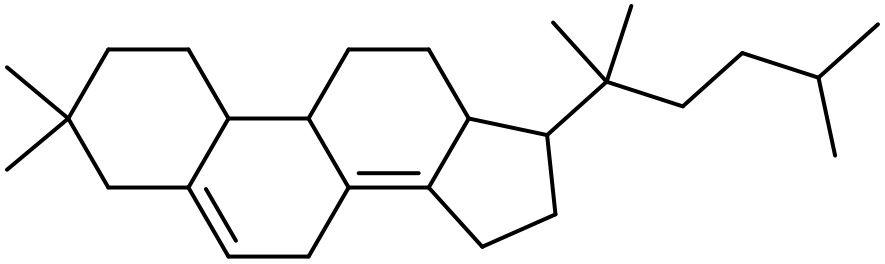
$C_6H_5CH(OH)CH_3 \rightarrow C_6H_5COCH_3 \rightarrow C_6H_5COOH$

The last step needs vigorous heating.

$C_6H_5C(CH_3)_3$ has no benzylic H, so it remains unchanged.

IAPT answer: not yet released | **Zigyan answer:** (B)

36. How many chiral centers are present in the following structure?



(A) 4 (B) 10 (C) 6 (D) 8

Solution · Q36 **Answer: (A)**

Each of the three ring junctions has one sp^3 CH carbon that is chiral.

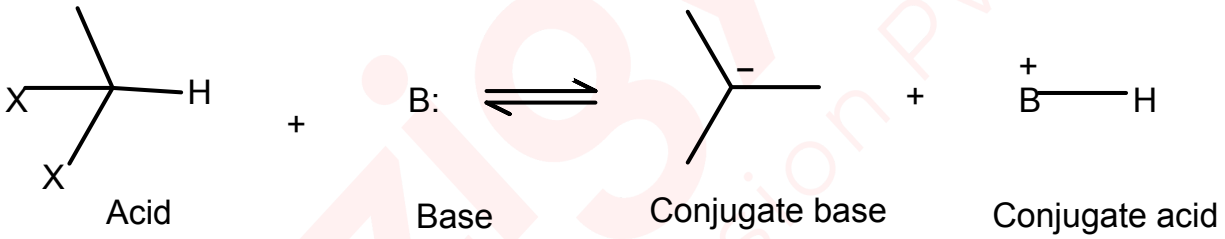
The ring carbon bearing the side chain is also chiral.

$$3 + 1 = 4$$

Carbons with two methyl groups and all sp^2 carbons are not chiral.

IAPT answer: not yet released | **Zigyan answer:** (A)

37. Consider the following reaction:



The acid in the above representation is known as a **carbon acid** where **X** is an electron withdrawing group. The most 'acidic' carbon acid amongst the following is:

(A) 3-hexanone (B) 2,3-hexandione (C) 2,5-hexandione (D) 2,4-hexandione

Solution · Q37 **Answer: (D)**

A stronger carbon acid gives a more stable carbanion.

In 2,4-hexanedione, a CH_2 group lies between two C=O groups:

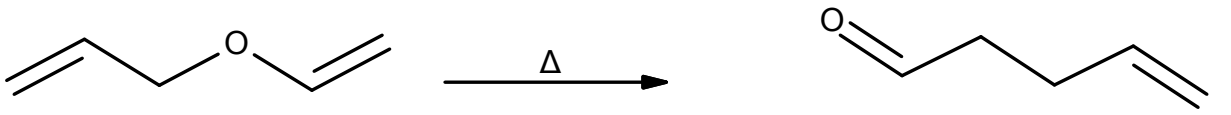
$CH_3COCH_2COCH_2CH_3$

Its carbanion is delocalised over both oxygen atoms.

In the other three compounds, an α-carbanion is delocalised into only one C=O group.

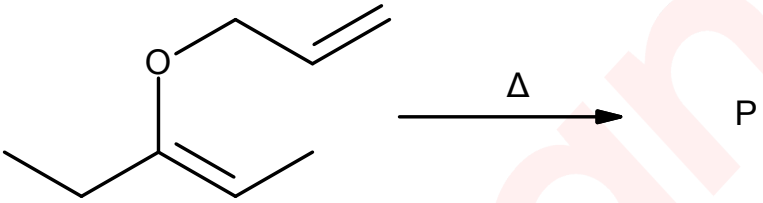
IAPT answer: not yet released | **Zigyan answer:** (D)

38. Claisen rearrangement is a chemical reaction which involves heating of an allyl vinyl ether to form a 1,4-enone. There is an intramolecular rearrangement of the π system where a σ bond is broken and reformed in a different position in the product. A simple illustration is shown below:



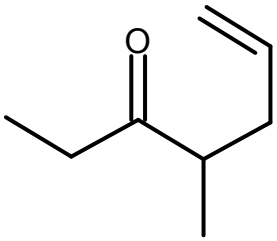
allyl vinyl ether — unsaturated carbonyl compound

Consider the following reaction and identify the structure of **P**, which readily forms the product.

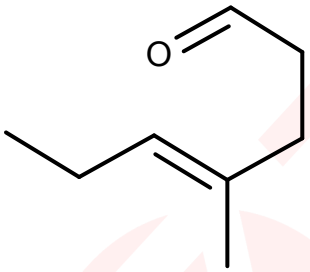


The product **P** is:

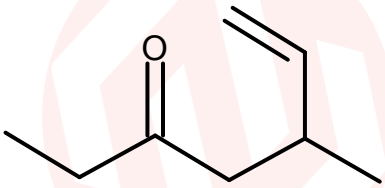
(A)



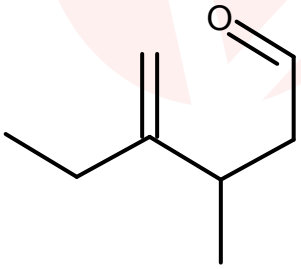
(B)



(C)



(D)



Solution · Q38 **Answer: (A)**

[3,3]-Sigmatropic shift:

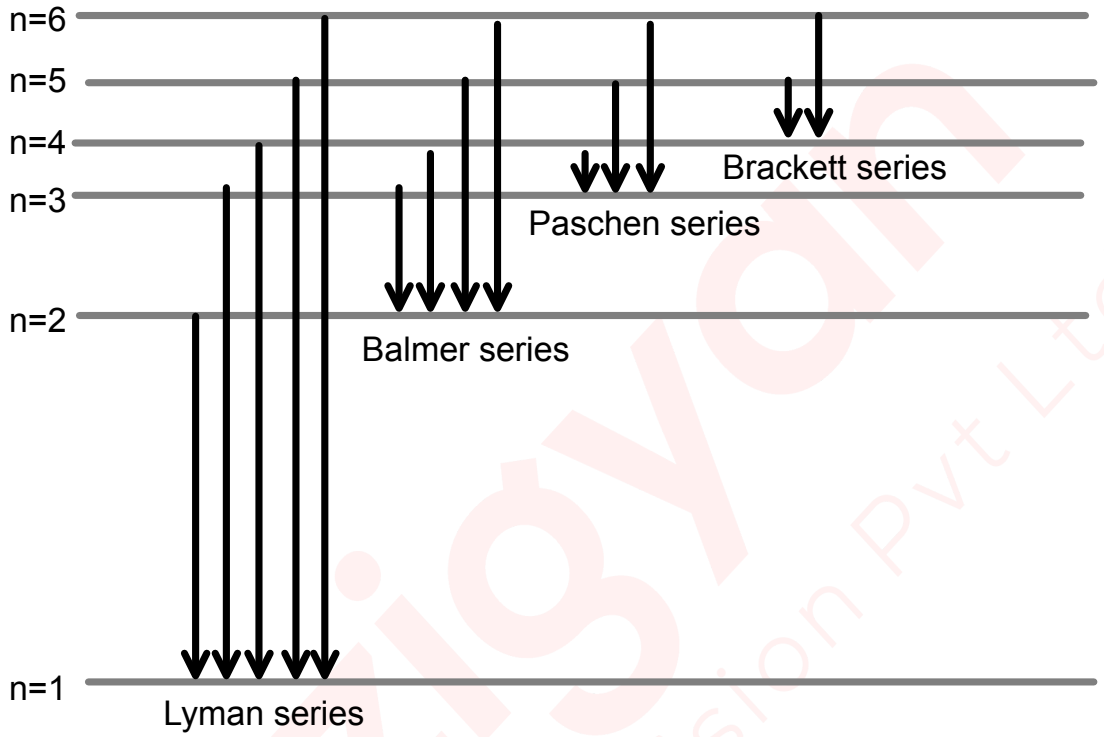
The O–C(allyl) bond breaks.

A new C–C bond joins the terminal CH_2 carbon to the $CH(CH_3)$ carbon.

$$CH_2{=}CHCH_2{-}O{-}C(C_2H_5){=}CHCH_3 \rightarrow C_2H_5COCH(CH_3)CH_2CH{=}CH_2$$

IAPT answer: not yet released | **Zigyan answer:** (A)

39. The line spectrum of hydrogen atom is shown below. Identify the statement that is correct *(Diagram is for representative purpose only and not to scale)*



Energy transitions for the Hydrogen Atom

(A) First line of the Lyman series (n = 2 → 1) for hydrogen atom has the same wavelength as the first line of the Balmer series (n = 3 → 2) for the He^+ ion.

(B) First Balmer line (n = 3 → 2) in hydrogen has the same wavelength as the transition from line (n = 6 → 4) in the second line of the Brackett series.

(C) The first line of the Paschen series of hydrogen atom has the same wavelength as the first line of the Balmer series of Li^{+2} ion.

(D) The first line of the Lyman series (n = 2 → 1) of Li^{+2} ion has the same wavelength as the third line (n = 5 → 2) of the Balmer series of He^+ ion.

Solution · Q39 **As per Zigyan: no option is correct**

$$\frac{1}{\lambda} = RZ^2\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$$

(A)

H, 2 → 1

$$\frac{1}{\lambda} = \frac{3R}{4}$$

He^+, $3 \rightarrow 2$

$$\frac{1}{\lambda} = \frac{5R}{9}$$

(B)

H, $3 \rightarrow 2$

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

H, $6 \rightarrow 4$

$$\frac{1}{\lambda} = \frac{5R}{144}$$

(C)

H, $4 \rightarrow 3$

$$\frac{1}{\lambda} = \frac{7R}{144}$$

Li^{+2}, $3 \rightarrow 2$

$$\frac{1}{\lambda} = \frac{5R}{4}$$

(D)

Li^{+2}, $2 \rightarrow 1$

$$\frac{1}{\lambda} = \frac{27R}{4}$$

He^+, $5 \rightarrow 2$

$$\frac{1}{\lambda} = \frac{21R}{25}$$

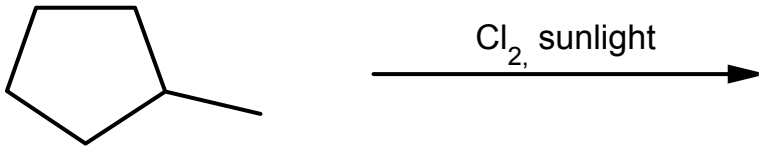
$\therefore$ As printed, no option gives two equal wavelengths.

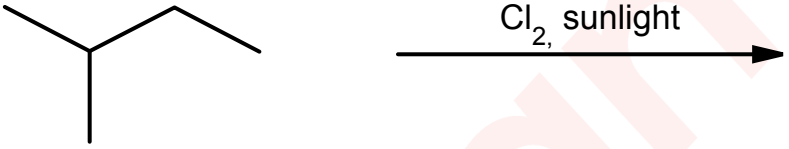
Reference: NCERT Class XI Chemistry (Part I), Unit 2 'Structure of Atom', section 2.4: in hydrogen-like species such as He^+ and Li^{2+}, level energies vary as Z^2/n^2.

Check: Doubling both Z and n keeps Z/n unchanged, so H $6 \rightarrow 4$ does not match H $3 \rightarrow 2$.

IAPT answer: not yet released | **Zigyan answer:** none of the options is correct

40. The total number of monochlorinated products (including the stereoisomers) in the following reactions **I** and **II** are respectively:

I 

II 

(A) 5, 5 (B) 10, 5 (C) 6, 5 (D) 8, 4

Solution · Q40 **As per Zigyan: no option is correct**

I. Products, counting stereoisomers:

Cℓ on the side-chain CH_3: 1

1-chloro-1-methylcyclopentane: 1

1-chloro-2-methylcyclopentane (2 chiral C): 4

1-chloro-3-methylcyclopentane (2 chiral C): 4

$$1 + 1 + 4 + 4 = 10$$

II. Products from 2-methylbutane:

1-chloro-2-methylbutane (R, S): 2

2-chloro-2-methylbutane: 1

2-chloro-3-methylbutane (R, S): 2

1-chloro-3-methylbutane: 1

$$2 + 1 + 2 + 1 = 6$$

$\therefore$ The pair 10 and 6 is not among the options.

Reference: NCERT Class XII Chemistry (Part II), Unit 6 'Haloalkanes and Haloarenes', Example 6.3: 2-methylbutane has four structural monochloro isomers.

Check: In II, two chiral structures give two each and two achiral ones give one each, six in all. Reaction I gives 1 + 1 + 4 + 4, which is ten.

IAPT answer: not yet released | **Zigyan answer:** none of the options is correct

41. For the following stoichiometric oxidation of NO by O_2

$2NO\ (g) + O_2\ (g) \rightarrow 2NO_2\ (g)$

Experimental kinetic data obtained is given in the following table

NO /mol dm^{-3}	O_2/ mol dm^{-3}	Initial rate / mol dm^{-3}s^{-1}
0.0200	0.0200	7.11×10^{-5}
0.0400	0.0200	2.8×10^{-4}
0.0200	0.0400	1.41×10^{-4}

The rate law that can be deduced form the kinetic data is

(A) $-\,d[NO_2]/dt = k\,[NO]^2\,[O_2]$

(B) $\frac{1}{2}\,d[NO_2]/dt = k\,[NO]^2\,[O_2]$

(C) $\frac{1}{2}\,d[NO_2]/dt = k\,[NO]\,[O_2]^2$

(D) $d[NO]/dt = k\,[NO]^2\,[O_2]$

Solution · Q41 **Answer: (B)**

$$r = k[NO]^x[O_2]^y$$

On doubling [NO] only:

$$2^x = \frac{2.8 \times 10^{-4}}{7.11 \times 10^{-5}} \approx 4$$

$$\Rightarrow x = 2$$

On doubling $[O_2]$ only:

$$2^y = \frac{1.41 \times 10^{-4}}{7.11 \times 10^{-5}} \approx 2$$

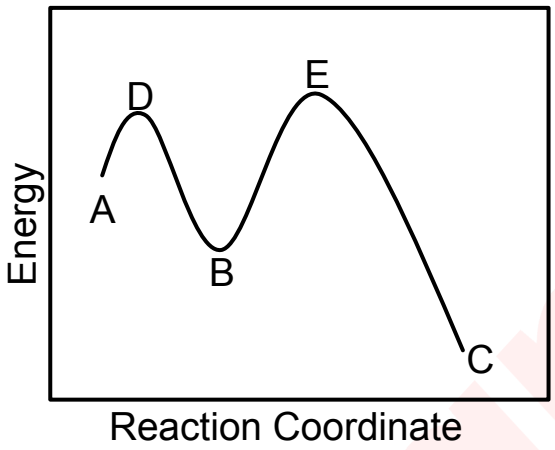
$$\Rightarrow y = 1$$

For $2NO + O_2 \rightarrow 2NO_2$,

$$\therefore \frac{1}{2}\frac{d[NO_2]}{dt} = k[NO]^2[O_2]$$

IAPT answer: not yet released | **Zigyan answer:** (B)

42. The given energy profile diagram corresponds to the reaction A→B→C, Activation energies and the rate constants for the reaction I; A→B and for II; B→C are E_1 and k_1 and E_2 and k_2, respectively.



The correct statement among the following is:

(A) Reaction I is rate determining

(B) $k_1 > k_2$

(C) $(E_1 + E_2)$ is the activation energy for the reaction C→A.

(D) D is an intermediate and E is a transition state.

Solution · Q42 **Answer: (B)**

From the diagram:

$$E_1 = E(D) - E(A)$$

$$E_2 = E(E) - E(B)$$

$$\Rightarrow E_2 > E_1$$

For similar pre-exponential factors,

$$\Rightarrow k_1 > k_2$$

So II is rate determining.

The barrier for C → A is E(E) − E(C), which is not $E_1 + E_2$.

D is a transition state and B is the intermediate.

IAPT answer: not yet released | **Zigyan answer:** (B)

43. Choose the correct option of spontaneous and non-spontaneous processes in the following table

Process	(A)	(B)	(C)	(D)
Radioactive decay	spontaneous	Non-spontaneous	spontaneous	Non-spontaneous
Freezing water above 0 °C	Non-spontaneous	Non-spontaneous	spontaneous	Non-spontaneous
Adsorption of nitrogen on activated charcoal	spontaneous	spontaneous	spontaneous	spontaneous
Burning of coal	Spontaneous	spontaneous	Non spontaneous	spontaneous
Evaporation of water at 25 °C	Non-spontaneous	Non-spontaneous	Non-spontaneous	spontaneous

(A) spontaneous, Non-spontaneous, spontaneous, Spontaneous, Non-spontaneous

(B) Non-spontaneous, Non-spontaneous, spontaneous, spontaneous, Non-spontaneous

(C) spontaneous, spontaneous, spontaneous, Non spontaneous, Non-spontaneous

(D) Non-spontaneous, Non-spontaneous, spontaneous, spontaneous, spontaneous

Solution · Q43 **As per Zigyan: (A)**

Radioactive decay, adsorption of N_2 on charcoal and burning of coal are spontaneous.

Freezing of water above 0 °C is non-spontaneous.

The vapour pressure is not stated, so evaporation is taken in the standard state.

$H_2O(l) \rightarrow H_2O(g, 1\ bar)$, at 25 °C:

$$\Delta G^\circ \approx +8.6\ kJ\ mol^{-1}$$

$\therefore$ It is non-spontaneous in the standard state.

Only column (A) fits.

Reference: OpenStax Chemistry 2e, section 16.4 'Free Energy', Example 16.7: for water turning into vapour at 298 K, ΔG° is about +8.6 kJ per mole, so it is not spontaneous in the standard state.

IAPT answer: not yet released | **Zigyan answer:** (A)

44. Most of the biochemical reactions are enzyme catalyzed. The mechanism of an enzyme catalyzed reaction can be written as follows

$$E + S \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} ES \underset{k_{-2}}{\overset{k_2}{\rightleftharpoons}} E + P$$

Where E and S stands for Enzyme and Substrate, while k_1, k_2, k_{-1} and k_{-2} represent rate constants at the respective steps as shown in the mechanism. The concentration of ES, assuming initial concentration of Enzyme is $[E]_0$ is given by the equation

$$[ES] = \frac{[E]_0[S]}{\frac{k_{-1}+k_2}{k_1} + [S]} = \frac{[E]_0[S]}{K_m + [S]}$$

Which of the following statement is correct with respect to above expression?

(A) When $K_m > [S]$, then the reaction is zero order with respect to substrate

(B) When $K_m = [S]$, it offers lowest possible rate for the enzymatic reaction

(C) K_m has the unit of concentration

(D) When $[S] > K_m$, reaction is first order with respect to substrate

Solution · Q44 **Answer: (C)**

$$K_m = \frac{k_{-1} + k_2}{k_1}$$

Unit:

$$\frac{s^{-1}}{L\ mol^{-1}\ s^{-1}} = mol\ L^{-1}$$

This is a unit of concentration, so (C) is true.

(A) $K_m \gg [S]$ gives first order.

(D) $[S] \gg K_m$ gives zero order.

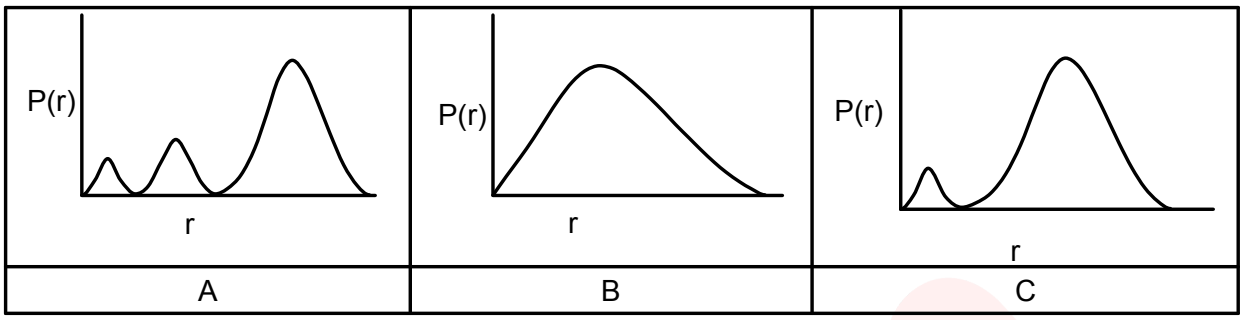
(B) At this point the rate is half of the maximum:

$$[S] = K_m$$

$$v = V_{max}/2$$

IAPT answer: not yet released | **Zigyan answer:** (C)

45. A rough sketch of the variation in the radial probability **P(r)** as function of distance **r** from center of nucleus are represented below.



The correct orbital to which they can be associated is

(A) A: 2p, B: 3s, C: 3d

(B) A: 3s, B: 3d, C: 4s

(C) A: 3s, B: 2p, C: 2s

(D) A: 3p, B: 3d, C: 3s

Solution · Q45 **Answer: (C)**

N is the number of peaks in the curve.

$$N = n - \ell$$

A: $N = 3 \rightarrow 3s$

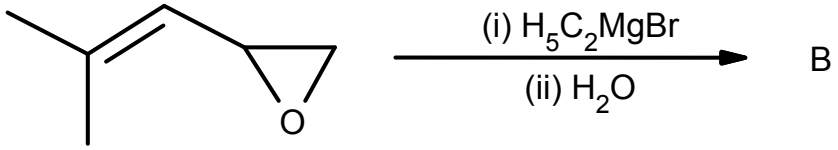
B: $N = 1 \rightarrow 2p$

C: $N = 2 \rightarrow 2s$

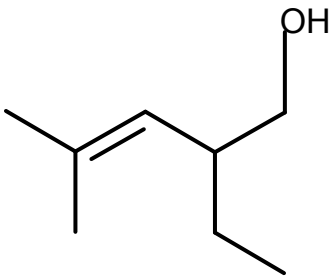
Only set (C) fits all three curves.

IAPT answer: not yet released | **Zigyan answer:** (C)

46. Product **B** in the following reaction is:



(A)



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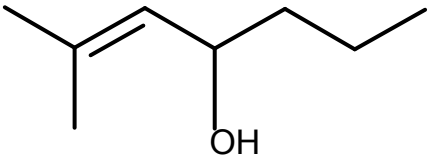
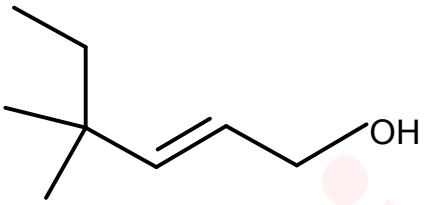
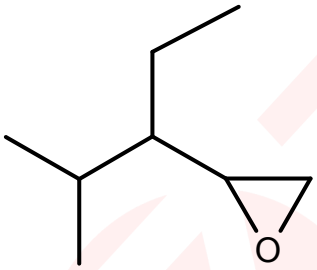


(C)



(D)



Solution · Q46 **Answer: (B)**

C_2H_5MgBr attacks the less hindered CH_2 carbon of the epoxide (S_N2), and the ring opens.

$$(CH_3)_2C{=}CH{-}CH(OMgBr){-}CH_2C_2H_5$$

On adding water:

$$B = (CH_3)_2C{=}CH{-}CH(OH){-}CH_2CH_2CH_3$$

IAPT answer: not yet released | **Zigyan answer:** (B)

47. A human brain typically operates at 25W (1W = 1 J/s). The mass of glucose that must be consumed to sustain brain activity for 1h is _____.

(Assuming the energy comes from the following reaction)

$C_6H_{12}O_6 + O_2 \rightarrow 6CO_2 + 6H_2O + \Delta U$

Given that at 25 °C the energy of the reaction is ΔU = 2828 kJ/mol. Molar mass of glucose = 180g/mol

(A) 5.73 g (B) 1.59 mg (C) 5.73 kg (D) 1.59 g

Solution · Q47 **Answer: (A)**

Energy used in 1 h:

$$E = 25 \times 3600 \text{ J} = 90 \text{ kJ}$$

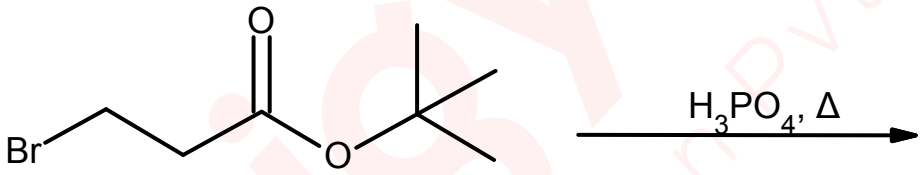
Mass of glucose:

$$m = \frac{90}{2828} \times 180 \text{ g}$$

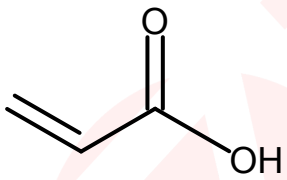
$$\Rightarrow m = 5.73 \text{ g}$$

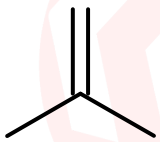
IAPT answer: not yet released | **Zigyan answer:** (A)

48. The following reaction was carried out.

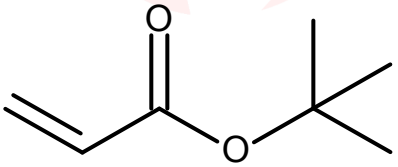


On investigation it was found that multiple products were obtained. One of the products decolourized bromine water. This particular product is:

(A)


(B)


(C)


(D)


Solution · Q48 **Answer: (B)**

With hot acid, the tert-butyl ester cleaves through $(CH_3)_3C^+$, which loses H^+.

$$BrCH_2CH_2COOC(CH_3)_3 \rightarrow BrCH_2CH_2COOH + (CH_3)_2C{=}CH_2$$

2-Methylpropene decolourises bromine water.

Removing HBr to give acrylic acid needs a base.

IAPT answer: not yet released | **Zigyan answer:** (B)

PART A-2 · ONE OR MORE CORRECT OPTIONS

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

49. When equal volumes of 0.02 M $AgNO_3$ and 0.02 M NaCl are mixed, AgCl precipitates out (K_{sp} of AgCl at 298 K = 1.8×10^{-10}), which of the following statement(s) is/are true?

(A) The addition of ammonium hydroxide to the mixture will cause the precipitate to redissolve due to the formation of a soluble complex ion.

(B) If the temperature is increased, the K_{sp} of AgCl increases, causing more precipitate to dissolve.

(C) The solubility of AgCl in 0.01 M NaCl will be higher than its solubility in pure water.

(D) If the initial concentration of both reactants is lowered to 0.00002 M, no precipitation will occur.

Solution · Q49 **Answer: (A), (B), (D)**

After mixing equal volumes:

$$[Ag^+] = [C\ell^-] = 0.01\ M$$

$$Q = 10^{-4} > K_{sp}$$

So $AgC\ell$ precipitates.

(A) Ammonia forms a soluble complex. True.

$$AgC\ell + 2NH_3 \rightarrow [Ag(NH_3)_2]^+ + C\ell^-$$

(B) Dissolution of $AgC\ell$ is endothermic, so K_{sp} rises with temperature. True.

(C) The common ion $C\ell^-$ lowers the solubility. False.

(D) After mixing, each ion is halved:

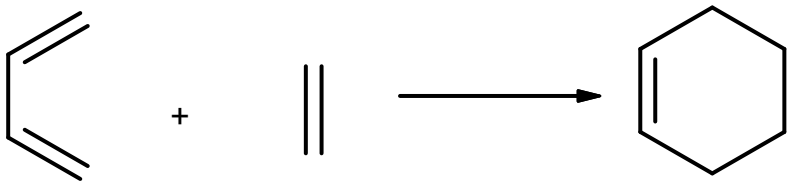
$$[Ag^+] = [C\ell^-] = 1 \times 10^{-5}\ M$$

$$Q = 1 \times 10^{-10} < 1.8 \times 10^{-10}$$

No precipitate forms. True.

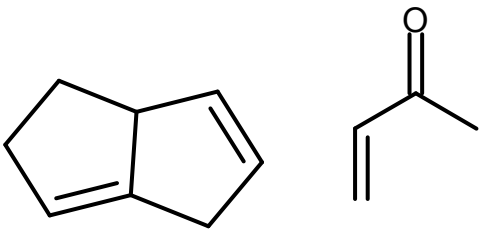
IAPT answer: not yet released | **Zigyan answer:** (A), (B), (D)

50. A conjugated diene and an unsaturated compound can undergo a thermal cycloaddition to cyclohexene even on mere heating to 50 °C. A simple example is shown below.

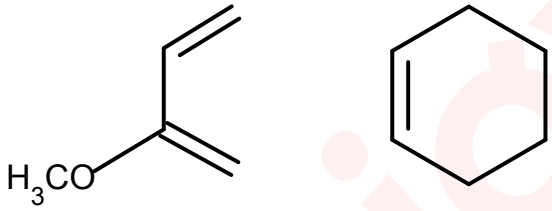


Presence of electron releasing groups on the diene and electron withdrawing groups on the unsaturated compound favour the formation of the cyclohexene derivative. From the following combinations, mark the option (s) of the diene and unsaturated compound that can react favorably to form the cyclic system.

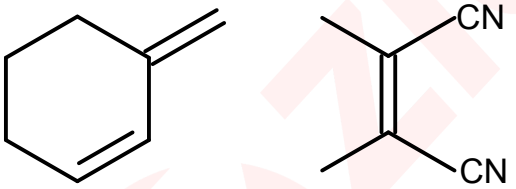
(A)



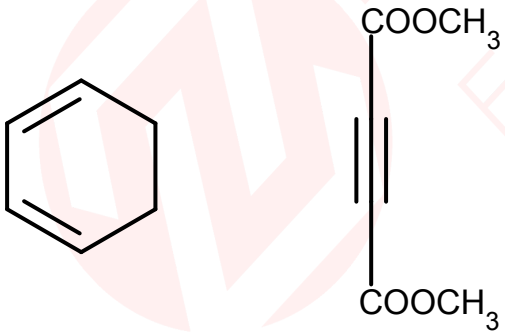
(B)



(C)



(D)



Solution · Q50 **As per Zigyan: (D)**

Needed: a conjugated s-cis diene and an electron-poor dienophile.

(A) The two C=C bonds are not conjugated.

(B) Cyclohexene is an unactivated dienophile, so the reaction is not favourable.

(C) 3-Methylenecyclohexene is locked in the s-trans shape.

(D) Cyclohexa-1,3-diene is locked s-cis, and the alkyne carries two $-COOCH_3$ groups. Favourable.

Reference: OpenStax Organic Chemistry, section 14.5: the Diels–Alder reaction is fastest with an electron-withdrawing group on the dienophile, even ethylene reacts sluggishly, and the diene must adopt the s-cis shape.

Check: (A) lacks a conjugated diene, (B) an activated dienophile and (C) an s-cis diene. Only (D) lacks none of these.

IAPT answer: not yet released | **Zigyan answer:** (D)

51. Resonance in the covalent molecules brings out the following changes. Which of the following statements are correct?

(A) In a canonical structure the bond lengths become identical and lie between single bond and double bond.

(B) The hybridization of the central atom changes between different canonical structures.

(C) The resonance hybrid has lower energy than normal covalent molecule.

(D) Resonance forces the combining atoms into a planar arrangement to allow π-electron delocalization.

Solution · Q51 **Answer: (C), (D)**

(A) A single canonical form has distinct single and double bonds. Intermediate bond lengths belong to the hybrid. False.

(B) Canonical forms differ only in the arrangement of electrons; the atoms and hybridisation stay the same. False.

(C) The hybrid has lower energy than any single localised structure. True.

(D) pπ–pπ delocalisation needs parallel p orbitals, so the conjugated atoms are held in one plane. True.

IAPT answer: not yet released | **Zigyan answer:** (C), (D)

52. Identify the correct statements about the complexes "A" and "B" among $[CoCl(NH_3)_5]^{2+}$, $[Co(NH_3)_5(H_2O)]^{3+}$, $[Co(NH_3)_6]^{3+}$, $[Co(CN)_6]^{3-}$, $[Cu(H_2O)_4]^{2+}$, $[Cu(NH_3)_4]^{2+}$, $[Ti(H_2O)_6]^{3+}$, which absorb light at highest and lowest wavelengths, respectively.

(A) A has a square planar geometry

(B) B has an octahedral geometry

(C) A is paramagnetic, and B is diamagnetic

(D) Both A and B do not exhibit geometrical isomerism

Solution · Q52 **As per Zigyan: (A), (B), (C), (D)**

A larger d-orbital splitting means a shorter wavelength is absorbed.

Longest wavelength, red light (weak field):

$$A = [Cu(H_2O)_4]^{2+}$$

Shortest wavelength, ultraviolet (strong field):

$$B = [Co(CN)_6]^{3-}$$

(A) The four-coordinate Cu(II) aqua ion A is taken as dsp^2, square planar. True.

(B) B is d^2sp^3, octahedral. True.

(C) A is d^9 with one unpaired electron. B is low spin d^6 with none. True.

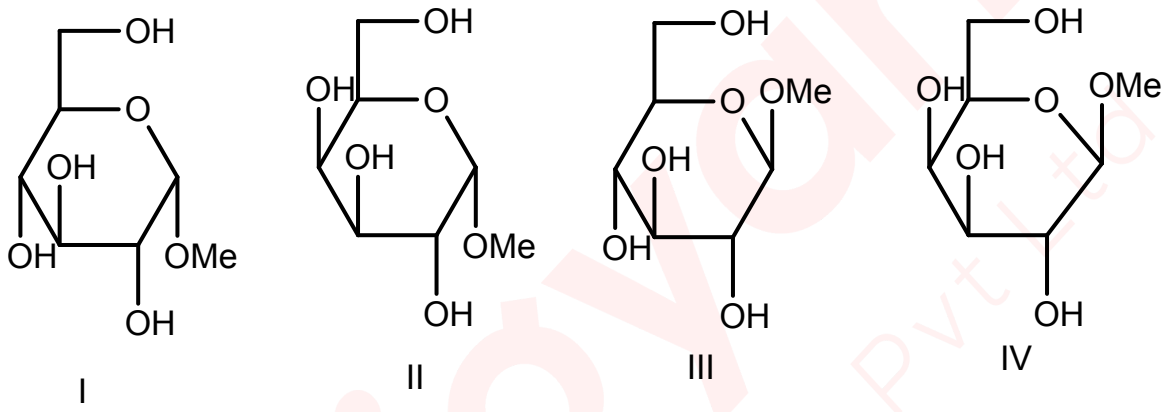
(D) All ligands in each complex are identical. True.

Reference: NCERT Class XII Chemistry (Part I), Unit 5 'Coordination Compounds', section 5.5.5, Table 5.3: $[Cu(H_2O)_4]^{2+}$ absorbs at 600 nm and $[Co(CN)_6]^{3-}$ at 310 nm, the table's extremes.

Check: The ammine copper ion, absent from the table, has the stronger-field ligand (NH_3 above H_2O in the same unit's series), so it absorbs at a shorter wavelength than A.

IAPT answer: not yet released | **Zigyan answer:** (A), (B), (C), (D)

53. Identify the correct set of stereochemical relationship amongst the following monomethyl monosaccharides labelled as **I** to **IV.**



(A) I and II are anomers; I and III are epimers

(B) I and II are epimers; III and IV are epimers

(C) I and III are anomers; II and IV are anomers

(D) II and III are epimers; I and IV are anomers

Solution · Q53 **Answer: (B), (C)**

From the ring drawings:

I: methyl α-D-glucoside

II: methyl α-D-galactoside

III: methyl β-D-glucoside

IV: methyl β-D-galactoside

I and II, like III and IV, differ only at C-4: epimers.

I and III, like II and IV, differ only at C-1: anomers.

IAPT answer: not yet released | **Zigyan answer:** (B), (C)

54. The equilibrium constants of the following isomerisation reaction at 400 K and 298 K are 2.07 and 3.42 respectively.

$$\text{cis-butene} \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} \text{trans-butene}$$

Which of the following is/are correct?

I. The forward reaction is exothermic

II. The forward reaction is endothermic

III. At both 400 K and 298 K, 50 % of cis-butene and 50 % of trans-butene are present at equilibrium

IV. At both 298 K and 400 K, $k_1 = k_{-1}$

V. The forward reaction is thermodynamically favoured at lower temperatures.

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

Solution · Q54 **Answer: (B)**

K falls from 3.42 at 298 K to 2.07 at 400 K.

So the forward reaction is exothermic (I) and is favoured at lower temperatures (V). II is false.

III and IV would need:

$$K = \frac{k_1}{k_{-1}} = 1$$

This is not so at either temperature, so both are false.

IAPT answer: not yet released | **Zigyan answer:** (B)

55. Identify the correct statements about Ellingham diagram from the following. Choose the correct answer from the following options

(A) The curve for most of the reactions of formation of metal oxide $M_xO(s)$ has positive slope.

(B) The change in phase is indicated by straight line and upward slope

(C) Ellingham diagram can be used to explain the difficulties involved in the reduction of metal sulphides

(D) The values of ΔH and ΔS remain nearly constant even on varying the temperature

Solution · Q55 **As per Zigyan: (A), (C), (D)**

(A) Gaseous O_2 is used up, so ΔS is negative and the slope is positive. True.

$$\frac{d(\Delta G)}{dT} = -\Delta S$$

(B) The line stays straight only while no phase changes; a phase change shows as a break with a change of slope, not as a straight line. False.

(C) Sulphide diagrams show why M_xS is difficult to reduce: the usual reducing agents cannot make ΔG negative enough. True.

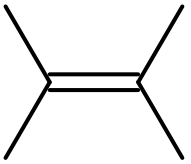
(D) Between phase changes ΔH and ΔS are nearly constant, hence the straight lines. True.

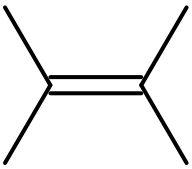
Reference: MIT course 2.813 reading 'Ellingham Diagrams', 'Construction of an Ellingham Diagram': ΔH and ΔS stay nearly constant unless a phase changes, most lines slope upwards, and slope changes on melting or vaporising.

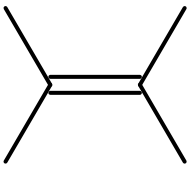
Reference: The same part says similar diagrams can be drawn for reactions with sulphur.

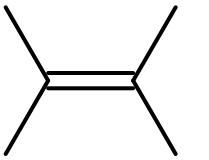
IAPT answer: not yet released | **Zigyan answer:** (A), (C), (D)

56. The reactions that will form vicinal diols as products from the following, are:

(A) 

(B) 

(C) 

(D) 

Solution · Q56 **Answer: (A), (B), (D)**

(A) Epoxidation, then acid hydrolysis, gives a vicinal diol:

$$(CH_3)_2C{=}C(CH_3)_2 \rightarrow (CH_3)_2C(OH)C(OH)(CH_3)_2$$

(B) Taking $KMnO_4$ as cold, dilute and alkaline, syn hydroxylation gives the same diol.

(C) Methoxide opens the epoxide to a methoxy alcohol, not a diol:

$(CH_3)_2C(OCH_3)C(OH)(CH_3)_2$

(D) OsO_4 adds syn; Na_2SO_3 cleaves the osmate ester to the diol.

IAPT answer: not yet released | **Zigyan answer:** (A), (B), (D)

57. Which of the following statement(s) is /are correct?

(A) H_2O_2 is prepared on an industrial scale by the autoxidation of 4-alkyl anthraquinols, which is extracted by water and concentrated to ~30% (by weight) by distillation under reduced pressure.

(B) H_2O_2 in gas phase adopts a skew configuration with a dihedral angle of 111.5°, which is due to the repulsive interaction of the O-H bonds with the lone pair of electrons on each O atom.

(C) H_2O_2 (l) $\rightarrow$ H_2O (l) + ½ O_2 (g) ; $\Delta G^o = -119.2$ kJ mol^{-1}
In the absence of catalysts, H_2O_2 decomposes negligibly slow but the above reaction is strongly catalysed by metal surfaces (Pt, Ag) or by MnO_2 or by the traces of alkali (dissolved from glass).

(D) H_2O_2 oxidises Mn^{2+} to Mn^{4+} in alkaline medium and reduces MnO_4^- to Mn^{2+} in acidic medium.

Solution · Q57 **Answer: (B), (C), (D)**

(A) The industrial process uses 2-alkyl anthraquinols, not 4-alkyl. False.

(B) Gas phase H_2O_2 is skew, dihedral angle 111.5°, because of bond pair and lone pair repulsions. True.

(C) Its decomposition is very slow without catalyst; Pt, Ag, MnO_2 or alkali speed it up. True.

(D) Oxidant in basic medium:

$Mn^{2+} + H_2O_2 \rightarrow Mn^{4+} + 2OH^-$

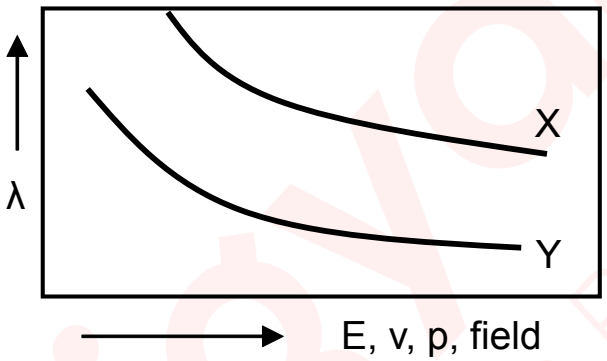
Reductant in acidic medium:

$2MnO_4^- + 5H_2O_2 + 6H^+ \rightarrow 2Mn^{2+} + 5O_2 + 8H_2O$

True.

IAPT answer: not yet released | **Zigyan answer:** (B), (C), (D)

58. The following figure shows variation of the de Broglie wavelength λ with the kinetic energy (E), velocity (v), momentum (p) and the applied electric field for two particles namely an electron and a proton. Qualitatively the curves X and Y represent the two particles.



The statement(s) that are true according to the figure is /are

(A) the curve X is for an electron and curve Y is for a proton, if the two carries equal energy

(B) the curve X is for an electron and curve Y is for a proton, if the two are moving with equal velocity.

(C) the curve X is for an electron and curve Y is for a proton, if the two are having equal momentum.

(D) the curve X is for an electron and curve Y is for a proton, if the two have been accelerated by same electric field.

Solution · Q58 **Answer: (A), (B), (D)**

At any given value, X has the larger λ.

(A) At equal kinetic energy:

$$\lambda = \frac{h}{\sqrt{2mE}}$$

Smaller mass gives larger λ, so X is the electron. True.

(B) At equal velocity:

$$\lambda = \frac{h}{mv}$$

X is the electron. True.

(C) At equal momentum:

$$\lambda = \frac{h}{p}$$

The two curves would coincide. False.

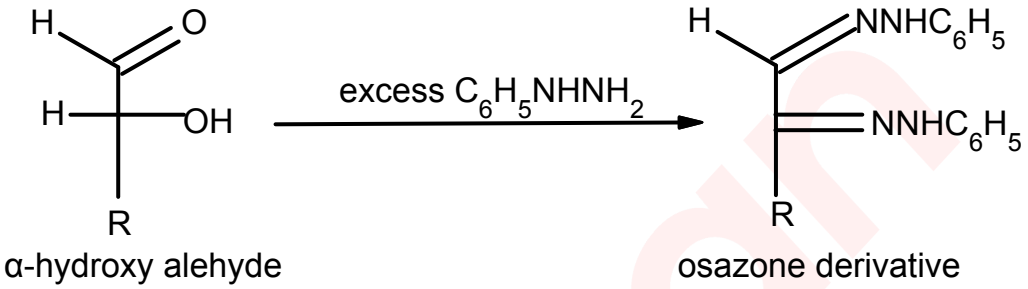
(D) "Same electric field" is taken as the same accelerating potential V:

$$\lambda = \frac{h}{\sqrt{2meV}}$$

X is the electron. True.

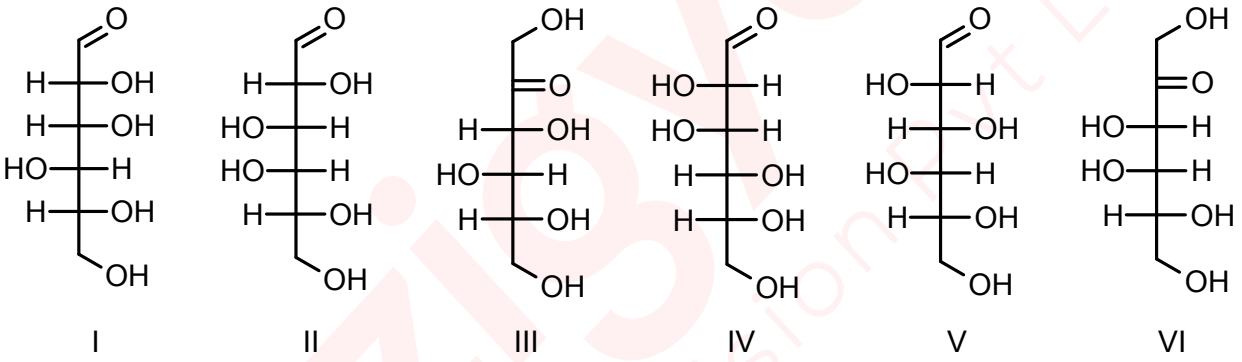
IAPT answer: not yet released | **Zigyan answer:** (A), (B), (D)

59. Osazones are derivatives of carbohydrates, obtained by the reaction of excess phenyl hydrazine with the carbohydrate. A general representation of the structure of osazone derivative is drawn below:



α-hydroxy alehyde osazone derivative

A few structures **I, II, III, IV, V** and **VI** of monosaccharides are drawn below.



From the above structures, mark the pair(s) in the options that will give the same osazone derivative.

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

Solution · Q59 **Answer: (A), (B), (D)**

Only C-1 and C-2 change in osazone formation.

So the same C-3, C-4 and C-5 give the same osazone.

Side of OH at C-3, C-4, C-5:

I, III, V: right, left, right

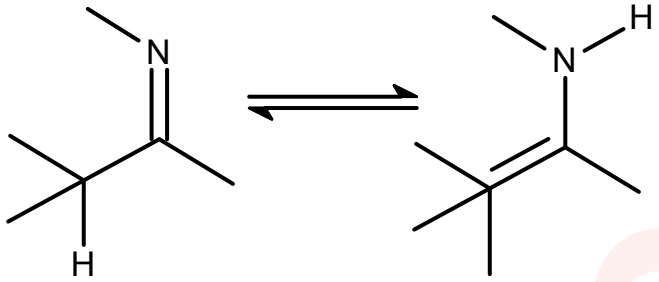
II, VI: left, left, right

IV: left, right, right

So the pairs I and III, II and VI, and I and V match. II and III do not.

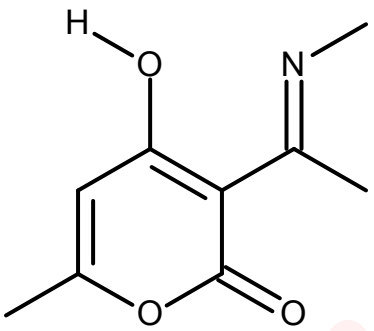
IAPT answer: not yet released | **Zigyan answer:** (A), (B), (D)

60. Similar to the keto-enol tautomerism is another common tautomeric relationship consisting of equilibrium between **imines** (also known as Schiff bases) and **enamines**, which are the nitrogen equivalents of enols. An illustration is shown below.

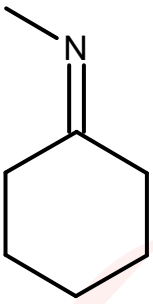


Which of the following can exhibit imine-enamine tautomerism?

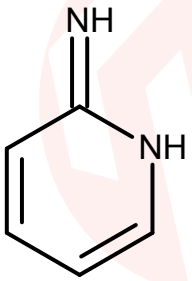
(A)



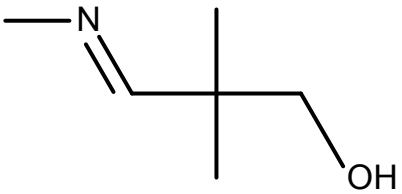
(B)



(C)



(D)



Solution · Q60 **As per Zigyan: (A), (B), (C)**

Needed: an imine with α C–H, or an enamine with N–H.

(A) The CH_3 group on the imine carbon has α hydrogen. Yes.

(B) The ring CH_2 next to C=N has α hydrogen. Yes.

(C) The ring HN–CH=CH part is an enamine with N–H. Yes.

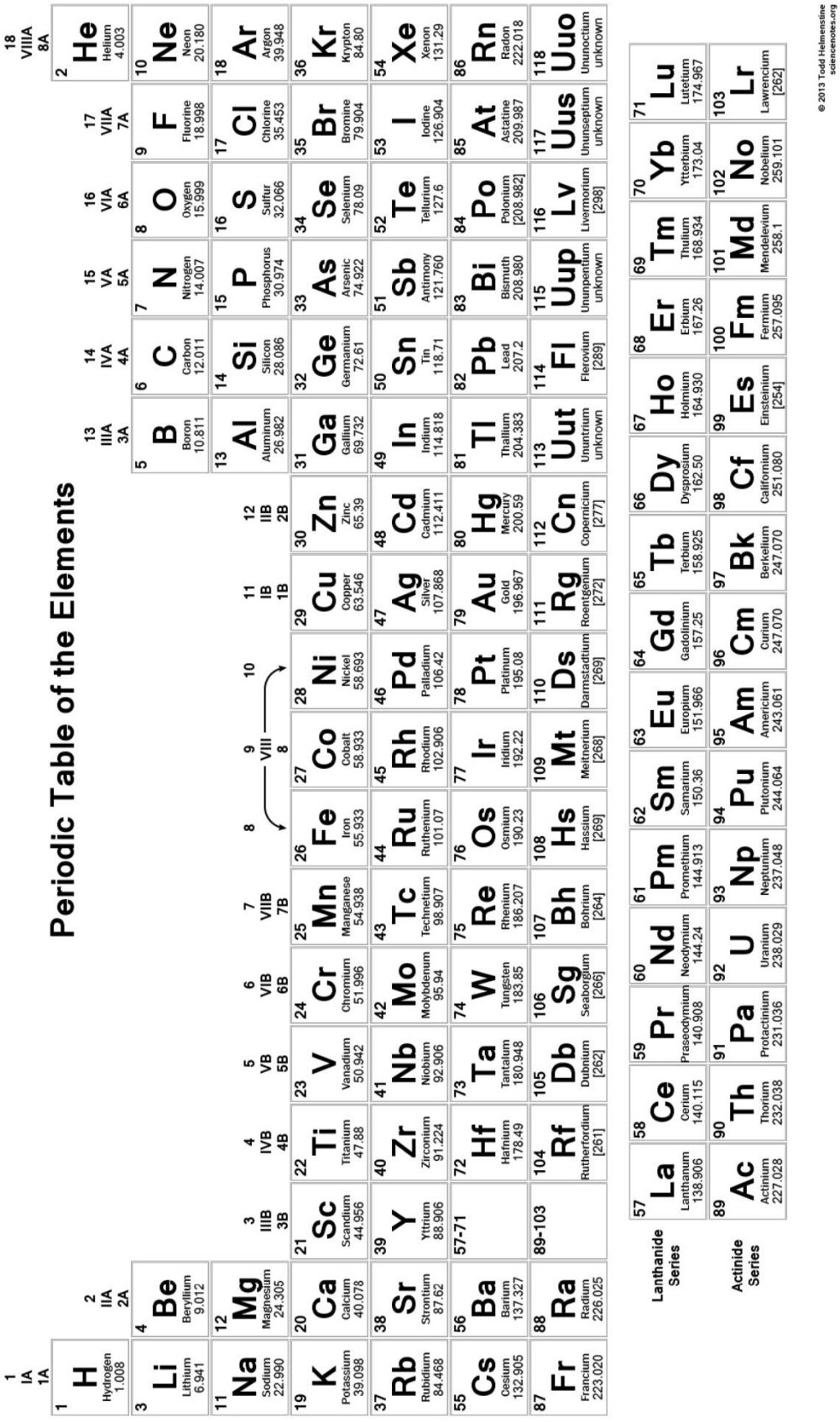
(D) The α carbon is quaternary. No.

Reference: OpenStax Organic Chemistry, sections 19.8 and 22.1: an enamine has nitrogen on a carbon–carbon double bond; tautomers interconvert, usually by a hydrogen shift.

Check: The carbon next to the imine carbon carries hydrogen in (A) and (B), but none in (D).

IAPT answer: not yet released | **Zigyan answer:** (A), (B), (C)

Given in the question paper



ANSWER KEY

NSEC 2026 · ZIGYAN PROVISIONAL KEY

60
QUESTIONS · 216 MARKS

Zigyan's own PROVISIONAL answer key for paper code 31: IAPT had not released its key when this booklet was made, so check these against IAPT's final key. ★ marks an answer given as per Zigyan.

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

★ Answers as per Zigyan

- **Q1** — As per Zigyan: (C); IAPT key not yet released.
- **Q6** — As per Zigyan: no option is correct; IAPT key not yet released.
- **Q9** — As per Zigyan: (A); IAPT key not yet released.
- **Q26** — As per Zigyan: (C); IAPT key not yet released.
- **Q31** — As per Zigyan: (A); IAPT key not yet released.
- **Q34** — As per Zigyan: no option is correct; IAPT key not yet released.
- **Q39** — As per Zigyan: no option is correct; IAPT key not yet released.
- **Q40** — As per Zigyan: no option is correct; IAPT key not yet released.
- **Q43** — As per Zigyan: (A); IAPT key not yet released.
- **Q50** — As per Zigyan: (D); IAPT key not yet released.
- **Q52** — As per Zigyan: (A), (B), (C), (D); IAPT key not yet released.
- **Q55** — As per Zigyan: (A), (C), (D); IAPT key not yet released.
- **Q60** — As per Zigyan: (A), (B), (C); IAPT key not yet released.

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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

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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

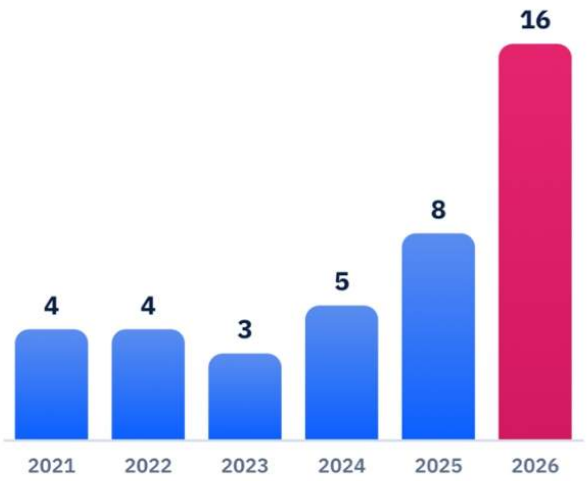
40
JEE Advanced selections in 6 years

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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