

JEE MAIN HYDROCARBONS — PYQS

Max. Marks: 124

Questions: 31

Section A (MCQ) — 27 questions

- Q.1** n-Butane on monochlorination under photochemical condition gives an optically active compound "P". "P" on further chlorination gives dichloro compounds. The number of dichloro compounds obtained (ignore stereoisomers) is :

[JEE Main 2026 (Online) 8th April Evening Shift]

- (1) 3 (2) 4 (3) 5 (4) 6

Scan or tap for the full solution



- Q.2** Given below are two statements :

Statement-I: Methane can be prepared by decarboxylation of sodium ethanoate, Kolbe's electrolysis of sodium acetate and reaction of CH_3MgBr with water.

Statement-II: Methane cannot be prepared from unsaturated hydrocarbons and by Wurtz reaction.

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

[JEE Main 2026 (Online) 6th April Morning Shift]

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

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- Q.3** An optically active alkyl bromide $\text{C}_4\text{H}_9\text{Br}$, reacts with ethanolic KOH to form major compound [A] which reacts with bromine to give compound [B]. Compound [B] reacts with ethanolic KOH and sodamide to give compound [C]. One molecule of water adds to compound [C] on warming with mercuric sulphate and dilute sulphuric acid at 333 K to form compound [D]. The functional group in compound D will be confirmed by :

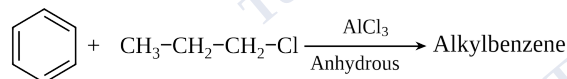
[JEE Main 2026 (Online) 6th April Evening Shift]

- (1) Haloform test (2) Lucas test
 (3) Silver mirror test (4) Benedict test

Scan or tap for the full solution



- Q.4** For the following Friedel Craft's alkylation reaction, which of the statements are correct?



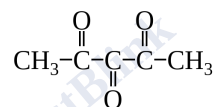
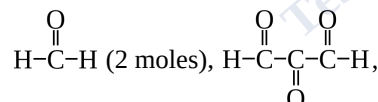
- A. Major product is n-propyl benzene.
 B. iso-propyl carbocation intermediate is also generated.
 C. Multiple substitution is inevitable.
 D. Introducing electron-donating substituent on benzene will not produce any alkyl benzene.
 Choose the correct answer from the options given below : [JEE Main 2026 (Online) 5th April Morning Shift]

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

Scan or tap for the full solution

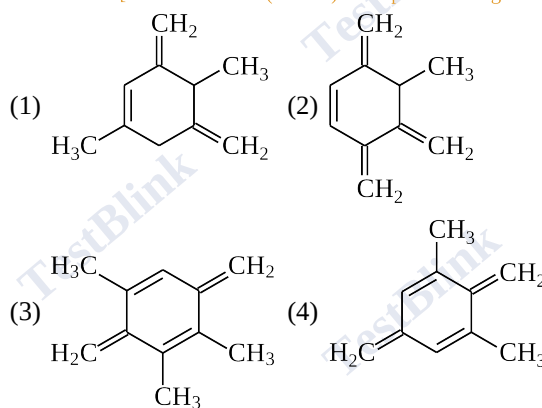


- Q.5** An alkene (X) on ozonolysis followed by reduction gives following products.

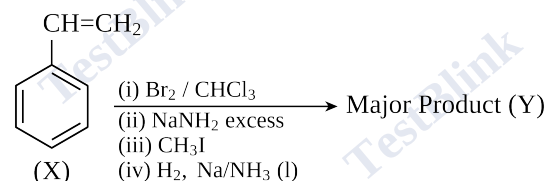


The alkene (X) is :

[JEE Main 2026 (Online) 4th April Morning Shift]



Scan or tap for the full solution

**Q.6**

Compound (X) is subjected to the sequence of reactions as shown above. Molar mass of the major product (Y) formed is _____ g mol^{-1} .

(Given molar mass in g mol^{-1} C : 12, H : 1, O : 16)

[JEE Main 2026 (Online) 4th April Evening Shift]

- (1) 90 (2) 118 (3) 160 (4) 125

Scan or tap for the full solution



Q.7 The compound (X) on

- on heating in the presence of anhydrous AlCl_3 and HCl gas gives 2,4-dimethyl pentane
- aromatization gives toluene and
- cyclisation gives methyl cyclohexane

The correct name of compound (X) is:

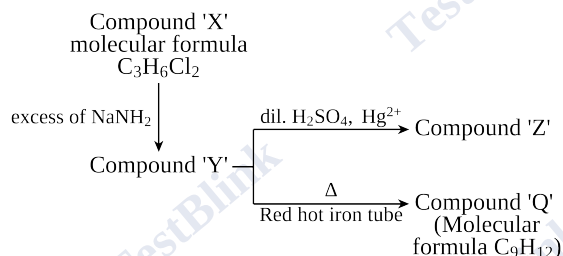
[JEE Main 2026 (Online) 2nd April Evening Shift]

- (1) Hept-2-ene (2) Hept-1,3,5-triene
(3) Heptane (4) Hept-2,4,6-triene

Scan or tap for the full solution



Q.8 Given below are two statements for the following reaction sequence.



Statement-I: Compound 'Z' will give yellow precipitate with NaOI .

Statement-II: Compound 'Q' has two different types of 'H' atoms (aromatic : aliphatic) in the ratio 1:3.

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

[JEE Main 2026 (Online) 28th January Morning Shift]

- Statement-I is true but Statement-II is false
- Both Statement-I and Statement-II are true
- Statement-I is false but Statement-II is true
- Both Statement-I and Statement-II are false

Scan or tap for the full solution



Q.9 $\text{Ph}-\text{CH}=\text{CH}_2 \xrightarrow[\text{HBr}]{(\text{PhCOO})_2}$ Product

Consider the above reaction

- The reaction proceeds through a more stable radical intermediate.
- The role of peroxide is to generate $\text{H}^\cdot$ (Hydrogen radical).
- During this reaction, benzene is formed as a byproduct.
- 1-Bromo-2-phenylethane is formed as the minor product.
- The same reaction in absence of peroxide proceeds via carbocation intermediate.

Identify the correct statements.

Choose the correct answer from the options given below :

[JEE Main 2026 (Online) 28th January Morning Shift]

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

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Q.10 The reactions which produce alcohol as the product are :

- $\text{CH}_4 + \text{O}_2 \xrightarrow{\text{Mo}_2\text{O}_3, \Delta}$
- $2\text{CH}_3\text{CH}_3 + 3\text{O}_2 \xrightarrow{(\text{CH}_3\text{COO})_2\text{Mn}, \Delta}$
- $(\text{CH}_3)_3\text{CH} \xrightarrow{\text{KMnO}_4}$
- $2\text{CH}_4 + \text{O}_2 \xrightarrow{\text{Cu}/523 \text{ K}/100 \text{ atm}}$
- $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_3 \xrightarrow{\text{KMnO}_4/\text{H}^+}$

Choose the **correct** answer from the options given below :

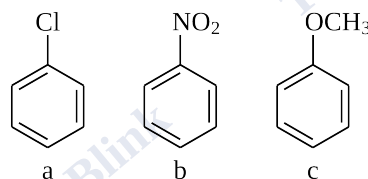
[JEE Main 2026 (Online) 28th January Evening Shift]

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

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Q.11 Consider the following compounds :



Arrange these compounds in the increasing order of reactivity with nitrating mixture.

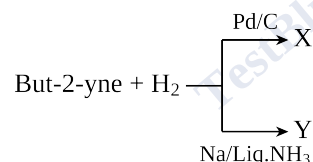
[JEE Main 2026 (Online) 23rd January Morning Shift]

- (1) $c < b < a$ (2) $b < c < a$ (3) $c < a < b$ (4) $b < a < c$

Scan or tap for the full solution



Q.12 But-2-yne and hydrogen (one mole each) are separately treated with (i) Pd/C and (ii) Na/liq. NH_3 to give the products X and Y respectively.



Identify the incorrect statements.

- X and Y are stereoisomers.
- Dipole moment of X is zero.
- Boiling point of X is higher than Y.
- X and Y react with $\text{O}_3/\text{Zn} + \text{H}_2\text{O}$ to give different products.

Choose the correct answer from the options given below :

[JEE Main 2026 (Online) 23rd January Morning Shift]

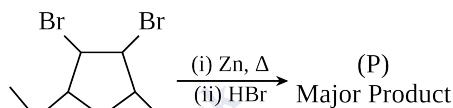
- (1) B and D Only
(3) A and B Only

- (2) A and C Only
(4) B and C Only

Scan or tap for the full solution

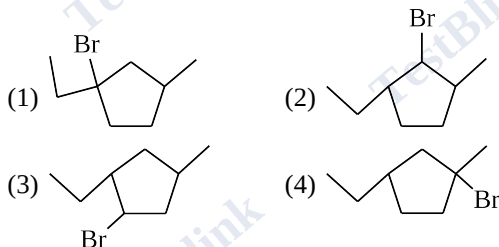


Q.13



Identify (P)

[JEE Main 2026 (Online) 23rd January Evening Shift]



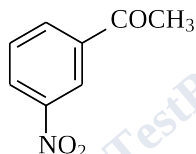
Scan or tap for the full solution



Q.14

Given below are two statements :

Statement-I: Benzene is nitrated to give nitrobenzene, which on further treatment with $\text{CH}_3\text{COCl}/\text{AlCl}_3$ will give



Statement-II: $-\text{NO}_2$ group is a m-directing, and deactivating group.

In the light of the above statements, choose the most appropriate answer from the options given below

[JEE Main 2026 (Online) 22nd January Morning Shift]

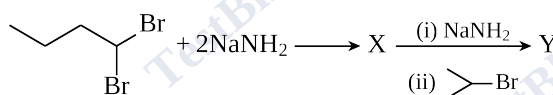
- (1) Statement-I is incorrect but Statement-II is correct
 (2) Both Statement-I and Statement-II are correct
 (3) Both Statement-I and Statement-II are incorrect
 (4) Statement-I is correct but Statement-II is incorrect

Scan or tap for the full solution



Q.15

Consider the following reaction :



The product Y formed is :

[JEE Main 2026 (Online) 22nd January Evening Shift]

- (1) 2-methylhex-3-yne (2) 5-methylhex-2-yne
 (3) Isopropylbut-1-yne (4) 2-methylhex-2-yne

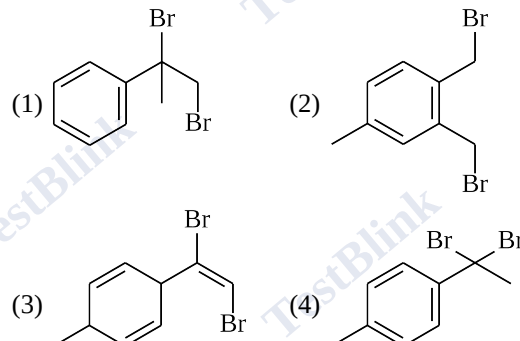
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Q.16

The dibromo compound [P] (molecular formula: $\text{C}_9\text{H}_{10}\text{Br}_2$) when heated with excess sodamide followed by treatment with dilute HCl gives [Q]. On warming [Q] with mercuric sulphate and dilute sulphuric acid yields [R] which gives positive Iodoform test but negative Tollens' test. The compound [P] is :

[JEE Main 2026 (Online) 22nd January Evening Shift]



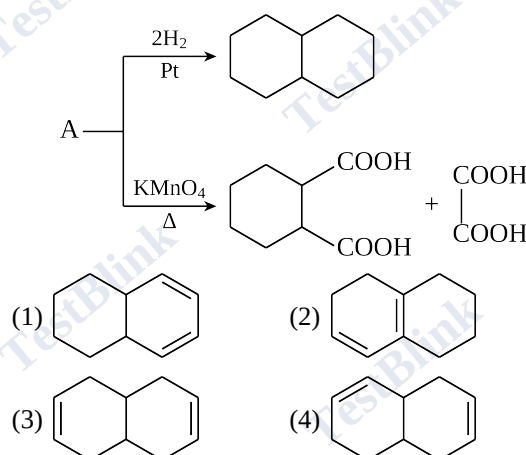
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Q.17

Identify A in the following reaction.

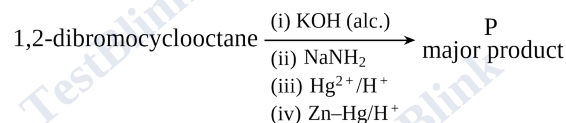
[JEE Main 2026 (Online) 21st January Morning Shift]



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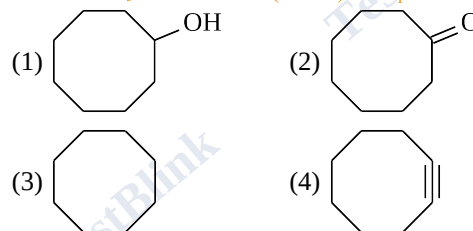


Q.18



'P' is

[JEE Main 2025 (Online) 8th April Evening Shift]



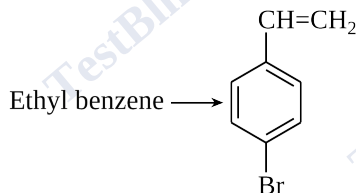
Scan or tap for the full solution



Q.19

Choose the correct set of reagents for the following conversion.

[JEE Main 2025 (Online) 8th April Evening Shift]



- (1) $\text{Cl}_2/\text{anh. AlCl}_3; \text{Br}_2/\text{Fe}; \text{alc. KOH}$
- (2) $\text{Cl}_2/\text{Fe}; \text{Br}_2/\text{anh. AlCl}_3; \text{aq. KOH}$
- (3) $\text{Br}_2/\text{Fe}; \text{Cl}_2, \Delta; \text{alc. KOH}$
- (4) $\text{Br}_2/\text{anh. AlCl}_3; \text{Cl}_2, \Delta; \text{aq. KOH}$

Scan or tap for the full solution



Q.20 Given below are two statements:

Statement-I: Ozonolysis followed by treatment with $\text{Zn}, \text{H}_2\text{O}$ of cis-2-butene gives ethanal.

Statement-II: The product obtained by ozonolysis followed by treatment with $\text{Zn}, \text{H}_2\text{O}$ of 3,6-dimethyloct-4-ene has no chiral carbon atom.

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

[JEE Main 2025 (Online) 7th April Morning Shift]

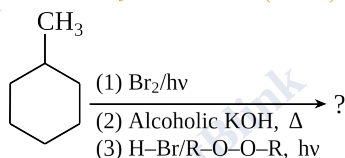
- (1) Statement-I is false but Statement-II is true
- (2) Both Statement-I and Statement-II are false
- (3) Statement-I is true but Statement-II is false
- (4) Both Statement-I and Statement-II are true

Scan or tap for the full solution



Q.21 Predict the major product of the following reaction sequence:

[JEE Main 2025 (Online) 4th April Morning Shift]

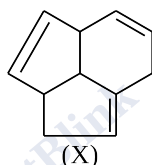


- (1)
- (2)
- (3)
- (4)

Scan or tap for the full solution

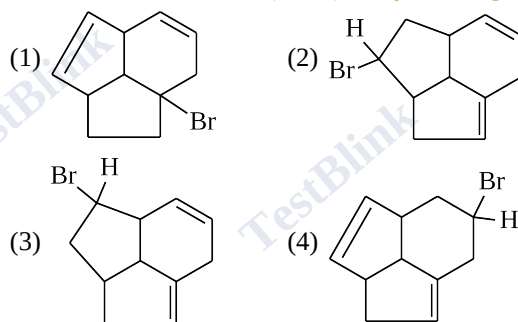


Q.22 Consider the following molecule (X).



The major product formed when the given molecule (X) is treated with HBr (1 eq) is :

[JEE Main 2025 (Online) 4th April Evening Shift]

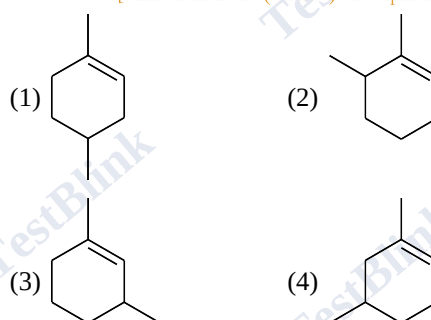


Scan or tap for the full solution



Q.23 Which compound would give 3-methyl-6-oxoheptanal upon ozonolysis?

[JEE Main 2025 (Online) 3rd April Morning Shift]



Scan or tap for the full solution



Q.24 An optically active alkyl halide $\text{C}_4\text{H}_9\text{Br}$ [A] reacts with hot KOH dissolved in ethanol and forms alkene [B] as major product which reacts with bromine to give dibromide [C]. The compound [C] is converted into a gas [D] upon reacting with alcoholic NaNH_2 . During hydration 18 gram of water is added to 1 mole of gas [D] on warming with mercuric sulphate and dilute acid at 333 K to form compound [E]. The IUPAC name of compound [E] is :

[JEE Main 2025 (Online) 2nd April Morning Shift]

- (1) Butan-2-ol
- (2) But-2-yne
- (3) Butan-2-one
- (4) Butan-1-al

Scan or tap for the full solution



Q.25 Given below are two statements:

Statement-I: Neopentane forms only one monosubstituted derivative.

Statement-II: Melting point of neopentane is higher than n-pentane.

In the light of the above statements, choose the most appropriate answer from the options given below:

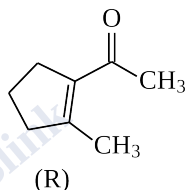
[JEE Main 2025 (Online) 2nd April Evening Shift]

- (1) Statement-I is incorrect but Statement-II is correct
 (2) Both Statement-I and Statement-II are correct
 (3) Statement-I is correct but Statement-II is incorrect
 (4) Both Statement-I and Statement-II are incorrect

Scan or tap for the full solution



- Q.26** A molecule (P) on treatment with acid undergoes rearrangement and gives (Q). (Q) on ozonolysis followed by reflux under alkaline condition gives (R). The structure of (R) is given below.



The structure of (P) is

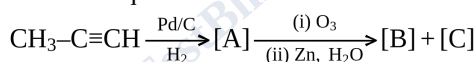
[JEE Main 2025 (Online) 28th January Morning Shift]

- (1)
- (2)
- (3)
- (4)

Scan or tap for the full solution



- Q.27** Identify product [A], [B] and [C] in the following reaction sequence.



[JEE Main 2025 (Online) 28th January Evening Shift]

- (1) [A]: $\text{CH}_3\text{--CH=CH}_2$, [B]: CH_3CHO , [C]: $\text{CH}_3\text{CH}_2\text{OH}$
 (2) [A]: $\text{CH}_3\text{--CH=CH}_2$, [B]: CH_3CHO , [C]: HCHO
 (3) [A]: $\text{CH}_3\text{CH}_2\text{CH}_3$, [B]: CH_3CHO , [C]: HCHO

- (4) [A]: $\text{CH}_2=\text{CH}_2$, [B]: $\text{H}_3\text{C--C(=O)--CH}_3$, [C]: HCHO

Scan or tap for the full solution



Section B (Numerical) — 4 questions

- Q.28** An alkane (Y) requires 8 moles of oxygen for complete combustion and on chlorination with $\text{Cl}_2/h\nu$, (Y) gives only one monochlorinated product (Z). The total number of primary carbon atoms in (Y) is ____.

[JEE Main 2026 (Online) 6th April Evening Shift]

Scan or tap for the full solution



- Q.29** One mole of an alkane (x) requires 8 mole oxygen for complete combustion. Sum of number of carbon and hydrogen atoms in the alkane (x) is ____.

[JEE Main 2026 (Online) 2nd April Morning Shift]

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- Q.30** The cycloalkene (X) on bromination consumes one mole of bromine per mole of (X) and gives the product (Y) in which C:Br ratio is 3:1. The percentage of bromine in the product (Y) is ____ %.

(Given : molar mass in g mol^{-1})

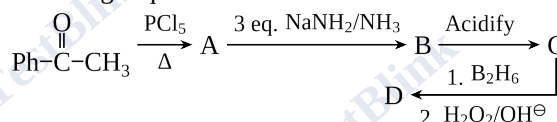
H:1, C:12, O:16, Br:80)

[JEE Main 2026 (Online) 22nd January Morning Shift]

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- Q.31** Identify the structure of the final product (D) in the following sequence of the reactions :



Total number of sp^2 hybridised carbon atoms in product D is ____.

[JEE Main 2025 (Online) 7th April Evening Shift]

Scan or tap for the full solution



ANSWER KEY

Section A (MCQ) — 27 questions

Ques.	1	2	3	4	5	6	7
Ans.	2	4	1	2	4	2	3
Ques.	8	9	10	11	12	13	14
Ans.	2	3	4	4	1	4	1
Ques.	15	16	17	18	19	20	21
Ans.	1	4	1	3	3	3	2
Ques.	22	23	24	25	26	27	
Ans.	1	1	3	2	1, 4	2	

Section B (Numerical) — 4 questions

Ques.	28	29	30	31							
Ans.	4	17	66	7							