

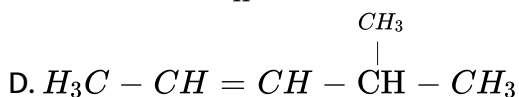
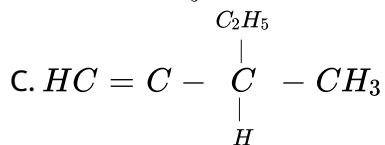
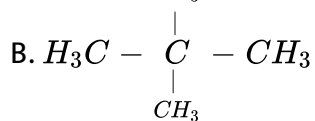
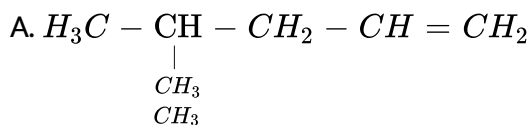
## CHEMISTRY

### BOOKS - PEARSON IIT JEE FOUNDATION

#### Organic Chemistry

#### Example

1. Give IUPAC names for the following



**Answer:**

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2. Molecular formula of a hydrocarbon is  $C_5H_{10}$ . What type of isomerisms are exhibited by it ? Give the structural formula of the isomes .

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3. Write the possible isomes for the following molecular formulae.

(a)  $C_4H_8O$  ( b)  $C_3H_6O_2$  ( c)  $C_5H_{12}O$

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4. Methane is considered as a more environment friendly fuel than petrol. justify.

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5. Two containers A and B are filled with the same amount of chlorine gas. Limited amount of methane is passed into container 'A' and excess of methane into container 'B'. Identify the products formed in A and B. Give reason in support of your answer.

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6. A more hydrogenated oil is less rancid than less hydrogenated oil, Give reasons.

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7. LPG contains butane and propane in major proportions whereas CNG contains methane as the major components justify.

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8. Same fraction of petroleum refining are used as dry cleaning liquids and some fractions are used as lubricating oils, What are the requisite characteristics of those fractions ?

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9. What is the composition of petroleum gas ? Why is it used as a domestic fuel ?

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### Very Short Type Questions

1. Why was organic chemistry considered chemistry of carbon compounds ?

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2. Name the first organic compound synthesised and mention how it was synthesised.

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3. Unsaturated hydrocarbons give their characteristic \_\_\_\_\_ reactions.

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4. Define catenations .What is its special significance with respect to organic chemistry ?

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5. Give general formula for alkanes alkene and alkynes

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6. What are aliphatic hydrocarbons ? How are they classified ?

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7. The structure of isobutane is \_\_\_\_\_

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8. What is primary suffix in the name of the name of an organic compound ?

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9. Why are coal and petroleum called fossil fuels ?

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10. Calcium carbide on hydrolysis forms :

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11. What is meant by destructive distillation ? What are the products of destructive distillation of coal ?

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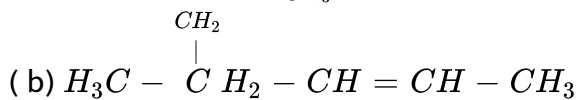
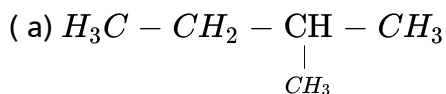
12. What is meant by decarboxylation ? How can methane be prepared by using this reaction ?

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13. Cyclohexane is an example for \_\_\_\_\_ hydrocarbon.

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14. Give the IUPAC names for the following hydrocarbons .



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15. Mention some uses of methane .

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16. Detergents are sodium salts of \_\_\_\_\_

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17. Write the position isomer for butyne .

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18. How is acetylene prepared from calcium carbide? Give equation.

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19. What is the chemical reaction associated with the hydrogenation of oils?

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20. What is a soap and how does it differ from a detergent?

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21. Which of the following is added to soap for transparency?

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22. \_\_\_\_\_ end of soap dissolves in soft water .

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23. What are food preservatives ?

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### Short Answer Type Question

1. What meant by homologous series ? What are its characteristics?

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2. By giving equations explain the Decolourisation of bromine water by unsaturated hydrocarbons

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3. Explain hydrogenation of ethene and ethyne

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4. Give the structural formulae of the first four members of homologous series of alkanes, alkenes and alkynes.

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5. Explain isomerism in alkanes.

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6. How can CNG be a better alternative to petrol?

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7. Explain the advantages of detergents over soaps .

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## Level 1

1. Pentane has three chain isomers .

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2. Methane can be prepared by the decarboxylation of sodium methanoate.

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3. Closed chain hydrocarbons which do not resemble aliphatic hydrocarbons in their chemical behaviour are called \_\_\_\_\_





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4. IUPAC name of saturated straight chain hydrocarbon with 10 carbon atoms is \_\_\_\_\_



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5. 1-butene and 2-butene are \_\_\_\_\_ isomers.



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6. Ethane can be prepared by decarboxylation of \_\_\_\_\_



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7. The method involved in refining of petroleum is \_\_\_\_\_



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8. Hexane on cracking gives \_\_\_\_\_ and \_\_\_\_\_

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9. The best quality caoal with respect to percentage of carbon is \_\_\_\_\_

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10. Match the entries in Column A with the appropriate ones in Column B.

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11. Identify the compound which does not belong to the same homologous series.

- A. propane
- B. butyne
- C. ethyne
- D. netyne

**Answer:**

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12. The IUPAC name of  $CH_3 - \underset{\substack{| \\ C_3H_7}}{CH} - \underset{\substack{| \\ C_2H_6}}{CH} - \underset{\substack{| \\ C_2H_5}}{CH} - CH_3$

- A. 3,4 dimethyl-4-ethyl Octane
- B. 4-ethyl-3,5-dimethyl Octane
- C. 2,3-dimethyl -4-Propyl Pentane

D. 5-ethyl-3-hexyne

**Answer: A::B::C::D**

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**13.** The products of incomplete combustion of methane are

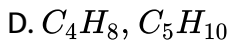
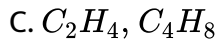
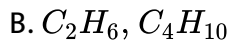
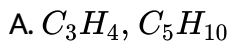
- A. Carbon and hydrogen
- B. carbon monoxide and water.
- C. carbon dioxide and water
- D. carbon monoxide and hydrogen

**Answer:**

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**14.** Which of the following pairs belong to the same homologous series ?

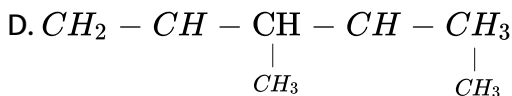
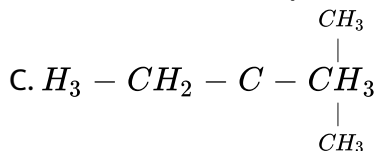
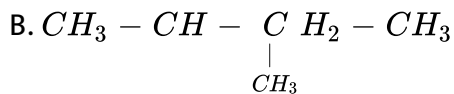
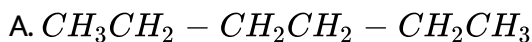




Answer:

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15. Which among the following isomers of hexane has the highest boiling points ?



**Answer:**

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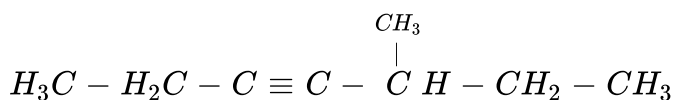
16. The straight chain isomer of  $C_4H_{10}$  is the major component in \_\_\_\_\_

- A. biogas
- B. petroleum gas
- C. natural gas
- D. coal gas

**Answer:**

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17. The IUPAC name of the following compound is \_\_\_\_\_



A. 2-ethyl-3-hexyne

B. 3-methyl

C. 5-methyl-3-heptyne

D. 5-methyl-3-hexyne

**Answer:**



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**18.** The hydrocarbon obtained on heating calcium oxide with coke in an electric furnace which is followed by hydrolysis is

A.  $C_2H_4$

B.  $C_2H_6$

C.  $CH_4$

D.  $C_2H_2$

**Answer:**

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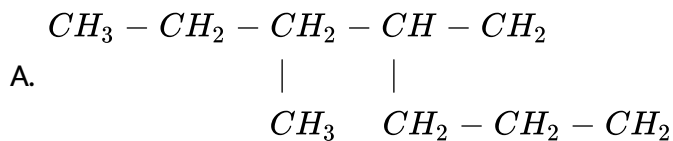
19. Which of the following can be the best substitute for petrol as an automobile fuel ?

- A. petrol
- B. biogas
- C. kerosene
- D. CNG

**Answer:**

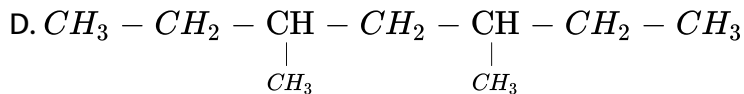
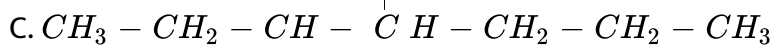
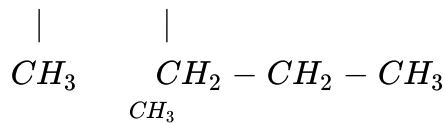
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20. Structural formula of 3-4 dimethyl heptane is





B.



**Answer:**



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21. The primary suffix for a compound with general formula  $C_nH_{2n-2}$  is

A. -ane

B. -yne

C. -ene

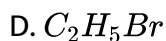
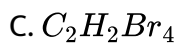
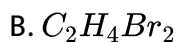
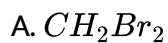
D. -enol

**Answer:**



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22. A compound on hydrogenation yields ethane by consuming 2 molecules of hydrogen. The same compound on being treated with excess of bromine water gives

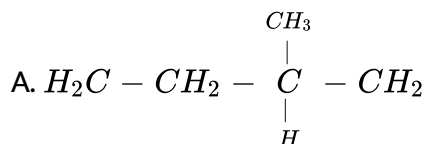


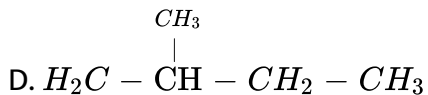
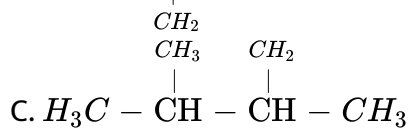
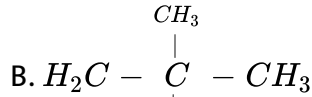
**Answer:**



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23. Which of the structures does not correspond of the chain isomer of pentane ?

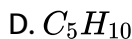
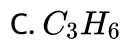




**Answer:**

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**24.** Which of the following is not an alkane ?



**Answer:**

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25. IUPAC name of a hydrocarbon is given as 3,5-Dimethyl-2-hexene. Identify the correct sequence of steps to draw its structural formula .

( 1) numbering of carbon chain

( 2) locating the position of double bond ( 3)

writing long chain corresponding to hexene (4)

locating the methyl groups (prefixes ) at the respective positions

( 5) placing hydrogens to satisfy tetravalency of carbon

A. 13254

B. 32145

C. 13245

D. 31245

**Answer:**



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26. Identity the correct sequence of fraction obtained when petroleum is subjected to fractional distillation .

lubricating oil

petrol

petroleum ether

diesel oil

A. 2341

B. 3241

C. 3214

D. 2431

**Answer:**



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27. 1 mole of ethyne on complete combustion gives

- A. 2 moles of carbon monoxide half -mole of water
- B. 4 moles of carbon dioxide and 1 mole of water
- C. 2 moles of carbon dioxide and 1 mole of water
- D. 2 moles of carbon dioxide and 2 moles water

**Answer:**

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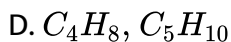
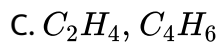
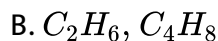
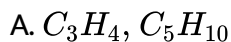
**28.** Which of the following molecular formulae represent a saturated hydrocarbon ?

- A.  $C_4H_4$ ,  $C_5H_{10}$
- B.  $C_2H_6$ ,  $C_4H_8$
- C.  $C_2H_4$ ,  $C_4H_6$
- D.  $C_4H_8$ ,  $C_5H_{10}$

**Answer:**

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29. Which of the following pairs belong to the same homologous series ?



**Answer:**

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30. The number of bromine molecules required for the Decolourisation of 1 mole of ethene and ethyne are respectively

A. one and three

B. two and three

C. one and two

D. two and four

**Answer:**



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**31. Polyethene**

A. polyenthenene

B. polyenthyne

C. benzene

D. polyvinyl chloride

**Answer:**



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32. The bromination of acetylene gives \_\_\_\_\_ as the final product .

- A. dibromoethane
- B. tetrabromoethane
- C. tetrabromoethane
- D. dibromoethane

**Answer:**



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33. Which of the following is an identification test for unsaturation in an organic compound ?

- A. addition in an organic compound ?
- B. addition of ozone
- C. addition of bromine
- D. addition of oxygen

**Answer:**



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**34.** The hydrocarbon used for welding purpose is

A. ethane

B. ethyne

C. ethene

D. benzene

**Answer:**



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**35.** Coal gas mainly consists of

A. methane  $CO, H_2$

B. Propane  $CO_2H_2$

C. methane  $COH_2O$

D. methane  $CO_2, H_2$

**Answer:**

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**36.** The reagent  $NaOH + CaO$  is used for

A. carbonxylation

B. dehydrogenation

C. hydrogenation

D. decarboxylation

**Answer:**

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37. Degradation of organic wastes in the absence of air gives

- A. methane ,hydrogen neitrogen and  $CO_2$
- B. methane carbon monoxide and hydrogen
- C. methane corbon monoxide and hydrogen
- D. methane  $SO_2$  and hydrogen

**Answer:**



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38. Sulphur compounds in crude oil can be removed by using

- A. copper oxide
- B. alumia
- C. iron oxide
- D. magneisum oxide

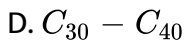
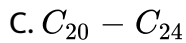
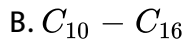
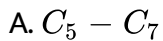


**Answer:**



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**39.** Petroleum fraction of which of the following compositions can be used as a lubricating oil ?



**Answer:**

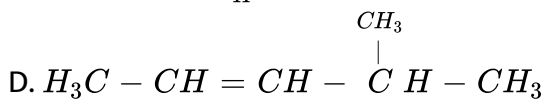
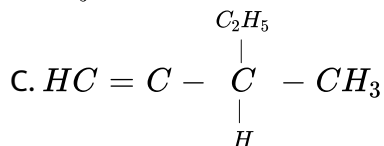
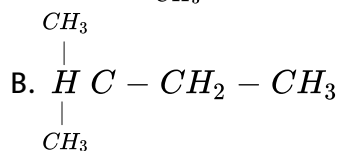
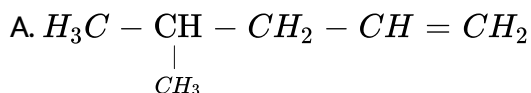


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1. Write all possible chain isomers for pentene and hexyne .

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2. Give IUPAC names for the following



**Answer:**

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3. A hydrocarbon 'X' can have only three chain isomers and one of the isomers consists of same alkyl groups attached to central carbon atom with single bonds. Identify the preceding and succeeding homologue of 'X'.

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4. Explain the role of natural gas in the preparation of ammonium fertilisers.

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5. A straight chain saturated hydrocarbon with vapour density 43 on heating in absence of air gives X and Y. On treatment with bromine water gives Z. Identify X, Y and Z.

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6. The percentage composition of a hydrocarbon 'X' is 90 per cent carbon and 10 per cent hydrogen respectively .Write the structural formulè of two successive and preceding homologues of X

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7. Why are some coal deposits associated with large amounts of sulphur ?

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8. Give the structural formulae of four compounds of the homologous series succeeding the one having molecular formula  $C_3H_4$ . Also give their molecular weights.

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9. Compound X can be prepared by passing a gas Y through a metal tube which is at very high temperature. Y on treatment with 2 g of hydrogen gas in presence of nickel gives a compound Z. Z can also be prepared by treating ethyl alcohol with 'ic' acid of sulphur at  $170^{\circ}\text{C}$ . Y can also be prepared by hydrolysis of 'A'. Identify X, Y, Z and A and write all the balanced chemical equations.

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10. Two containers A and B are filled with the same amount of chlorine gas. Limited amount of methane is passed into container 'A' and excess of methane into container 'B'. Identify the products formed in A and B. Give a reason in support of your answer.

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11. The vapour density of an unsaturated aliphatic hydrocarbon 'X' is 34. Write the structural formula of X and its succeeding homologue Y Also

write the position isomers of X and Y.

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12. How does the burning of coal lead to air pollution as well as water pollution ?

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13. At the end of the process of preparation of soap, common salt is added. Explain the role of common salt in the process.

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14. A compound X on hydrolysis produces a gas Y which on hydrogenation produces a gas Z which can decolourise bromine water forming a compound with molecular weight 188 a.m.u Identify X, Y and Z.

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15. Two students Rishi and Khushi were preparing for International Chemistry Olympiad. They had come across a question. In that, a table of boiling point of members of homologous series of alkanes was given and also. Predict the trend observed. What reason can be attributed to the above trend?

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16. In an organic chemistry laboratory a scientist subjected a hydrocarbon to combustion. The products occupied a volume ratio of 4:3 under the same conditions of temperature and pressure. The scientist drew the possible structures of the hydrocarbon. She then subjected the compound to ozonolysis to identify the exact structure. Predict the products formed when the compound is treated with bromine water.

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17. A research scholar, during his experiment came across an aliphatic hydrocarbon 'X'. In the process of identification of 'X' he passed 'X' through alkaline  $KMnO_4$ . The solution became colourless. He found out the vapour density of the compound to be 34. Identify X and its succeeding homologue 'Y' and also position isomers of straight chain isomers.

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18. The molar ratio of carbon dioxide and water produced by the combustion of one mole of an aliphatic hydrocarbon 'X' is 5 : 4. Write the possible structures of X. What happens when 'X' is passed through bromine water?

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19. The government had a proposal for establishing a thermal power plant where coal would be the source of power. A panel has been sent to the



site to examine the feasibility of the proposal. The farmers in that area panicky that their soils may become less fertile and may even become unfit for cultivation. However, the panel members convinced them by giving an assurance that the best quality coal will be used in the plant to minimize the effect. Can you explain the reason why burning of coal makes the soil lose fertility and how quality of coal has a bearing on the above? What other effects does burning of coal have on the environment?



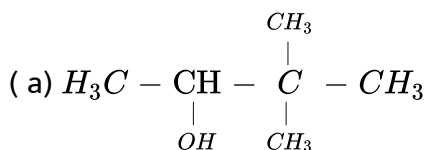
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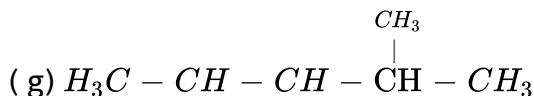
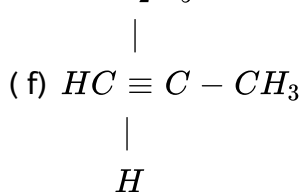
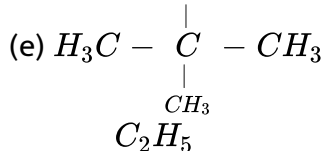
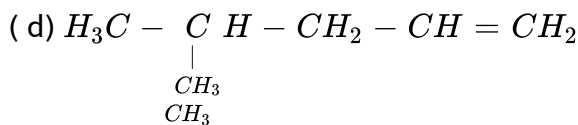
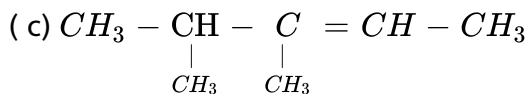
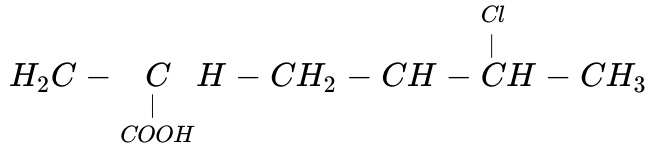
20. CNG is a better automobile fuel when compared to petrol and diesel. Give reasons.



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21. Write IUPAC names for the following structures :





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22. X' is an alicyclic hydrocarbon . with the moleclar formula  $C_4H_8$ . Y is the corrcsponding aliphatic compound. Give all the possible isomers of y . and their IUPAC names. Identify the products of bro-mination. When Y is treated with hydrogen what are the products formed? How are these products separated from the nuxture?

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**23.** Coke is obtained by the destructive distillation of coal .But, coke is considered to be the purer form of carbon than coal Give a reason.

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**24.** Give reasons for the following: (a) Petroleum deposits are always associated with a layer of natural gas

The volatile products obtained by distillation of coal are passed through water.

( c ) A mixture of acetylene and oxygen is used ofr welding metals.

( d ) Anthratic coal is of better quality than bituminous coal.

( e ) It is possible to perpare an alkane with one car-bon atom from a carboxylic acid with two carbon atoms.

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1. Chloromethane has a certain value of dipole moment even though the dipole moment value of methane is zero. Justify.

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2. Coal has a major role to play in the production of steel. Explain the role of coal.

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3. Petrol used in automobiles obtained by fractional distillation is less preferred over the petrol obtained by cracking. Justify.

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4. Why do detergents cause pollution? How do newly developed biodegradable detergents differ from them?

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5. Fluorination of methane is explosive. How do you account for this? How can fluorination of methane be carried out?

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6. Can kerosine be used as a substitute for petrol in autominiles ? Give reasons in supoport of your answer.

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7. Why iodination of alkanes is carried out in the presence of oxidizing agents?





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8. Why are shaving creams and shampoos softer than soap?



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9. The same coal deposit is found to contain variable composition of coal!

Justify.



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