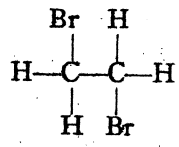
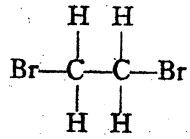
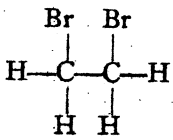
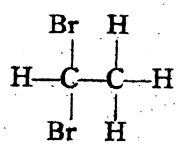
1. Ethane is a member of the hydrocarbon series with the general formula
   (1) $C_nH_{2n+2}$ (3) $C_nH_{2n-n}$
   (2) $C_nH_{2n}$ (4) $C_nH_{2n-6}$

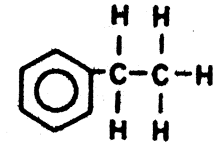
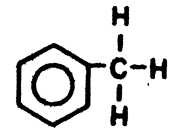
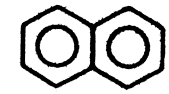
2. In the alkane series, each molecule contains
   (1) only one double bond (3) one triple bond
   (2) two double bonds (4) all single bonds

3. Which molecular formula can be represented by the structural formula shown below?

   (1) $C_6H_6$ (3) $C_6H_{12}$
   (2) $C_6H_{10}$ (4) $C_6H_{14}$

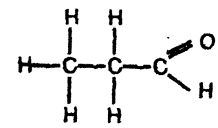
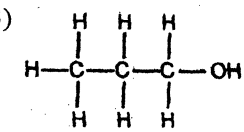
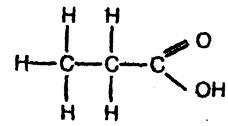
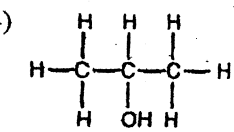
4. In a given homologous series of hydrocarbons, the boiling point generally increases as the size of the molecules increases. The best explanation for this statement is that in larger organic molecules
   (1) the number of covalent bonds per molecule is greater
   (2) the molecules are more symmetrical
   (3) more hydrogen bonding is possible
   (4) there are greater intermolecular forces

5. What is the correct formula of 1,1-dibromoethane?
   (1) 
   (3) 
   (2) 
   (4) 

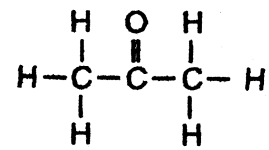
6. Which of the following represents toluene?
   (1) 
   (3) 
   (2) 
   (4) 

7. As the number of carbon atoms in each successive member of a homologous hydrocarbon series increases, the number of possible isomers
   (1) decreases (3) remains the same
   (2) increases

8. Which pair of names refers to the same compound?
   (1) ethyne and acetylene (3) ethane and acetylene
   (2) ethyne and ethene (4) ethane and ethene

9. Which structural formula represents a primary alcohol?
   (1) 
   (3) 
   (2) 
   (4) 

10. What is the name of the compound with the following formula?



    (1) propanone (3) propanal
    (2) propanol (4) propanoic acid

11. Which is an isomer of $CH_3CH_2CH_2COOH$?
    (1) $CH_3CH_2OCH_2CH_3$ (3) $CH_3CH_2CH_2CH_2OH$
    (2) $CH_3CH_2CH_2OCH_3$ (4) $CH_3COOCH_2CH_3$

12. Which compound is a ketone?
    (1) $CH_3OH$ (3) $CH_3COOH$
    (2) $CH_3COCH_3$ (4) $CH_3COOCH_3$

13. Which molecule contains a triple covalent bond between adjacent carbon atoms?
(1) $C_2H_4$ (3) $C_3H_6$
(2) $C_2H_2$ (4) $C_3H_8$

14. As the number of carbon atoms in each successive member of a homologous hydrocarbon series increases, the number of possible isomers
(1) decreases (3) remains the same
(2) increases

15. The compound $CH_3CH_2COOCH_3$ is an example of
(1) an ester (3) an acid
(2) an alcohol (4) a polymer

16. An atom of which element can bond covalently with four other identical atoms?
(1) lithium (3) fluorine
(2) oxygen (4) carbon

17. The class of organic compounds to which $C_3H_5(OH)_3$ belongs is called
(1) bases (3) alcohols
(2) acids (4) hydrocarbons

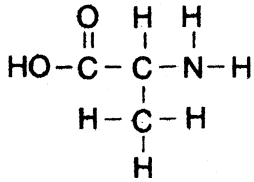
18. Which compound is an ester?
(1) $CH_3OH$ (3) $CH_3OCH_3$
(2) $CH_3COOH$ (4) $CH_3COOCH_3$

19. A general characteristic of organic compounds is that they all
(1) react vigorously
(2) dissolve in water
(3) are strong electrolytes
(4) melt at relatively low temperatures

20. What is the total number of hydroxyl groups contained in one molecule of 1,2-ethanediol?
(1) 1 (3) 3
(2) 2 (4) 4

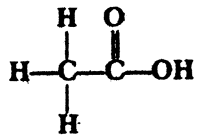
21. Which is the common name for the organic compound whose IUPAC name is methanal?
(1) formaldehyde (3) formic acid
(2) acetaldehyde (4) acetic acid

22. The molecule below belongs to which class of compounds?

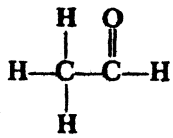


(1) alcohol (3) aldehyde
(2) ester (4) amino acid

23. Which structural formula represents an aldehyde?
(1)



(3)



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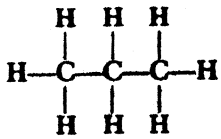

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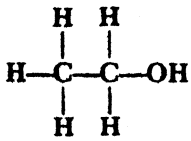


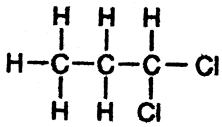
24. The total number of covalent bonds in a molecule of $C_3H_8$ is
(1) 11 (3) 3
(2) 10 (4) 8

25. Which organic compound is classified as an acid?
(1) $CH_3CH_2COOH$ (3) $C_{12}H_{22}O_{11}$
(2) $CH_3CH_2OH$ (4) $C_6H_{12}O_6$

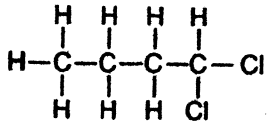
26. Which of the following compounds has the highest normal boiling point?
(1) $C_2H_6$ (3) $C_4H_{10}$
(2) $C_3H_8$ (4) $C_5H_{12}$

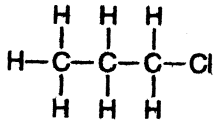
27. Which organic compound is saturated?
(1) ethene (3) propene
(2) ethyne (4) propane

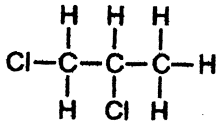
28. Given the compound:

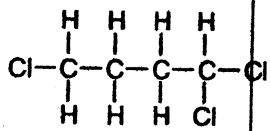


Which structural formula represents an isomer?

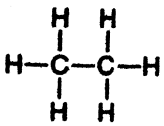
(1) 

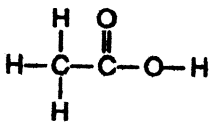
(3) 

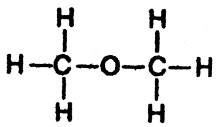
(2) 

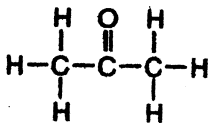
(4) 

29. Which organic compound will dissolve in water to produce a solution that will turn blue litmus red?

(1) 

(3) 

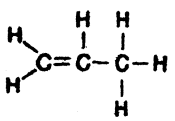
(2) 

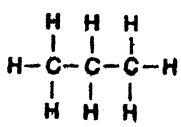
(4) 

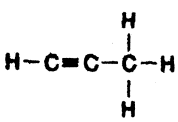
30. Which equation represents an esterification reaction?

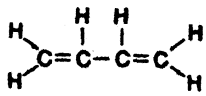
(1) $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$
(2) $C_5H_{10} + H_2 \rightarrow C_5H_{12}$
(3) $C_3H_8 + Cl_2 \rightarrow C_3H_7Cl + HCl$
(4) $HCOOH + CH_3OH \rightarrow HCOOCH_3 + HOH$

31. Which structural formula represents a saturated compound?

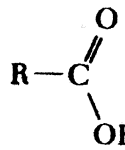
(1) 

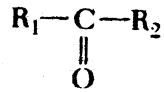
(3) 

(2) 

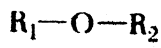
(4) 

32. Which general formula represents a ketone?

(1) 

(3) 

(2) 

(4) 

33. What is the name of the process that begins with the joining of monomer molecules?

(1) fermentation
(2) polymerization
(3) esterification
(4) hydrogenation

34. In general, which property do organic compounds share?

(1) high melting point
(2) high electrical conductivity
(3) readily soluble in water
(4) slow reaction rate

35. In which group could the hydrocarbons all belong to the same alkene series?

(1) $C_2H_2$, $C_2H_4$, $C_2H_6$
(2) $C_2H_2$, $C_2H_4$, $C_4H_8$
(3) $C_2H_4$, $C_2H_6$, $C_3H_6$
(4) $C_2H_4$, $C_3H_6$, $C_4H_8$

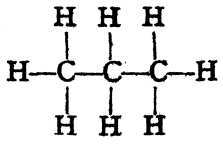
36. Which compound is an isomer of $CH_3OCH_3$?

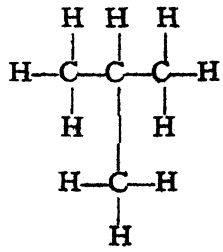
(1) $CH_3COOH$
(2) $CH_3CHO$
(3) $C_6H_5OH$
(4) $C_2H_5OH$

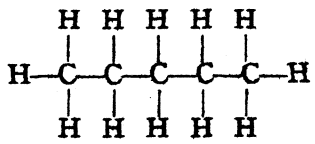
37. Which pair of compounds are isomers?

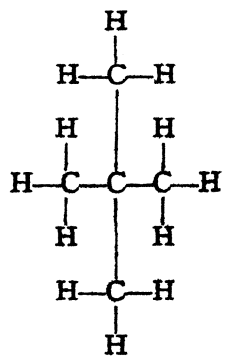
(1) $C_6H_6$ and $C_6H_{12}$
(2) $C_2H_4$ and $C_2H_6$
(3) $CH_3CH_2OH$ and $CH_3COOH$
(4) $CH_3CH_2OH$ and $CH_3OCH_3$

38. Which is an isomer of *n*-butane?

(1) 

(2) 

(3) 

(4) 

39. For simplicity, the structure of benzene is often represented as

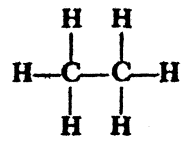
(1) 

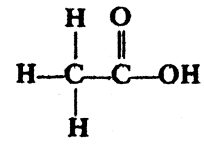
(3) 

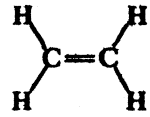
(2) 

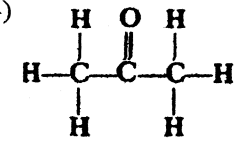
(4) 

40. Which formula represents an unsaturated hydrocarbon?

(1) 

(3) 

(2) 

(4) 

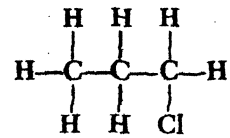
41. What type of monohydroxy alcohol is 2-propanol?

(1) primary
(2) secondary
(3) tertiary
(4) dihydroxy

42. Which equation represents fermentation?

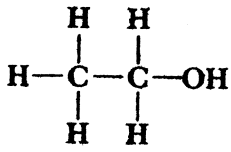
(1) $C_2H_6 + Cl_2 \rightarrow C_2H_6Cl + HCl$
(2) $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$
(3) $CH_3COOH + CH_3OH \rightarrow CH_3COOCH_3 + H_2O$
(4) $nC_2H_4 \rightarrow (C_2H_4)n$

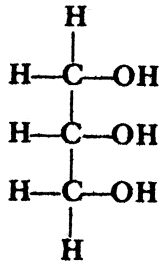
43. What is the correct I.U.C. name of the following compound?

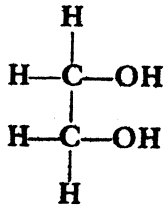


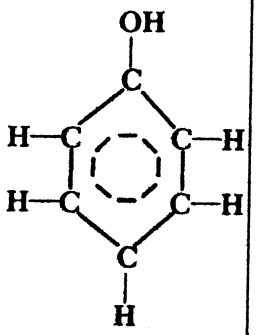
(1) ethane
(2) propane
(3) 3-chloropropane
(4) 1-chloropropane

44. Which structural formula represents a dihydroxy alcohol?

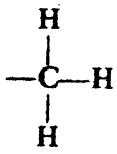
(1) 

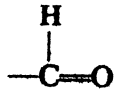
(3) 

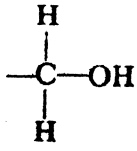
(2) 

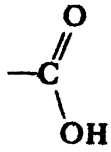
(4) 

45. Which functional group is found in all organic acids?

(1) 

(3) 

(2) 

(4) 

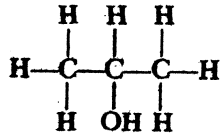
46. If a hydrocarbon molecule contains a triple bond, its IUPAC name ends in

(1) "-ane"
(2) "-ene"
(3) "-one"
(4) "-yne"

47. What is the geometric shape of a methane molecule?

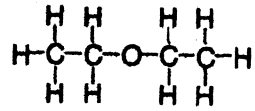
(1) triangular
(2) rectangular
(3) octahedral
(4) tetrahedral

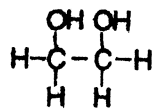
48. A compound with the structural formula below should be classified as an

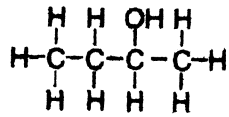


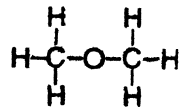
(1) alcohol
(2) acid
(3) alkane
(4) alkene

49. Which structural formula represents diethyl ether?

(1) 

(3) 

(2) 

(4) 

50. The IUPAC name of an aldehyde has the ending

(1) -ol
(2) -al
(3) -oate
(4) -oic