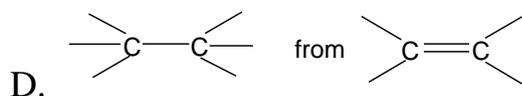
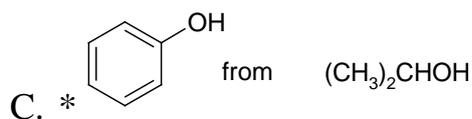
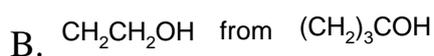
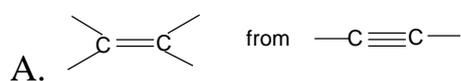


## CHM 112 PAST QUESTION

1. 0.265 g of an organic compound produced on evaporation  $102 \text{ cm}^3$  of vapour at 373 K and 775 mmHg. Percentage composition of the constituents elements are 92.24 % C and 7.76 % H. The molecular mass and molecular formula of the compound are:

- A. 78 g and  $\text{C}_2\text{H}_4$
- B. \*78 g and  $\text{C}_6\text{H}_6$
- C. 80 g and  $\text{C}_5\text{H}_5$
- D. 80 g and  $\text{C}_4\text{H}_8$

2. Solubility of pure organic isolate in sodium hydroxide solution, followed by reprecipitation with carbon (IV) oxide readily distinguishes



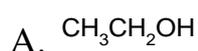
3. The geometry of organic molecule formed with  $\text{SP}$ ,  $\text{SP}^2$  and  $\text{SP}^3$  hybrid orbitals respectively are

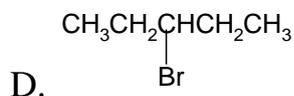
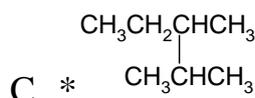
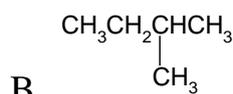
- A. Triangular, tetrahedral and linear
- B. Linear, tetrahedral and triangular
- C. Pyramidal, linear and tetrahedral
- D. \*Linear, triangular and tetrahedral

4. One of the following does NOT describe a carbon bonded to four different atoms or groups of atoms

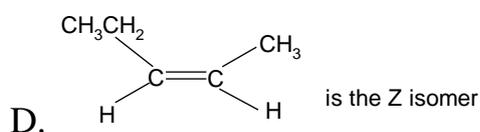
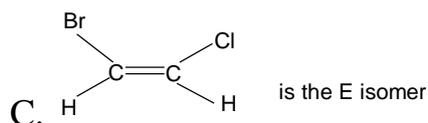
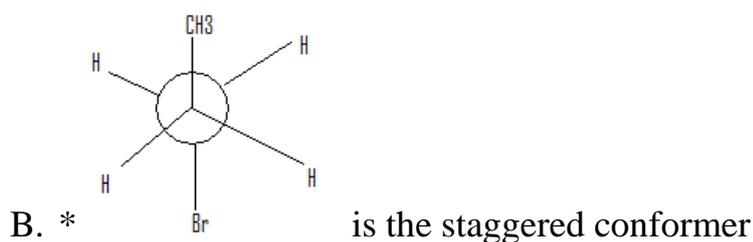
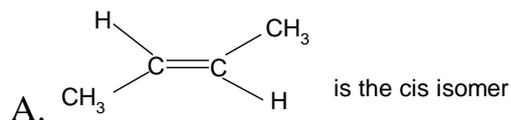
- A. \*Stereochemistry
- B. Stereogenic centre
- C. Asymmetric centre
- D. Chirality center

5. Which of the following compounds can exist as a pair of enantiomers?





6. Which of the following is correct?



7. On analysis of 3.4 mg of an organic compound, 8.03 g of  $\text{CO}_2$  and 3.34 g of  $\text{H}_2\text{O}$  were obtained. The percentage composition of carbon and hydrogen in the compound are..... respectively

- A. 5.86 % and 10.05 %
- B. 42.80 % and 9.05 %
- C. \*61.86 % and 10.48 %
- D. 62.48 % and 9.05 %

8. A sample of organic compound yielded 61.86 % carbon and 10.48 % Hydrogen, the empirical formula of the compound is

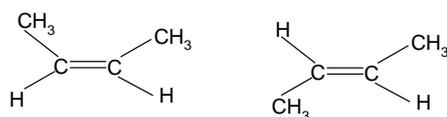
- A.  $\text{CH}_3\text{O}_6$
- B.  $\text{C}_3\text{HO}_6$
- C. \* $\text{C}_3\text{H}_6\text{O}$
- D.  $\text{C}_6\text{H}_{12}\text{O}_2$

9. A compound that rotates the plane of polarized light is said to be

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- A. Dextrorotatory
- B. Levorotatory
- C. \*Optically active
- D. Chiral compound

10. The following compounds  are said to be ..... isomers

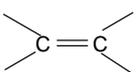
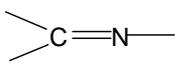
- A. \*Geometrical
  - B. Conformational
  - C. Configurational
  - D. Translational
11. 15 ml of a gaseous hydrocarbon was exploded with excess oxygen. On cooling the reduction in volume was 45 ml. If the vapour density of the hydrocarbon is 22, what is the molecular formula of the hydrocarbon?
- A. C<sub>4</sub>H<sub>8</sub>
  - B. \*C<sub>3</sub>H<sub>8</sub>
  - C. C<sub>2</sub>H<sub>6</sub>
  - D. C<sub>4</sub>H<sub>10</sub>
12. Sodium fusion filtrate that gives white precipitate when treated with acidic silver (I) nitrate solution indicate the presence of ..... in an organic isolate
- A. \*Chlorine
  - B. Sulphur
  - C. Bromine
  - D. Iodine
13. Stereoisomers can be defined as the compound that have: the same molecular formula
- A. and the same sequence of covalently bonded atoms
  - B. and spatial orientation but different sequence of covalently bonded atoms
  - C. \*and the same sequence of covalently bonded atoms but different spatial orientation of atoms
  - D. but different structural formula

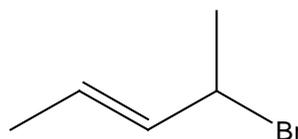
14. Sodium fusion filtrates that gives black precipitate with acidify lead acetate and pale yellow precipitate when treated with acidify  $\text{AgNO}_3$  indicate the presence of ..... in an organic isolate respectively.
- oxygen and chlorine
  - sulphur and bromine
  - iodine and sulphur
  - \*sulphur and iodine
15. The combustion of 0.2137 g of an organic compound gave 0.4862 g  $\text{CO}_2$  and 0.1938 g  $\text{H}_2\text{O}$ . The percentage composition of the constituent elements and the empirical formula of the compound is
- C = 62.04; H = 10.08;  $\text{C}_3\text{H}_6\text{O}$
  - C = 62.04; H = 10.04; O = 27.88;  $\text{C}_2\text{H}_3\text{O}$
  - \*C = 62.04; H = 10.04; O = 27.88;  $\text{C}_3\text{H}_6\text{O}$
  - C = 10.08; H = 27.88;  $\text{C}_2\text{H}_4$
16. The empirical formula of an organic substance was found to be  $\text{C}_3\text{H}_6\text{O}$ . When 0.152 g of the substance was dissolved in 25 g of water it produces a depression of  $0.19^\circ\text{C}$  in freezing point of water. If the molecular depression constant is  $18.5^\circ\text{C}$  for 100 g of water, what is the molecular formula of the substance?
- \* $\text{C}_3\text{H}_6\text{O}$
  - $\text{C}_6\text{H}_{12}\text{O}_6$
  - $\text{C}_4\text{H}_8$
  - $\text{C}_4\text{H}_6\text{O}_2$
17. Alkyl cyanide and alkyl isocyanide are
- \*Tautomers
  - Metamers
  - Functional isomers
  - Geometrical isomers
18. Various compounds corresponding to the molecular formula  $\text{C}_4\text{H}_{10}$  are
- functional isomers
  - \*chain isomers
  - position isomers
  - tautomeras

19. Which of the following molecules can exhibit geometrical isomerism?

- A.  $\text{CH}_3\text{CH}=\text{CH}_2$
- B.  $*\text{CH}_3\text{CH}=\text{CHCH}_3$
- C.  $(\text{CH}_3)_2\text{C}=\text{CH}_2$
- D.  $\text{CH}_3\text{CH}=\text{C}(\text{CH}_3)$

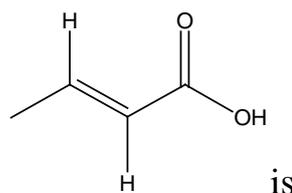
20. Geometrical isomer can be exhibited by compounds containing

- A. 
- B.  $\text{—N}=\text{N—}$
- C. 
- D. \*All of the above



21. How many stereoisomers are possible for 4 - bromopentan - 2 - ene

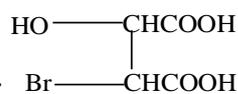
- A. 2 geometrical isomers
- B. 2 optical isomers
- C. 2 geometrical and 1 optical isomers
- D. \*2 geometrical and 2 optical isomers



22. The configuration of the following compound

- A. \*Z – configuration
- B. R – configuration
- C. S – configuration
- D. E – configuration

23. How many optical isomers are possible for



- A. 8
- B. \*4
- C. 3
- D. 2

24. Which of the following compounds will rotate the plane of plane polarized light?
- A.  $\text{CH}_3\text{COCO}_2\text{H}$
  - B.  $^*\text{CH}_3\text{CH}(\text{OH})\text{CO}_2\text{H}$
  - C.  $\text{CH}_3\text{CH}(\text{CH}_3)\text{CO}_2\text{H}$
  - D.  $\text{HOOCCH}(\text{CH}_3)\text{CO}_2\text{H}$
25. A liquid that decomposes near its boiling point can be purified by
- A. Distillation
  - B.  $^*$ Vacuum distillation
  - C. Steam distillation
  - D. Fractional distillation
26. In qualitative analysis of organic compounds, the Lassaigne (sodium fusion) method of analysis will detect all of the following except
- A.  $^*$ Phosphorous
  - B. Nitrogen
  - C. Halogen
  - D. Sulphur
27. In quantitative analysis of organic substances, Carius method of analysis can NOT be use to estimate which of the following elements
- A. Phosphorous
  - B. Sulphur
  - C. Chlorine
  - D.  $^*$ Nitrogen
28. Which of the following statement is true about eudiometry? It is use
- A. in the estimation of empirical formula
  - B. to determine molecular formula of organic compounds
  - C. to determine the molecular formula of all hydrocarbons
  - D.  $^*$ to determine the molecular formula of gaseous hydrocarbons
29. Which of the following can be used to estimate the amount of carbon (IV) oxide produced in a eudiometer?
- A.  $\text{Ca}(\text{OH})_2$
  - B.  $\text{Na OH}$
  - C.  $^*\text{KOH}$

D.  $\text{Al}(\text{OH})_3$

30. There is no known method to determine the amount of oxygen present in an organic sample

A. True

B. \*False

C. I don't know

D. Very true

31. When an organic compound is strongly heated, the organic parts burnt away leaving behind a residue. The residue is

A. Na

B. Al

C. \*Metal

D. Fe

32. Which of the following give the percentage halide in an organic sample?

A.  $\frac{\text{weight of sample}}{\text{weight of AgX}} \times \frac{\text{atomic weight of X}}{\text{molecular weight of AgX}} \times 100$

B.  $\frac{\text{weight of AgX}}{\text{weight of sample}} \times \frac{\text{atomic No of X}}{\text{molecular weight of AgX}} \times 100$

C. \*  $\frac{\text{weight of AgX}}{\text{weight of sample}} \times \frac{\text{atomic weight of X}}{\text{molecular weight of AgX}} \times 100$

D.  $\frac{\text{weight of sample}}{\text{weight of AgX}} \times \frac{\text{molecular weight of AgX}}{\text{atomic weight of X}} \times 100$

33. On analysis, 0.369 g of an organic sample gave 0.345 g of AgBr, calculate the percentage bromine in the organic compound.

A. 40.00 %

B. \*39.83 %

C. 39.00 %

D. 38.39 %

34. Which of the following is NOT relevant in the determination of molecular formula of gaseous hydrocarbon using eudiometer? Amount of

A. oxygen used

B.  $\text{CO}_2$  produced

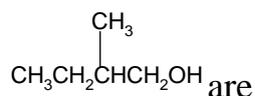
C. unreacted oxygen

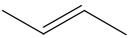
D. \*the hydrocarbon used

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35.3, 3 - dimethyl - 1 - propanol  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH}_2\text{OH} \\ | \\ \text{CH}_3 \end{array}$  and 2 - methyl - 1 - butanol



- A. \*chain isomers  
 B. position isomers  
 C. functional isomers  
 D. metamers
36. Which of the following does NOT belong to the group?  
 A. Chain isomerism  
 B. Functional isomerism  
 C. \*Optical isomerism  
 D. Position isomerism
37. Which of the following is correct?  
 A.  and  are functional isomers  
 B.  and  are metamers  
 C.  $\text{CH}_3\text{CH}_2\text{COOH}$  and  $\text{CH}_3\text{COOCH}_3$  are metamers  
 D. \* $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$  and  $\text{CH}_3\text{CHClCH}_3$  are position isomers
38. Which of the following represent the general equation for the reaction of hydrocarbons when exploded in excess oxygen?  
 A. \* $\text{C}_x\text{H}_y + (x+y/4) \text{O}_2 \rightarrow x \text{CO}_2 + y/2 \text{H}_2\text{O}$   
 B.  $\text{C}_x\text{H}_y + (x+y) \text{O}_2 \rightarrow x \text{CO}_2 + y/2 \text{H}_2\text{O}$   
 C.  $\text{C}_x\text{H}_y + (x+y/2) \text{O}_2 \rightarrow x \text{CO}_2 + y \text{H}_2\text{O}$   
 D.  $\text{C}_x\text{H}_y + (x+y/4) \text{O}_2 \rightarrow x \text{CO}_2 + y \text{H}_2\text{O}$
39. In the following reaction  $\text{C}_4\text{H}_{10} + (x+y/4) \text{O}_2 \rightarrow x \text{CO}_2 + y/2 \text{H}_2\text{O}$ , the value of  $(x+y/4)$  is  
 A. 13  
 B. 12.  
 C. 10  
 D. \* $6\frac{1}{2}$

40. Determine the value of x and y in the following equation  $C_xH_y + 6 O_2 \rightarrow x CO_2 + 4 H_2O$

- A.  $C_4H_{10}$
- B.  $C_3H_8$
- C.  $*C_4H_8$
- D.  $C_5H_{12}$

41. Which of the following statement is true?

- A. All compounds containing chirality centre are chiral
- B. All chirality centres are bonded to 4 carbon atoms
- C.  $*Chiral$  compounds contain at least a chiral carbon
- D. All achiral compounds do not contain chiral carbon

42. Which of the following statements is true?

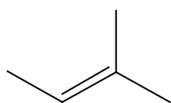
- A. Kjeldahl method of analysis is suitable for the determination of the quantity of nitrogen in all samples
- B. Only Dumas method of analysis is suitable for the determination of the quantity of nitrogen in agricultural products
- C. Both Dumas and Kjeldahl methods of analysis can be used to estimate the quantity of nitrogen in all samples
- D.  $*Kjeldahl$  is the most suitable method for the estimation of nitrogen in agricultural products

43. Urea is an organic compound found in the urine of animals. Which of the following will be most appropriate for the quantification of the constituent elements of urea?

- A. Liebig's method
- B. Dumas method
- C.  $*Liebig's$  and Kjeldahl methods
- D. All of the above



44. Which of the following statements is correct about (i) 2 - methyl -1- butene; (ii) 3 - methyl -1- butene;



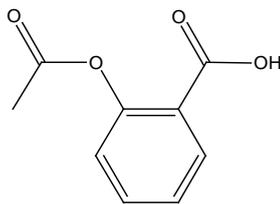
(iii) 2 - methyl -2- butene

- A. i & ii are functional isomers

- B. \*i & iii are position isomers
- C. ii & iii are tautomers
- D. i & ii are metamers

45. Which of the following statements is true about  $C_5H_{10}$ ?

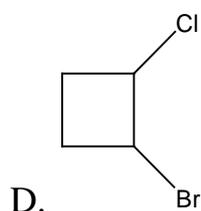
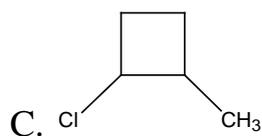
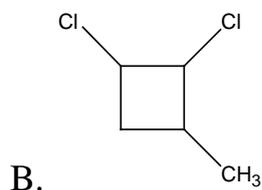
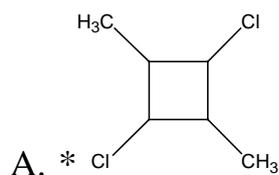
- A. All its isomers are straight chain hydrocarbon
- B. All its isomers are saturated
- C. All its isomers are unsaturated
- D. \*It has both cyclic and straight chain isomers



46. Acetyl salicylic acid (aspirin) is the active ingredient of most analgesic drugs in use today. Which of the following will be the most appropriate in the estimation of the quantity of the constituent elements of aspirin?

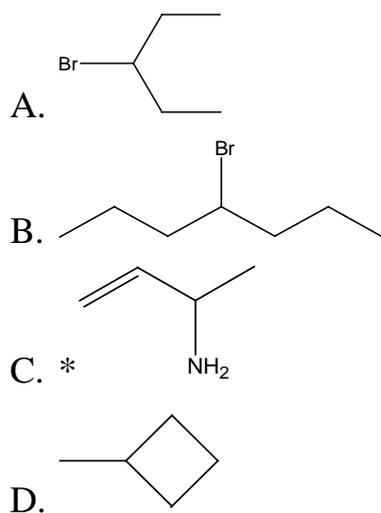
- A. Kjeldahl method
- B. Carius method
- C. \*Liebig's method
- D. Messenger's method

47. Which of the following compounds is NOT chiral?

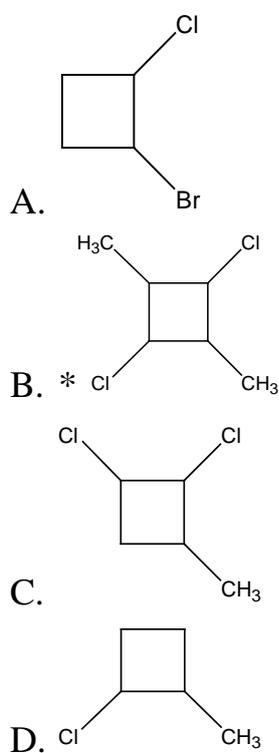


48. Which of the following compounds have chirality centre?

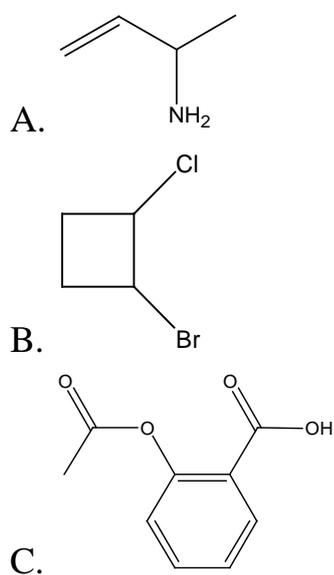
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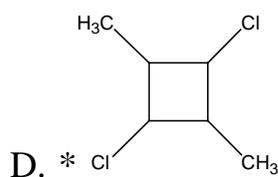


49. Which of the following molecules is NOT chiral?



50. Which of the following has at least one plane of symmetry?





51. What is the functional group present in an alkanolic acid?

- A. Hydroxyl    \*B. Carboxyl    C. Carbonyl    D. Carboxylic acid

52. Organic compounds belong to classes characterized by

- A. a hydroxyl group    B. a ketone group    C. a sugar    \*D. same functional group

53. Classes of organic compounds are referred to as

- A. alkanes    B. geometric isomers    C. oligomers    \*D. homologous series

54. Which of the following statements is true?

- \*A. Characteristic similarity can be observed in a class of organic compound.  
 B. Characteristic similarity can be observed in a class of inorganic compound.  
 C. Physical characteristic can be observed for electrons  
 D. Physical characteristic may be observed for carbanions

55. Which of the following is not represented in the isomers of the compound with molecular formula  $C_4H_{10}O$ ?

- \*A. Ketone    B. Alcohol    C. Ether    D. Alkanol

56. Which of the following combinations contain an odd item?

- A. Proteins, carbohydrates, fats    B. Proteins, Carbohydrates, oils  
 C. Fats, oils, proteins    \*D. Oils, carbohydrate, glycerol

57. Ethyne is a compound that represents organic compounds with

- A. double bonds    B. single bond    \*C. triple bonds    D. two double bonds

58. The functional groups in an alkanol and alkanolic acid are referred to as:

- A. hydroxy and carbonyl    B. alcohol and carboxyl  
 \*C. hydroxyl and carboxyl    D. hydroxy and carboxylic

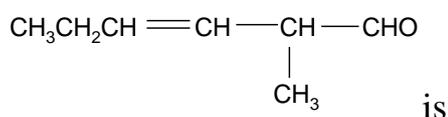
59. The functional groups present in the compound  $H_2NCH_2COOH$  are:

- A. Amino acid and carboxyl    \*B. Amine and carboxyl  
 C. Amino, carbonyl and hydroxyl    D. Amine and carboxylic acid

60. The structure of tert-butylethanoate is

- A.  $\text{CH}_3\text{COOBut}$       B.  $\text{CH}_3\text{COO}^t\text{Bu}$       C.  $\text{CH}_3\text{COOCH}_2\text{CH}_2\text{CH}_2\text{CH}_3$       D.  $\text{CH}_3\text{COOCH}_2\text{CH}(\text{CH}_3)_2$

61. The IUPAC name for



is

- A. 2-Methyl-3-hex-1-al      B. 2-Methyl-3-hexa-1-al  
 \*C. 2-Methyl-3-hexen-1-al      D. 2-Methyl-1,3-hexenal

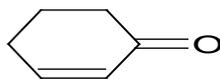
62. Ethyl ethanoate is the same thing as:

- A. ethyl vinylate      B. ethyl acrylate      \*C. ethyl acetate      D. ethyl crotonate

63. The correct IUPAC name for the compound  $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}(\text{CH}_3)\text{CHO}$  is:

- \*A. 2-methyl-4-hexen-1-al      B. 2-methyl-4, 1-hexenal  
 C. 2-methyl-4, 5-hexen-1-al      D. 2-methyl-4-ene-1-hexenal

64. The correct IUPAC nomenclature for



is:

- A. 2 - cyclohexene - 1 - one      B. 1 - Cyclohexene - 2-one  
 C. Cyclohexene 2, 1 - one      \*D. Cyclohex-1-ene-2-one

65. The addition of hydrogen bromide to propene gives two products. Which is the major product?

- A. Bromopropane      B. Propyl bromide      \*C. Isopropyl bromide      D. 1-bromopropane

66. The formation of 2-bromobutane from 1-butene is predicted by

- A. Hoffmann's rule      \*B. Markovnikoff's rule      C. Saytzeff's rule      D. Grignard's rule

67. Carbon dioxide is a compound with the formula

- A.  $\text{CO}_2$       B.  $\text{CO}^2$       C.  $\text{cO}_2$       \*D.  $\text{CO}_2$

68. The origin of chemistry was in

- A. Europe      B. America      C. Asia      \*D. Africa

69. The chemist regarded as the founder of organic chemistry is

- A. Liebermann      B. Newmann      \*C. Chevreul      D. Novalis

70. Generally organic compounds with a few exceptions are

- \*A. volatile and combustible      B. soluble in water

C. very high in melting compounds      D. very high in boiling compounds

71. The central atom in organic compounds

- \*A. share its valence electrons      B. donates its valence electrons  
C. accepts valence electrons from other atoms      D. distributes its valence electrons

72. The covalent bond characteristic of organic compounds is

- A. stronger than ionic bond      \*B. weaker than ionic bond  
C. much stronger than ionic bond      D. much weaker than ionic bond

73. Which of the following statements is not true?

- A. Carbon is the central atom in all organic compounds  
B. Oxygen is present in majority of organic compounds  
C. The heteroatoms are well represented in organic compounds  
\*D. Metals are not unusual to find in organic compounds

74. The carbon element has four outer shells of electrons. In forming compounds of carbon, these electrons

- A. are distributed evenly to other elements      \*B. are shared with electrons of other elements  
C. are donated to other atoms      D. are spread to other orbitals

75. The ground state configuration of carbon suggest that

- A. carbon can form only one bond      \*B. carbon can form only two bonds  
C. carbon can form only three bonds      D. carbon can form only four bonds

76. The tetravalency of carbon is accounted for in the

- A. ground state configuration      B. pure hybrid state configuration  
C. saturated state configuration      \*D. excited state configuration

77. The various hybridized orbital types that explain the types of bonds in carbon compounds are

- A.  $sp^4$ ,  $sp^3$ ,  $sp^2$       B.  $sp^4$  and  $sp^3$       \*C.  $sp^3$ ,  $sp^2$  and  $sp$       D.  $sp_1$ ,  $sp^2$  and  $sp^3$

78. The hybridization of one 2s and three 2p orbitals results in the formation of

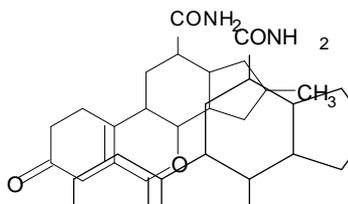
- A. two equivalent  $2sp^3$  orbitals      B. three equivalent  $2s2p$  orbitals  
\*C. four equivalent  $2sp^3$  orbitals      D. four equivalent  $sp^3$  orbitals

79. In hybridization, a 2s electron is promoted to a

- A.  $2p^z$  orbital      \*B.  $2p_z$  orbital      C.  $2p^y$  orbital      D.  $2p_y$  orbital

80. The  $sp^3$  hybrid orbital energy level is

- A. lower than the 2s energy level      \*B. lower than the 2p energy level  
 C. higher than the 2p energy level      D. lower than the 1s energy level
81. In ethane, the pi – bond is formed from the overlap of  
 A. s – p hybrid orbitals      B.  $sp^3$  – p hybrid orbitals  
 C. p – p hybrid orbitals      \*D. p – p orbitals
82. The partial reduction of a triple bond in an organic compound leads to  
 A. a saturated compound      B. a partially saturated compound  
 C. a partially unsaturated compound      \*D. an unsaturated compound
83. The correct name for  $C(CH_3)_3CH_2CH(CH_3)_2$  is:  
 \*A. 2,2,4-trimethylpentane      B. 2,2,4, trimethyl pentane  
 C. 2,4,4-trimethylpentane      D. 2,4,4, trimethyl pentane
84. What is the correct structure of sec-butyl bromide:  
 A.  $CH_3CH_2CH_2CH_2Br$       \*B.  $CH_3CH_2CHBrCH_3$       C.  
 $(CH_3)_2CHCHBrCH_3$       D.  $(CH_3)_3CBr$
85. isopentyl alcohol is the same as:  
 A. 2-methylbutan-4-ol      B. 2-methylpentan-1-ol  
 \*C. 3-methylbutan-1-ol      D. 3-methylpentan-1-ol
86. Which of the following is most suitable for continuous liquid-solid extraction?  
 A. Conical flask      B. Separating funnel  
 \*C. Soxhlet extraction      D. Distillation extraction
87. The products of the complete combustion of pentane are:  
 A. Water and carbon      B. Pentanone and water  
 C. Pentanoic acid and water      \*D. Carbondioxide and water.
88. Which general formular represents organic compounds with one double bond between adjacent atoms?  
 A.  $C_nH_{2n+2}$       \*B.  $C_nH_{2n}$       C.  $C_nH_{2n-4}$       D.  $C_nH_{2n-2}$
89. Which of the following organic acids will be most completely deprotonated by alkalis?  
 A. ethanoic acids,  $pK_a = 11.3$       \*B. phenol,  $pK_a = 10.0$   
 C. ethanol,  $pK_a = 16.0$       D. water,  $pK_a = 15.7$
90. The compound shown below has the following functional groups:



- \*A. Ketone, alkene, alkanamide, alkoxide  
 B. Ketone, esters, alkene, alkanamide  
 C. Carboxylic acid, alkene, ketone, ester  
 D. Ether, alkanamide, ketone, alkene

91. The ultimate method for separating mixture of organic materials is:

- A. Boiling point  
 B. Thin-Layer Chromatography (TLC)  
 \*C. Preparative Thin-Layer Chromatography (PTLC)  
 D. Sedimentation

92. Which pair of compounds is aromatic?

- A.  $C_6H_5OH$  and  $C_6H_{14}$   
 \*B.  $C_6H_5COOH$  and  $C_6H_5OH$   
 C.  $C_5H_{12}$  and  $C_4H_9$   
 D.  $C_2H_4O$  and  $N_2H_4$

93. Which of the following is the most reactive hydrocarbon?

- A.  $C_2H_6$   
 \*B.  $C_2H_4$   
 C.  $C_5H_{10}$   
 D.  $C_6H_5NH_2$

94. Organic extracts are easily concentrated with:

- A. Centrifuge  
 B. Soxhlet extractor  
 \*C. Rotatory evaporator  
 D. Distillation set-up

95. Which of the following compounds does not react with sodium?

- A.  $CH_3CH_2OH$   
 B.  $CH_3CH_2CH_3$   
 C.  $CH_3CO_2H$   
 \*D.  $CH_3COCl$

96. An example of a molecule with no dipole moment is:

- A.  $CH_3Cl$   
 B. cis- $CHBr=CHBr$   
 \*C.  $CH_4$   
 D.  $(CH_3)_4NBr$

97. Which of the following functional groups most adequately represent ethanoyl chloride?

- \*A. haloformyl  
 B. hydroxyl  
 C. carbonyl  
 D. carboxyl

98. Which of the following acids is a stronger acid than  $ClCH_2COOH$ ?

- A.  $CH_3COOH$   
 \*B.  $CF_3COOH$   
 C.  $CH_3CH_2OH$   
 D.  $CH_3CONH_2$

99. Which of the following arrangements shows the descending order in the strength in boiling point?

- A.  $C_3H_8 < C_2H_5OH < CH_3CHO < CH_3COOH$   
 B.  $C_2H_5OH > CH_3COOH < CH_3CHO < C_3H_8$

\*C.  $\text{CH}_3\text{COOH} > \text{C}_2\text{H}_5\text{OH} > \text{CH}_3\text{CHO} > \text{C}_3\text{H}_8$  D.  $\text{CH}_3\text{COOH} < \text{C}_2\text{H}_5\text{OH} > \text{CH}_3\text{CHO} < \text{C}_3\text{H}_8$

100. Which of the following arrangements is in order of descending strength in polarity?

\*A.  $\text{CCl}_4 > \text{CHCl}_3 > \text{CH}_2\text{Cl}_2 > \text{CH}_3\text{Cl}$  B.  $\text{CCl}_4 < \text{CHCl}_3 < \text{CH}_2\text{Cl}_2 < \text{CH}_3\text{Cl}$   
C.  $\text{CH}_2\text{Cl}_2 < \text{CHCl}_3 < \text{CCl}_4 < \text{CH}_3\text{Cl}$  D.  $\text{CHCl}_3 < \text{CCl}_4 < \text{CH}_2\text{Cl}_2 < \text{CH}_3\text{Cl}$

101. Predict which of the following reactions will be more successful.

A.  $\text{CH}_3\text{O}^- + \text{CH}_3\text{OH} \rightarrow \text{CH}_3\text{OCH}_3 + \text{OH}^-$   
B.  $\text{CH}_3\text{O}^- + \text{CH}_3\text{Br} \rightarrow \text{CH}_3\text{OCH}_3 + \text{Br}^-$   
\*C.  $\text{HO}^- + \text{C}_6\text{H}_5\text{CH}_2\text{I} \rightarrow \text{C}_6\text{H}_5\text{CH}_2\text{OH} + \text{I}^-$   
D.  $\text{Cl}^- + \text{C}_6\text{H}_5\text{CH}_2\text{I} \rightarrow \text{C}_6\text{H}_5\text{CH}_2\text{Cl} + \text{I}^-$

102. The combustion of a monobasic organic acid (containing carbon, hydrogen and oxygen only) gave the following results:

Weight of acid taken = 0.542g; Weight of carbon dioxide formed = 1.084g

Weight of water formed = 0.443g. The molecular formula of the acid is:

\*A.  $\text{HCOOH}$  B.  $\text{CH}_3\text{CO}_2\text{H}$  C.  $\text{C}_2\text{H}_5\text{COOH}$  D.  $\text{RCOOH}$

$\text{RCOOH}$

103. The best chemical method by which you would separate a mixture of propyne and 2-butyne is

\*A. reaction with ammoniacal copper(I) chloride B. reaction with silver nitrate  
C. Reaction with acidified potassium permanganate D. reaction with bromine water.

104. In a study of the chlorination of propane, one of the four products has the formula:

A.  $\text{C}_3\text{H}_6\text{Cl}$  \*B.  $\text{C}_3\text{H}_6\text{Cl}_2$  C.  $\text{C}_3\text{H}_5\text{Cl}_2$  D.  $\text{C}_3\text{H}_4\text{Cl}_2$

105. When cyclopropane reacts with  $\text{H}_2/\text{Pt}$  at  $30^\circ\text{C}$ , the compound formed is:

A. cyclopropene B. Butane \*C. Propane D. Cyclopentene

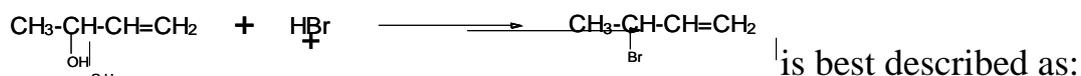
106. The reaction of neopentane with chlorine in the presence of UV light gives:

\*A. neopentyl chloride B. neopentene C. pentyl chloride D. pentyl dichloride

107. One of the following pairs of compounds could be distinguished by using bromine water

- \*A. pentane and 2-pentene      B. 1-hexyne and 3-hexyne  
 C. 1-propanol and allyl alcohol      D. 1-pentene and pentanoic acid

108. The reaction:



is best described as:

- \*A. substitution      B. elimination      C. addition      D. rearrangement
109. The most suitable reagent to distinguish between ethyne and benzene is:  
 A. Fehling's solution      B. Benedict's solution  
 \*C. Ammoniacal solution of silver nitrate      D. Tollen's reagent
110. Colloid organic extracts require  
 A. filtration before concentration      B. Evaporation before filtration  
 C. concentration before centrifugation      \*D. Centrifugation before concentration
111. This information  $n_D^{20}$  1.333 about water refers to:  
 A. specific rotation of water      \*B. Refractive index of water  
 C. freezing temperature of water      D. Density of water on freezing
112. If two compounds A (m.p.  $-120^\circ\text{C}$ ) and B (m.p.  $-120^\circ\text{C}$ ) are different, then melting point of the mixture will usually be  
 \*A.  $< 120^\circ\text{C}$       B.  $> 120^\circ\text{C}$       C.  $120^\circ\text{C}$       D. Difficult to determine
113. Which of the following spectroscopic methods measures the vibration of various functional groups of an organic molecule?  
 A. Mass      \*B. Infrared      C. Ultraviolet      D. Nuclear Magnetic Resonance
114. Vacuum distillation is preferred for the separation of:  
 A. Two or more volatile components  
 B. Volatile components differing in boiling points by less than  $10^\circ\text{C}$   
 \*C. Samples with high boiling ( $180^\circ\text{C}$ )  
 D. Samples with low boiling points ( $>20^\circ\text{C}$ )
115. Which of the following is NOT correct about sublimation?  
 A. It is generally carried out under reduced pressure  
 B. On heating, the material passes from solid to vapour phase directly and vice versa on cooling.  
 \*C. The sample must be heated above its melting point.

D. It is often possible to obtain pure substances from this process.

116. The solubility of a substance may be decreased in aqueous phases by:

- \*A. the addition of neutral salts    B. the addition of acidic or basic materials  
C. the removal of heat    D. the addition of water

117. Which of the following compounds will give a precipitate with aqueous ammoniacal solution or copper (I) chloride?

- A.  $\text{CH}_3\text{CH}=\text{CHCH}_3$     B.  $\text{CH}_2=\text{CHC}_2\text{H}_5$     \*C.  $\text{HC}\equiv\text{CCH}_2\text{CH}_2\text{CH}_3$     D.  
 $\text{CH}_2=\text{CHCH}=\text{CH}_2$

118. The most suitable purification technique for the isolation of volatile compounds is:

- \*A. Steam distillation    B. Paper chromatography  
C. Fractional distillation    D. Crystallization

119. Alkanoic acids are more acidic than alkanols because of:

- A. Inductive effect    B. Conjugative effect  
\*C. Resonance effect    D. Strain effect

120. TLC is preferred to paper chromatography because

- \*A. TLC is more rapid    B. TLC is readily available  
C. TLC can separate large amount of substance    D. TLC has poor resolution

121. Correct products of reaction between butan-2-ol and concentrated  $\text{H}_2\text{SO}_4$

- \*A.  $\text{CH}_2=\text{CHCH}_2\text{CH}_3$     B.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$   
C.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$     D.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$

122. Identify the correct sequence for the chain reaction:

- A. Initiation  $\longrightarrow$     Termination    propagation  
B. Termination  $\longrightarrow$     Initiation  $\longrightarrow$     Propagation  
\*C. Initiation  $\longrightarrow$     Propagation  $\longrightarrow$     Termination  
D. Propagation  $\longrightarrow$     Initiation  $\longrightarrow$     Termination

123. Which compound will not exhibit hydrogen bonding?

- A. Water    B. Ethanol  
C. Ethanoic acid    \*D. Ethane

124. What factor accounts for higher acidity of phenol compared with ethanol?

- A. Inductive effect    B. Strain effect  
\*C. Resonance effect    D. Polarisation effect

125. Which reaction is not correct for  $\text{C}_2\text{H}_5\text{CHO}$  AMPORHELP |

- A. Dehydration to alkene  
C. Oxidation to mixture of acids
- B. Oxidation to alkanone  
\*D. Dehydration to alkanol
126. Which pair of compounds is unsaturated?
- A.  $\text{RCO}_2\text{H}$  and  $\text{RCH}_2\text{OH}$   
C.  $\text{C}_6\text{H}_6$  and  $\text{C}_4\text{H}_{10}$
- B.  $\text{CH}_2\text{CH}_2$  and  $\text{CH}_3\text{CH}_2$   
\*D.  $\text{RCN}$  and  $\text{CH}_2\text{CH}_2$
127. Ozonolysis, followed by hydrolysis with Zn dust in dilute HCl of one mole organic compound Y, yielded two moles of ethanol. The organic compound Y is
- A. But-1-ene  
C. Butene
- \*B. But-2-ene  
D. But-2-yne
128. Aromatic compounds can readily be distinguished from aliphatic compounds by
- A. Combustion test  
\*C. Nitration test
- B. Benedict test  
D. Solubility test
129. Predict which of the following molecules is polar
- \*A.  $\text{CCl}_4$   
C.  $\text{CH}_4$
- B.  $\text{NH}_3$   
D.  $\text{CH}_3\text{Cl}$
130. Which of the following compounds would be expected to give a positive Tollen's test
- A. Pentan-3-one  
C. Propanol
- \*B. Acetaldehyde  
D. Cyclopentanol
131. The general formula for haloalkanes (where X represents the halogen atom) is:
- A.  $\text{C}_n\text{H}_{2n+2}\text{X}$   
\*C.  $\text{C}_n\text{H}_{2n+1}\text{X}$
- B.  $\text{C}_n\text{H}_{2n}\text{X}$   
D.  $\text{C}_n\text{H}_{2n-1}\text{X}$
132. Combustion test will not distinguish
- \*A. benzene from ethyne  
C. ethane from ethyne
- B. ethane from ethene  
D. butane from propyne
133. Formation of nitrosamine established the presence of the functional group
- \*A.  $-\text{NH}_2$   
C.  $-\text{COOH}$
- B.  $-\text{CONH}_2$   
D. R- OH
134. Both Hinsberg's and nitrous acid tests would distinguish,
- A. Alkanols  
\*C. Alkanamines
- B. Aliphatic hydrocarbons  
D. Alkanoic acids

This problem is for questions 135-136

3.54g of an organic compound yielded 8.03g of CO<sub>2</sub> and 3.34g of H<sub>2</sub>O.

135. Percentage compositions of carbon and hydrogen in the compound are:

- A. 62.48% and 5.05% respectively  
B. 5.86% and 10.05% respectively  
C. 42.80% and 12.50% respectively  
\*D. 61.86% and 10.48% respectively

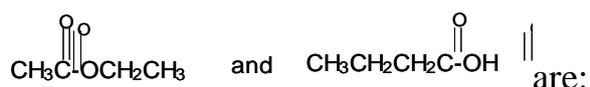
136. The empirical formula of the compound is

- A. CH<sub>3</sub>O<sub>6</sub>  
B. C<sub>3</sub>HO<sub>6</sub>  
C. C<sub>2</sub>H<sub>6</sub>O  
\*D. C<sub>3</sub>H<sub>6</sub>O

137. Which of the following is an example of Grignard Reagent?

- \*A. C<sub>2</sub>H<sub>5</sub>MgBr  
B. CH<sub>3</sub>Br  
C. CH<sub>3</sub>CH<sub>2</sub>NaHg  
D. CH<sub>2</sub>Br<sub>2</sub>

138.



- \*A. Isomers  
B. Esters  
C. Carboxylic acids  
D. Polymers

139.  $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}(\text{OH})(\text{CH}_3)_2$  The IUPAC nomenclature for the above compound is:

- A. 4-methylpentan-3-ol  
\*B. 2-methylpentan-3-ol  
C. 3-methylpentan-3-ol  
D. 1,1-dimethylbutan-2-ol

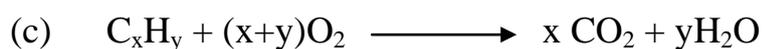
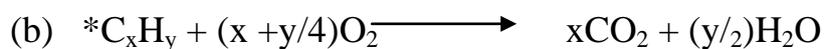
140. Which of the following is a secondary alkanol?

- A. C(CH<sub>3</sub>)<sub>3</sub>OH  
B. CH<sub>3</sub>=CHCH<sub>2</sub>OH  
C. CH<sub>3</sub>(CH<sub>2</sub>)<sub>3</sub>OH  
\*D. CH<sub>3</sub>CH(OH)CH<sub>3</sub>

141. Hydrocarbons contain

- (a) Oxygen, hydrogen and carbon only  
(b) Carbon, hydrogen and double bond only  
\*Carbon and hydrogen only  
(c) Carbon, hydrogen and halogen or sulphur

142. The general equation for the combustion of alkanes can be represented by



143. Which of the following is not correct about alkenes

- (d) \*They are less reactive to alkanes
- (e) They contain one or more double bonds
- (f) They contain fewer hydrogen atoms than an alkane with the same number of carbon atoms
- (g) Their bonds are made from the overlap of S and P orbitals

145. If there were free rotation about a double bond:

- (h) \*Isomers will not exist
- (i) Isomerism will be exhibited
- (j) Two methyl group will be on the opposite sides of the double bond
- (k) Geometric isomerism will exists

146. In the free radical reaction of methane with chlorine, the correct order of the reaction is

- (a) \*Initiation  $\longrightarrow$  propagation  $\longrightarrow$  Termination
- (b) Initiation  $\longrightarrow$  Termination  $\longrightarrow$  propagation
- (c) Termination  $\longrightarrow$  propagation  $\longrightarrow$  Initiation

(d) Propagation  $\longrightarrow$                       ~~Initiation~~                      Termination

147. Which of the equations below is the correct equation for the propagation stage of reaction of methane with chlorine?

- (a)  $\text{Cl}_2 \longrightarrow 2\text{Cl}^*$   
(b)  $\text{CH}_3 + \text{Cl}^* \longrightarrow \text{CH}_3\text{Cl}$   
(c)  $\text{CH}_3^- + \text{Cl}^* \longrightarrow \text{CH}_3\text{Cl}$   
(d)  $^*\text{CH}_4 + \text{Cl}^* \longrightarrow \text{CH}_3^* + \text{HCl}$

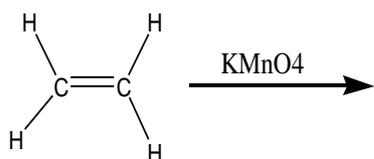
148. Which of the equations below represent the termination stage of the reaction of methane with chlorine

- (a)  $^*\text{CH}_3 + \text{Cl}^* \longrightarrow \text{CH}_3\text{Cl}$   
(b)  $\text{CH}_3^{--} + \text{Cl}^* \longrightarrow \text{CH}_3\text{Cl}^*$   
(c)  $\text{CH}_4 + \text{HCl} \longrightarrow \text{CH}_3\text{Cl} + \text{HCl}$   
(d)  $\text{CH}_4 + \text{Cl}^- \longrightarrow \text{CH}_3\text{Cl} + \text{H}^+$

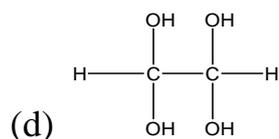
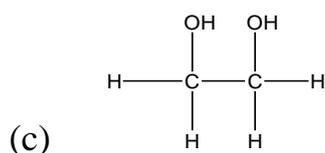
149. Unsaturated bond between two carbon atoms are made from

- (l) Sigma bond only  
(m) Sigma and hydrogen bonds only  
(n) \*Sigma and pie bond  
(o) Sigma and dative bond

150. What is the product of the reaction below



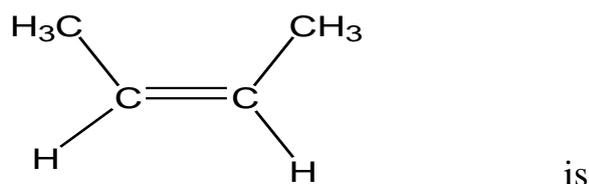
- (a)  $\begin{array}{c} \text{H} & \text{H} \\ | & | \\ \text{H}-\text{C}- & \text{C}-\text{H} \\ | & | \\ \text{H} & \text{H} \end{array}$                       (b)  $\begin{array}{c} \text{H} & \text{OH} \\ | & | \\ \text{H}-\text{C}- & \text{C}-\text{H} \\ | & | \\ \text{H} & \text{H} \end{array}$



151. What is the role of alkaline potassium manganate (VII) in its reaction with alkene

- (a) Catalyst (b) Reduction (c) Hydroxylation (d) Oxidation.

152. The correct IUPAC nomenclature for the structure

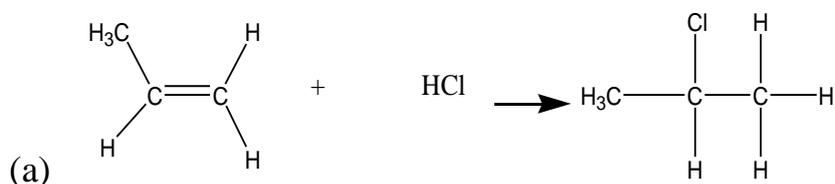


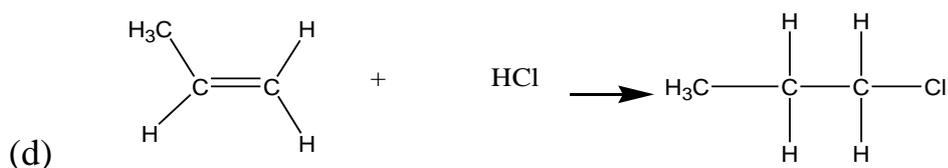
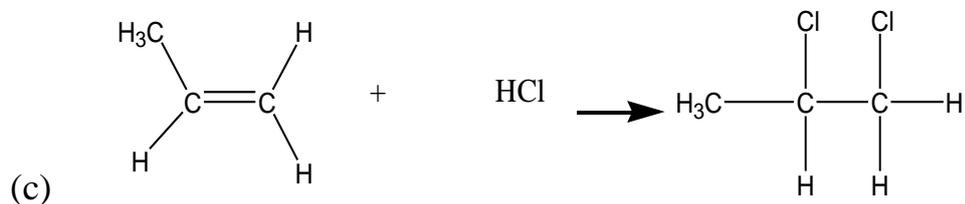
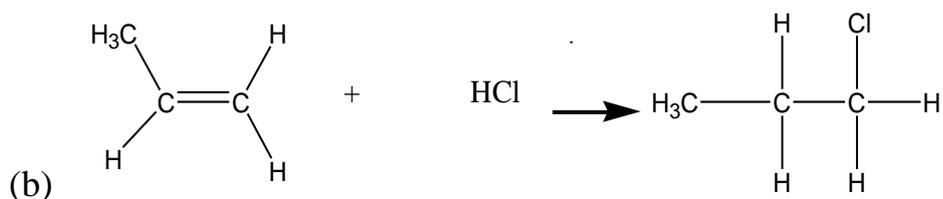
- (a) Cis-butene  
 (b) Cis-but-2-ene  
 (c) Trans-butene  
 (d) Trans-but-2-ene

153. The correct equation for the combustion of ethene is

- (a)  $C_2H_6 + 4O_2 \longrightarrow 2CO_3 + 2H_2O$   
 (b)  $C_2H_4 + 4O_2 \longrightarrow 3CO_2 + 2H_2O$   
 (c)  $C_2H_6 + 3O_2 \longrightarrow 2CO_2 + 2H_2O$   
 (d)  $C_2H_4 + 3O_2 \longrightarrow 2CO_2 + 2H_2O$

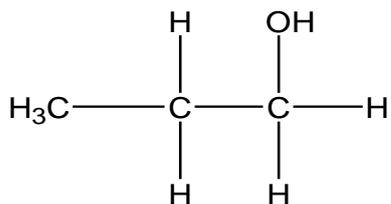
154. Which of this is the correct equation for the addition of hydrogen chloride to propene



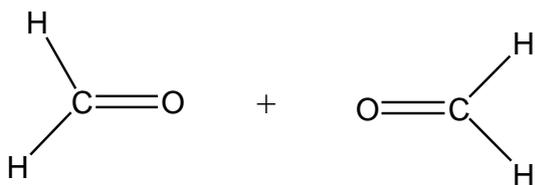


155. In the reaction of ethene with ozone, which of the product below is formed?

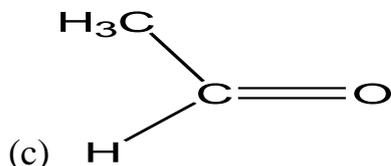
(a)



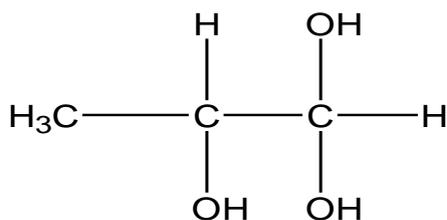
(b)



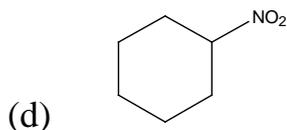
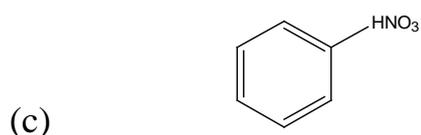
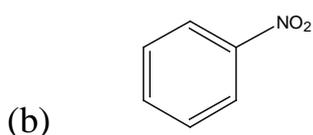
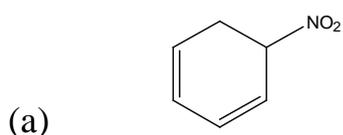
(c)



(d)



156. What is the correct structure for the product of nitration of benzene



157. The reagents for the nitration of benzene are

(a)  $\text{HNO}_3$  and  $\text{H}_2\text{SO}_4$  (b) Concentrated  $\text{HNO}_3$  (c)  $\text{NO}_2$  and  $\text{H}_2\text{SO}_4$

(d)  $\text{HNO}_3$  and  $\text{HNO}_3$

158. The symmetrical splitting of  $\text{CH}_3\text{CH}_3$  will result into

(a)  $2\text{CH}_3^-$  (b)  $\text{CH}_4$  (c)  $2\text{CH}_3^\ominus$  (d)  $2\text{CH}_3^+$

159. Which of the following is not correct about ethene and ethyne

(a) They are unsaturated hydrocarbons

(b) Their bonds are from S and P orbitals

(c) They undergo addition reactions

(d) They are equally reactive

160. Which of the following will discharge potassium permanganate colour?

(a) Butane (b) butene (c) Chlorobutane (d) butanoic acid.

162. Margarine can be prepared by catalytic - - - - - of alkene

(a) Bromination (b) Oxidation (c) Halogenation

(d) Hydrogenation

163. What is the major product in the reaction of propene with hydrogen chloride?

(a) 1-Chloropropane (b) 2-Chloropropane (c) 3-Chloropropane

(d) No reaction

164. Saturated hydrocarbon compounds undergo - - - - - reactions.

(a) Addition (b) multiplication (c) Substitution

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(d) Hydrogenation

165. One of the ways of identifying unsaturated hydrocarbon compound in the laboratory is

(a) Sooty flame given off during burning

(b) Sweet Smell

(c) Burning Sulphur Smell

(d) It is not easy

166. Aromatic hydrocarbons stability is due to presence of

(a) Rings (b) double bond (c) delocalized of electrons within the rings (d) cyclic nature of Benzene

167. This is correct about alkenes and alkynes except

(a) They undergo addition reaction with alkene rate faster

(b) They undergo oxidation reaction

(c) They undergo hydrogenation

(d) They undergo substitution reaction under drastic conditions

168. Asymmetric splitting of bonds will result in

(a) radical species (b) ionic species (c) strong species

(d) weak compound

169. When ethene is reacted with bromine solution

(a) Bromoethane is formed and the colour of the bromine solution is discharged

(b) Bromoethanol is formed

(c) No reaction will take place but there may be colour change

(d) The reaction is so spontaneous that no observation can be seen.

170. Benzene will undergo - - - - reaction easily

(a) Addition (b) Oxidation (c) Hydrogenation (d) \* Substitution

171. What is the difference between pentene and pentyne

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- (a) They are both unsaturated hydrocarbons
- (b) \*penthyne is more reactive than ethene
- (c) Only penthyne will undergo addition reaction
- (d) penthene will undergo substitution reaction

172. Volatile natural product which decomposes near its boiling point can be purified by

- A. Distillation
- B. Vacuum distillation
- \*C. steam distillation
- D. Fractional distillation

174. Which of the following may NOT be used as an adsorbent in adsorption chromatography?

- A. Keiselghur
- B. Alumina
- C. Silica gel
- \*D. Cellulose

175. Partition chromatography is based on one principle of

- A. Absorption law
- \*B. Distribution law
- C. Partition law
- D. solute/solvent law

176. Micro – estimation of elements in organic compound uses the quantity of substances in the range

- A. 0.20 – 0.50 g
- B. 0.02 – 0.05 g
- C. 20 – 50 mg
- D\*. 2 – 5 mg

177. The substance used to visualise the thin layer plate after resolution of components in TLC is

- A\*. ultraviolet lamp
- B. Silica gel
- C. Methylene blue
- D. Sodium metal

178. Solid organic compounds are generally obtained in a pure state from a mixture by

- A. Sublimation
- B. Crystallisation
- \*C. Fractional crystallisation
- D. Evaporation

179. In quantitative analysis, CHN analyser is used to identify/determine the quantities of

- A. S, N & P
- \*B. C, H & N
- C. C, H & X
- D. C, H & P

180. The following are the major instrumental methods of analysis except

- A. X – ray crystallography
- B. Nuclear magnetic Resonance
- C. Mass Spectrometry
- \*D. Electrophoresis

181. One of these techniques is concerns with magnetic properties of certain atomic nuclei

- A. IR
- B. UV
- \*C. NMR
- D. MS

182 The absorption positions are normally expressed in wave length using one of the following units

- A\*nm
- B. mm
- C.  $\mu\text{m}$
- D. cm

