

BOWEN UNIVERSITY, IWO, OSUN STATE
COLLEGE OF AGRICULTURE, ENGINEERING AND SCIENCE
INDUSTRIAL CHEMISTRY PROGRAMME
2022/2023 B.SC DEGREE SECOND SEMESTER EXAMINATION

Course Code: CHM 102 **Courses Title:** General Chemistry II

Course Credit: 3

Date: June 2023

Time Allowed:

35 minutes

INSTRUCTIONS: Answer seventy questions in all

1. In crystallization, the compound dissolved in a solvent is more soluble in what temperature?

- A. Room temperature
- B. Lower temperature
- C. Higher temperature
- D. Very low temperature

Answer: C

2. What is the basis for the process of distillation?

- A. Difference in melting point
- B. Difference in temperature
- C. Difference in pressure
- D. Difference in boiling point

Answer: D

3. Which of the following is the apparatus for differential extraction?

- A. Separatory funnel
- B. Porous sheet
- C. Packed column
- D. Electric motor

Answer: A

4. In column chromatography, identify the mobile and stationary phase from the following.

- A. Solid, Liquid
- B. Liquid, Solid

C. Gas, Liquid

D. Solid, Solid

Answer: B

5. What is the paper strip developed in partition chromatography called?

A. Chromatograph

B. Chroma

C. Chromatographing strip

D. Chromatogram

Answer: D

6. The two carbon atoms in acetylene are

A. sp^3 hybridized

B. sp^2 hybridized

C. sp hybridized

D. Unhybridized

Answer: C

7. Which species do not have sp^3 hybridization?

A. Ammonia

B. Methane

C. Water

D. Carbon dioxide

Answer: D

8. Compound formed by sp^3 hybridization will have structure

A. Planar

B. Pyramidal

C. Angular

D. tetrahedral

Answer D.

9. Hybridization involves

A. Addition of an electron pair

B. Mixing up of atomic orbitals

C. Removal of an electron pair

D. Separation of orbitals

Answer B.

10. The number of shared electrons in between carbon-carbon atoms in ethylene molecule is

A. 2

B. 4

C. 6

D. 3

Answer B

11. When two pairs of electrons are shared, the bond formed is?

A. Single covalent bond

B. Double covalent bond

C. Dative bond

D. Triple bond

Answer B

12. A (pi) bond is the result of the

A. overlap of two s orbitals.

B. overlap of an s and a p orbital.

C. overlap of two p orbitals along their axes.

D. sidewise overlap of two parallel p orbitals.

Answer D

13. A triple bond contains ___ sigma bond(s) and ___ pi bond(s).

A. 0, 3

B. 3, 0

C. 2, 1

D. 1, 2

Answer D

14. Draw a complete line-bond or electron-dot formula for acetic acid (CH_3COOH) and then decide which statement is incorrect.

A. One carbon is described by sp^2 hybridization.

- B. Both carbons are described by sp^3 hybridization.
- C. The molecule contains four lone pairs of valence electrons.
- D. One carbon is described by sp^3 hybridization.

Answer B

15. When the 1s orbitals of two hydrogen atoms combine to form a hydrogen molecule, how many molecular orbitals are formed?

- A. 1
- B. 2
- C. 3
- D. 4

Answer B

16. When the 1s orbitals of two hydrogen atoms combine to form a hydrogen molecule, which molecular orbitals are formed?

- A. One bonding molecular orbital only
- B. Two bonding molecular orbitals
- C. One bonding molecular orbital and one antibonding molecular orbital
- D. Two antibonding molecular orbitals

Answer C

17. Identify the atomic orbitals in the C-C sigma bond in ethyne.

- A. ($2sp^2$, $2sp^2$)
- B. ($2sp^3$, $2sp^3$)
- C. ($2sp$, $2sp$)
- D. ($2p$, $2p$)

Answer C

18. Which compound has the shortest carbon - carbon bond(s)?

- A. CH_3CH_3
- B. CH_2CH_2
- C. $HCCH$
- D. $CH_3CH_2CH_3$

Answer C

19. Which of the following contains an sp^2 -hybridized carbon?

- A. CH_4
- B. CH_3Cl
- C. CH_3CH_3
- D. CH_3CHCH_2

Answer D

20. Which compound has the shortest carbon-carbon single bonds?

- A. $H_3CCH_2CH_3$
- B. H_3CCHCH_2
- C. H_2CCCH_2
- D. $HCCCCH$

Answer D

21. Credit for the first synthesis of an organic compound from an inorganic precursor is usually given to:

- A. Berzelius
- B. Arrhenius
- C. Kekule
- D. Wohler

Answer D

22. Separating a liquid from a solution whose boiling points is higher than that of the liquid can be carried out through

- A. simple filtration
- B. simple distillation
- C. chromatography
- D. fractional distillation

Answer B

23. What do electronic theories in organic chemistry primarily focus on?

- A. Structure, physical properties, and reactivity of organic compounds
- B. Ionic bond formation in inorganic compounds
- C. Electrostatic bonds in nonpolar organic compounds

D. Quantum mechanics of electron distribution in atoms

Answer A

24. Who defined a covalent bond as the sharing of an electron pair?

- A. J. Stark
- B. G. Lewis
- C. L. Pauling
- D. T. Lowry

Answer B

25. Which scientists introduced the concepts of inductive, resonance, anomeric, and electronic effects?

- A. J. Stark and G. Lewis
- B. L. Pauling and T. Lowry
- C. R. Robinson and C. Ingold
- D. L. Pauling and C. Ingold

Answer D

26. What system for classifying organic reactions by shifts in electron density and by the electrostatic orientation of the reagents during a reaction was proposed by the English chemists?

- A. Nucleophilic, electrophilic, and radical mechanisms
- B. Markovnikov and El'tekov rules
- C. Conjugated chain reactions
- D. Substituent effects and aromatic ring reactions

Answer A

27. What rule explains the conversion of enols into carbonyl compounds?

- A. El'tekov rule
- B. Markovnikov rule
- C. Electrophilic rule
- D. Nucleophilic rule

Answer: A

28. The development of electronic theories in organic chemistry is linked to the development of which theories?

- A. Quantum mechanics and classical theory of chemical structure
- B. Electrostatic bonds and covalent bond theory
- C. Nucleophilic, electrophilic, and radical mechanisms
- D. Substituent effects and aromatic ring reactions

Answer: A

29. What did the concept of covalent bonds explain in organic chemistry?

- A. The behavior of inorganic compounds
- B. The relationship between structure and properties in organic compounds
- C. The formation of ionic bonds in organic compounds
- D. The resonance effects in conjugated chains

Answer: B

30. Which effects are commonly used to explain and predict the properties and reactivities of various organic compounds?

- A. Inductive, resonance, anomeric, and electronic effects
- B. Markovnikov and E1 effects
- C. Nucleophilic, electrophilic, and radical effects
- D. Substituent and aromatic effects

Answer: A

31. What did scientists explain using the theory of shifts in electron densities?

- A. Equalization of bonds in conjugated chains
- B. Aromatic ring reactions
- C. Formation of covalent bonds
- D. Ionic bond formation

Answer: A

32. What is the atomic number of an atom?

- A. The number of protons in the nucleus
- B. The number of electrons in the outer shell
- C. The sum of protons and neutrons in the nucleus
- D. The average mass of its atoms

Answer: A

33. What is the atomic weight of an element?

- A. The number of protons in the nucleus
- B. The number of electrons in the outer shell
- C. The average mass of its atoms
- D. The sum of protons and neutrons in the nucleus

Answer: C

34. What is the purpose of representing atoms with dots surrounding their atomic symbol?

- A. To indicate the number of protons in the nucleus
- B. To represent the number of neutrons in the nucleus
- C. To show the outer-shell electrons (valence electrons)
- D. To indicate the atomic weight of the atom

Answer: C

36. What are the two types of bonding resulting from atoms seeking to achieve a filled outer shell of electrons?

- A. Ionic and covalent bonds
- B. Metallic and covalent bonds
- C. Electrovalent and metallic bonds
- D. Electrovalent and ionic bonds

Answer: A

37. In covalent bonding, how do atoms achieve a filled outer shell of electrons?

- A. By transferring electrons to other atoms
- B. By sharing electrons with other atoms
- C. By losing electrons to become positively charged
- D. By gaining electrons to become negatively charged

Answer: B

38. What is the simplest compound formed by the combination of one Carbon atom and four Hydrogen atoms?

- A. Methane (CH₄)

- B. Water (H₂O)
- C. Ethane (C₂H₆)
- D. Propane (C₃H₈)

Answer: A

39. Which type of bond is characterized by atoms sharing electrons?

- A. Ionic bond
- B. Metallic bond
- C. Covalent bond
- D. Electrovalent bond

Answer: C

40. What is the electron configuration of carbon in its valence shell?

- A. Octet configuration
- B. Duplet configuration
- C. Filled p sublevel with six electrons
- D. Filled d sublevel with ten electrons

Answer: A

41. Which compound is formed by combining one carbon atom with four hydrogen atoms?

- A. Methane (CH₄)
- B. Ethane (C₂H₆)
- C. Propane (C₃H₈)
- D. Butane (C₄H₁₀)

Answer: A

42. What is the melting point of methane?

- A. -182°C
- B. -164°C
- C. 0°C
- D. 100°C

Answer: A

43. What is the boiling point of methane?

- A. -182°C

- B. -164°C
- C. 0°C
- D. 100°C

Answer: B

44. Isotopes of an element have the same number of:

- A. Protons and electrons
- B. Protons and neutrons
- C. Neutrons and electrons
- D. Neutrons and atomic mass

Answer: A

45. Which type of carbon isotope is radioactive and has a half-life of 5730 years?

- A. ^{12}C
- B. ^{13}C
- C. ^{14}C
- D. ^{15}C

Answer: C

46. The age of a substance derived from a living organism can be determined by measuring the content of:

- A. ^{12}C
- B. ^{13}C
- C. ^{14}C
- D. ^{15}C

Answer: C

47. The electrons in the outermost electron shell of an atom are called:

- A. Valence electrons
- B. Core electrons
- C. Inner-shell electrons
- D. Orbital electrons

Answer: A

48. The number of electrons in the valence shell of an atom is equal to:

- A. Atomic number
- B. Mass number
- C. Group number on the periodic table
- D. Number of neutrons in the nucleus

Answer: D

49. The realization that electrons have wavelike properties led to the development of:

- A. Quantum mechanics
- B. Atomic orbitals
- C. Electron shells
- D. Hund's rule

Answer: A

50. The version of quantum mechanics most useful to chemists was proposed by:

- A. Louis de Broglie
- B. Albert Einstein
- C. Max Planck
- D. Erwin Schrödinger

Answer: D

51. Each shell in an atom contains subshells known as:

- A. Electron shells
- B. Atomic orbitals
- C. Valence shells
- D. Degenerate orbitals

Answer: B

52. The first shell in an atom consists of only:

- A. s atomic orbital
- B. p atomic orbital
- C. d atomic orbital
- D. f atomic orbital

Answer: A

53. The maximum number of electrons that can occupy the second shell of an atom is:

- A. 2
- B. 8
- C. 18
- D. 32

Answer: B

54. Degenerate orbitals are orbitals that:

- A. Have the same shape
- B. Have the same energy
- C. Have the same number of electrons
- D. Have the same spin

Answer: B

55. The aufbau principle states that an electron always goes into:

- A. The highest energy orbital
- B. The lowest energy orbital
- C. A degenerate orbital
- D. An empty orbital

Answer: B

56. According to the Pauli Exclusion Principle, no more than ____ electrons can occupy each atomic orbital.

- A. One
- B. Two
- C. Three
- D. Four

Answer: B

57. Hund's rule states that when there are two or more atomic orbitals with the same energy, an electron will occupy:

- A. The first available orbital
- B. The orbital closest to the nucleus
- C. The orbital with the highest energy
- D. An empty orbital before pairing up

Answer: D

58. The number of valence electrons in an atom determines its:

- A. Atomic mass
- B. Atomic radius
- C. Chemical properties
- D. Electron configuration

Answer: C

59. Elements in the same column of the periodic table have similar chemical properties because they have the same number of:

- A. Protons
- B. Neutrons
- C. Electrons
- D. Atomic orbitals

Answer: C

60. The major factor determining an element's chemical properties is the number of:

- A. Core electrons
- B. Valence electrons
- C. Atomic orbitals
- D. Excited-state electrons

Answer: B

61. The ground-state electronic configuration of an atom describes:

- A. The arrangement of protons in the nucleus
- B. The orbitals occupied by the atom's electrons with the lowest energy
- C. The total number of electrons in the atom
- D. The excited-state electronic configuration of the atom

Answer: B

62. If energy is applied to an atom in the ground state, one or more electrons can:

- A. Jump into a lower-energy orbital
- B. Jump into a higher-energy orbital
- C. Change their spin direction

D. Combine with protons in the nucleus

Answer: B

63. Hund's rule helps minimize:

A. Electron repulsion

B. Atomic radius

C. Nuclear charge

D. Electron affinity

Answer: A

64. The electronic configuration of an element is important for determining its:

A. Atomic number

B. Atomic mass

C. Chemical behavior

D. Electron spin

Answer: C

65. Which rule specifies that an electron will occupy an empty orbital before pairing up with another electron?

A. Aufbau principle

B. Pauli exclusion principle

C. Hund's rule

D. Quantum mechanics

Answer: C

66. The electron configuration of carbon is:

A. $1s^2 2s^2 2p^2$

B. $1s^2 2s^2 2p^4$

C. $1s^2 2s^2 2p^6$

D. $1s^2 2s^2 2p^3$

Answer: A

67. The sp^2 hybridization of carbon results in:

A. Three sigma bonds and no pi bonds

B. Two sigma bonds and one pi bond

- C. Four sigma bonds and no pi bonds
- D. One sigma bond and two pi bonds

Answer: B

68. Carbon atoms in alkenes typically exhibit which type of hybridization?

- A. sp
- B. sp²
- C. sp³
- D. sp³d

Answer: B

69. A carbon atom involved in a triple bond is usually:

- a) sp
- b) sp²
- c) sp³
- d) sp³d

Answer: A

70. The hybridization of carbon in benzene (C₆H₆) is:

- a) sp
- b) sp²
- c) sp³
- d) sp³d

Answer: B

71. The hybridization of carbon in an aldehyde (e.g., formaldehyde, CH₂O) is:

- A. sp
- B. sp²
- C. sp³
- D. sp³d

Answer: B

72. The hybrid orbitals of carbon in ethene (C₂H₄) are:

- A. sp
- B. sp²

- C. sp^3
- D. sp^3d

Answer: B

73. The hybridization of carbon in an alkyne (e.g., ethyne, C_2H_2) is:

- A. sp
- B. sp^2
- C. sp^3
- D. sp^3d

Answer: A

74. The hybridization of the carbonyl carbon in a ketone (e.g., acetone, CH_3COCH_3) is:

- A. sp
- B. sp^2
- C. sp^3
- D. sp^3d

Answer: B

75. Which method of purification is based on the principle of separating sublimable compounds from nonsublimable impurities?

- A. Sublimation
- B. Crystallization
- C. Distillation
- D. Differential extraction

Answer: A

76. Crystallization is a commonly used technique for the purification of solid organic compounds. It relies on:

- A. Difference in boiling points
- B. Difference in melting points
- C. Difference in solubilities
- D. Difference in densities

Answer: C

77. Distillation is a method used to separate volatile liquids based on:

- A. Difference in boiling points
- B. Difference in melting points
- C. Difference in solubilities
- D. Difference in densities

Answer: A

78. Which technique is commonly used when the difference in boiling points of two liquids is not significant?

- A. Distillation
- B. Crystallisation
- C. Fractional distillation
- D. Differential extraction

Answer: C

79. What is the purpose of using a fractionating column in fractional distillation?

- A. To condense the vapors
- B. To increase the rate of distillation
- C. To provide more surfaces for heat exchange and separation of components
- D. To separate volatile liquids from nonvolatile impurities

Answer: C

80. Which chromatographic technique is based on the differential adsorption of compounds on an adsorbent?

- A. Column chromatography
- B. Thin layer chromatography
- C. Paper chromatography
- D. Gas chromatography

Answer: A

81. In paper chromatography, the stationary phase is:

- A. A solid adsorbent
- B. A paper soaked with water
- C. A liquid solvent
- D. A chromatography plate

Answer: B

82. What is the purpose of using a mobile phase in chromatography?

- A. To dissolve the compound
- B. To separate the compounds
- C. To retain the compounds
- D. To carry the compounds along the stationary phase

Answer: D

83. The technique used to separate substances that are steam volatile and immiscible with water is called:

- A. Steam distillation
- B. Crystallisation
- C. Distillation
- D. Differential extraction

Answer: A

84. Which purification technique is based on the principle of differential partitioning of components between stationary and mobile phases?

- A. Distillation
- B. Crystallisation
- C. Partition chromatography
- D. Differential extraction

Answer: C

85. Crystallization is a commonly used technique for the purification of which of the following?

- A. Liquid organic compounds
- B. Gaseous organic compounds
- C. Solid organic compounds
- D. Inorganic compounds

Answer: C

86. Which of the following techniques is used to separate mixtures into their components, purify compounds, and test the purity of compounds?

- A. Sublimation
- B. Crystallisation

- C. Distillation
- D. Chromatography

Answer: D

87. Thin layer chromatography (TLC) involves separation of substances over a thin layer of an adsorbent coated on a:

- A. Glass flask
- B. Metal plate
- C. Paper strip
- D. Glass plate

Answer: D

88. The principle of differential adsorption is used in which type of chromatography?

- A. Column chromatography
- B. Thin layer chromatography
- C. Steam distillation
- D. Partition chromatography

Answer: A

89. The R_f value in thin layer chromatography is calculated as:

- A. Distance moved by the substance from the base line divided by the distance moved by the solvent from the base line
- B. Distance moved by the solvent from the base line divided by the distance moved by the substance from the base line
- C. Distance moved by the substance from the base line divided by the distance moved by the stationary phase from the base line
- D. Distance moved by the stationary phase from the base line divided by the distance moved by the substance from the base line

Answer: A

90. Which type of chromatography is based on continuous differential partitioning of components between stationary and mobile phases?

- A. Adsorption chromatography
- B. Partition chromatography
- C. Column chromatography
- D. Differential extraction

Answer: B

91. Which technique is used to purify liquids with very high boiling points or that decompose at or below their boiling points?

- A. Fractional distillation
- B. Distillation under reduced pressure
- C. Steam distillation
- D. Column chromatography

Answer: B

92. Which type of chromatography is commonly used for separating mixtures into their components based on differential adsorption?

- A. Thin layer chromatography
- B. Paper chromatography
- C. Steam distillation
- D. Gas chromatography

Answer: A

93. What is the purpose of the stationary phase in chromatography?

- A. To move the components of the mixture
- B. To adsorb the components of the mixture
- C. To vaporize the components of the mixture
- D. To separate the components based on boiling points

Answer: B

94. What is the detection method most commonly used in thin layer chromatography to visualize colorless compounds?

- A. UV light
- B. Ninhydrin solution
- C. Iodine crystals
- D. Spraying with a reagent

Answer: A

95. What is the main difference between column chromatography and thin layer chromatography?

- A. The type of stationary phase used

- B. The type of mobile phase used
- C. The method of separation
- D. The detection technique

Answer: A

96. What is the purpose of the eluant in thin layer chromatography?

- A. To separate the components of the mixture
- B. To visualize the spots on the plate
- C. To carry the components along the stationary phase
- D. To remove impurities from the mixture

Answer: C

97. What does the R_f value represent in thin layer chromatography?

- A. The boiling point of the compound
- B. The solubility of the compound
- C. The degree of adsorption of the compound
- D. The distance traveled by the compound relative to the solvent front

Answer: A

98. What is the purpose of repeated crystallization in the purification of compounds?

- A. To remove impurities
- B. To increase the solubility of the compound
- C. To speed up the crystallization process
- D. To change the physical state of the compound

Answer: A

99. What is the purpose of using an adsorbent in adsorption chromatography?

- A. To separate volatile components
- B. To visualize the spots on the plate
- C. To carry the components along the stationary phase
- D. To differentiate between different compounds based on their adsorption

Answer: D

100. What is the primary factor used to determine the purity of a compound in traditional purification methods?

- a) Boiling point
- b) Melting point
- c) Solubility
- d) Density

Answer: B

101. Which elements are present in all organic compounds?

- A. Carbon and oxygen
- B. Carbon and nitrogen
- C. Carbon and hydrogen
- D. Carbon and sulphur

Answer: C

102. How are carbon and hydrogen detected in an organic compound?

- A. By heating the compound with copper(II) oxide
- B. By boiling the compound with distilled water
- C. By acidifying the compound with sulphuric acid
- D. By treating the compound with sodium metal

Answer: A

103. How is nitrogen detected in an organic compound using Lassaigne's test?

- A. By boiling the sodium fusion extract with iron(II) sulphate
- B. By acidifying the sodium fusion extract with acetic acid
- C. By treating the sodium fusion extract with sodium nitroprusside
- D. By heating the sodium fusion extract with nitric acid

Answer: A

104. How is sulphur detected in an organic compound using Lassaigne's test?

- A. By acidifying the sodium fusion extract with acetic acid
- B. By treating the sodium fusion extract with sodium nitroprusside
- C. By boiling the sodium fusion extract with iron(II) sulphate
- D. By heating the sodium fusion extract with nitric acid

Answer: A

105. How are halogens detected in an organic compound using Lassaigne's test?

- A. By boiling the sodium fusion extract with iron(II) sulphate
- B. By acidifying the sodium fusion extract with nitric acid
- C. By treating the sodium fusion extract with silver nitrate
- D. By heating the sodium fusion extract with ammonium molybdate

Answer: C

106. How is phosphorus detected in an organic compound?

- A. By heating the compound with copper(II) oxide
- B. By acidifying the compound with sulphuric acid
- C. By boiling the compound with distilled water
- D. By treating the compound with sodium peroxide

Answer: D

107. What is the significance of the formation of Prussian blue color in the test for nitrogen?

- A. It confirms the presence of oxygen.
- B. It confirms the presence of carbon.
- C. It confirms the presence of nitrogen.
- D. It confirms the presence of sulphur.

Answer: C

108. How is the presence of sulphur further confirmed in the sodium fusion extract?

- A. By adding lime-water and observing turbidity.
- B. By adding anhydrous copper sulphate and observing a color change.
- C. By adding lead acetate and observing a black precipitate.
- D. By adding silver nitrate and observing a white precipitate.

Answer: C.

109. What color indicates the presence of phosphorus in the test for phosphorus?

- a) Blue
- b) Green
- c) Yellow
- d) Red

Answer: C

110. What is the purpose of boiling the sodium fusion extract with concentrated nitric acid in the test for halogens?

- A. To decompose cyanide or sulphide ions.
- B. To oxidize the phosphorus to phosphate.
- C. To detect the presence of nitrogen.
- D. To acidify the solution before adding silver nitrate.

Answer: A

111. What is the name of the test used to detect carbon and hydrogen in organic compounds?

- a) Lassaigne's test
- b) Sodium fusion test
- c) Prussian blue test
- d) Copper oxide test

Answer: D

112. Which element present in organic compounds is detected by treating the sodium fusion extract with sodium nitroprusside?

- A. Nitrogen
- B. Sulphur
- C. Halogens
- D. Phosphorus

Answer: B

113. What is the color change observed when the sodium fusion extract is treated with sodium nitroprusside in the test for sulphur?

- A. Violet
- B. Red
- C. Yellow
- D. Blue

Answer: A

114. How is the presence of chlorine detected in the test for halogens?

- A. By observing a white precipitate soluble in ammonium hydroxide
- B. By observing a yellowish precipitate sparingly soluble in ammonium hydroxide

- C. By observing a yellow precipitate insoluble in ammonium hydroxide
- D. By observing a green coloration

Answer: A

115. What is the oxidizing agent used in the test for phosphorus?

- A. Copper(II) oxide
- B. Sodium peroxide
- C. Iron(II) sulphate
- D. Lead acetate

Answer: B

116. What is the purpose of the U-tubes containing anhydrous calcium chloride and potassium hydroxide solutions in the estimation of carbon and hydrogen in an organic compound?

- A. To absorb water and carbon dioxide formed on oxidation of the substance
- B. To absorb nitrogen gas formed on oxidation of the substance
- C. To absorb oxygen gas formed on oxidation of the substance
- D. To absorb carbon monoxide formed on oxidation of the substance

Answer: A

117. Which method can be used to estimate nitrogen in an organic compound?

- A. Estimation based on the formation of ammonia by heating with sulphuric acid and excess of sodium hydroxide
- B. Estimation based on the formation of free nitrogen by heating with copper oxide in the presence of carbon dioxide
- C. Both a and b
- D. None of the above

Answer: C

118. What is the purpose of heating the acid mixture with excess of sodium hydroxide in the Kjeldahl's method for the estimation of nitrogen?

- a) To liberate ammonia gas
- b) To absorb ammonia gas
- c) To convert ammonia gas to ammonium sulphate
- d) To convert ammonium sulphate to ammonia gas

Answer: A

119. How is nitrogen collected in the Dumas method for estimation?

- A. It is collected in a graduated tube over potassium hydroxide solution.
- B. It is collected in a U-tube containing anhydrous calcium chloride.
- C. It is collected in a U-tube containing concentrated solution of potassium hydroxide.
- D. It is collected in a U-tube containing fuming nitric acid.

Answer: A

120. What is the method used to estimate halogens in an organic compound?

- A. Dumas method
- B. Carius method
- C. Kjeldahl's method
- D. Sodium peroxide method

Answer: B

121. In the Carius method, what is the halogen present converted to?

- A. Halogen gas
- B. Halide ions
- C. Silver halide
- D. Sodium halide

Answer: C

122. How is sulphur determined in an organic compound?

- A. By heating with sodium peroxide or fuming nitric acid
- B. By heating with excess of sodium hydroxide
- C. By precipitation as barium sulphate
- D. By precipitation as ammonium phosphomolybdate

Answer: C

123. How is the percentage of oxygen in an organic compound usually determined?

- A. By difference between the total percentage composition and the sum of percentages of other elements
- B. By heating the compound in a stream of nitrogen gas
- C. By passing the gaseous products over red-hot coke
- D. By measuring the amount of iodine produced

Answer: A

124. Which method is used to estimate nitrogen in an organic compound by converting it to ammonium sulphate?

- A. Dumas method
- B. Kjeldahl's method
- C. Carius method
- D. Sodium peroxide method

Answer: B

125. Which compound is formed when sulphur is oxidized in the Carius method?

- A. Sulphuric acid
- B. Silver sulphate
- C. Barium sulphate
- D. Sodium sulphate

Answer: C

126. How is phosphorus estimated in an organic compound using the fuming nitric acid method?

- A. By precipitation as ammonium phosphomolybdate
- B. By oxidation to phosphoric acid
- C. By conversion to magnesium pyrophosphate
- D. By reaction with silver nitrate

Answer: A

127. How is the percentage of oxygen in an organic compound determined directly?

- A. By passing the gaseous products over red-hot coke
- B. By heating the compound with sodium peroxide
- C. By decomposing the compound in a stream of nitrogen gas
- D. By measuring the amount of iodine produced

Answer: A

128. In the combustion analysis method, what is the purpose of passing the mixture through a U-tube containing anhydrous calcium chloride?

- A. To absorb carbon dioxide
- B. To absorb water

- C. To absorb nitrogen
- D. To absorb oxygen

Answer: B

129. What is absorbed in the U-tube containing concentrated potassium hydroxide solution in the combustion analysis method?

- A. Carbon dioxide
- B. Water
- C. Nitrogen
- D. Oxygen

Answer: A

130. In the estimation of nitrogen using the Dumas method, what is the gas collected in the upper part of the graduated tube?

- A. Oxygen
- B. Nitrogen
- C. Carbon dioxide
- D. Water vapor

Answer: B

131. Which of the following is NOT a common crystal structure for metals and alloys?

- A. Body-centered cubic (bcc)
- B. Hexagonal close packed (hcp)
- C. Cubic close packed (ccp)
- D. Simple cubic

Answer: D

132. In the body-centered cubic (bcc) structure, how many nearest neighbors does each metal atom have?

- A. 4
- B. 6
- C. 8
- D. 12

Answer: C

133. Which stacking sequence is characteristic of the cubic close packed (ccp) structure?

- A. ABAB...
- B. ABCABC...
- C. AABBC...
- D. ABCDABCD...

Answer B

134. What is the coordination number of metal atoms in the hexagonal close packed (hcp) structure?

- A. 4
- B. 6
- C. 8
- D. 12

Answer: B

135. Which quantum number describes the energy level of an electron and the most probable distance from the nucleus?

- A. Principal quantum number (n)
- B. Orbital angular momentum quantum number (l)
- C. Magnetic quantum number (m)
- D. Electron spin quantum number (ms)

Answer: A

136. How many angular nodes does an atom have if the orbital angular momentum quantum number (l) is 3?

- A. 1
- B. 2
- C. 3
- D. 4

Answer: C

137. What are the possible values of the magnetic quantum number (ml) when $n = 2$ and $l = 1$?

- A. -1, 0, 1
- B. -2, -1, 0, 1, 2
- C. -1/2, 1/2
- D. 0

Answer: A

138. Which quantum number determines the direction of the electron spin?

- A. Principal quantum number (n)
- B. Orbital angular momentum quantum number (l)
- C. Magnetic quantum number (m)
- D. Electron spin quantum number (m_s)

Answer D

139. What is the name of the orbital with quantum numbers $n = 3$ and $l = 2$?

- A. 3s
- B. 3p
- C. 3d
- D. 3f

Answer: C

140. How many orbitals are there in a subshell with $l = 2$?

- A. 1
- B. 3
- C. 5
- D. 7

Answer: C

141. How many subshells are there in a principal shell with $n = 4$?

- A. 1
- B. 2
- C. 3
- D. 4

Answer: C

142. How many orbitals are there in a subshell with $l = 1$?

- A. 1
- B. 2
- C. 3
- D. 4

Answer B

143. Which quantum number determines the number of orbitals and their orientation within a subshell?

- A. Principal quantum number (n)
- B. Orbital angular momentum quantum number (l)
- C. Magnetic quantum number (m)
- D. Electron spin quantum number (m_s)

Answer: C

144. Which quantum number is independent of the others and determines the direction of the electron spin?

- A. Principal quantum number (n)
- B. Orbital angular momentum quantum number (l)
- C. Magnetic quantum number (m)
- D. Electron spin quantum number (m_s)

Answer: D

145. How many possible combinations of all four quantum numbers are there when $n = 3$, $l = 1$, and $m_l = 0$?

- A. 1
- B. 2
- C. 3
- D. 4

Answer: B

146. What is the maximum number of electrons that can occupy an orbital?

- A. 1
- B. 2
- C. 4
- D. 6

Answer: B

147. What is the significance of the principal quantum number (n) in determining the size of an atom?

- A. It determines the energy level of the electron.

- B. It determines the shape of the orbital.
- C. It determines the number of angular nodes.
- D. It determines the most probable distance of the electron from the nucleus.

Answer: D

148. Which of the following is an allotrope of carbon that exhibits extraordinary strength and unique electrical properties?

- A. Diamond
- B. Graphite
- C. Fullerenes
- D. Amorphous carbon

Answer: C

149. What is the basic structural element of carbon allotropes such as graphite, charcoal, carbon nanotubes, and fullerenes?

- A. Diamond
- B. Graphene
- C. Amorphous carbon
- D. Glassy carbon

Answer: B

150. Which carbon allotrope consists of molecules composed entirely of carbon that take on the form of hollow spheres, ellipsoids, or tubes?

- A. Diamond
- B. Graphite
- C. Fullerenes
- D. Amorphous carbon

Answer: C

151. Carbon nanotubes are cylindrical carbon molecules that exhibit extraordinary strength and unique electrical properties. They are efficient conductors of _____.

- A. Light
- B. Heat
- C. Sound
- D. Electricity

Answer: D

152. Which allotrope of carbon is widely used as an electrode material in electrochemistry, and exhibits high temperature resistance, hardness, low density, and extreme resistance to chemical attack?

- A. Diamond
- B. Graphite
- C. Fullerenes
- D. Glassy carbon

Answer: D

153. Which type of reaction involves the breaking of a sigma bond and the formation of a pi bond?

- a) Addition reaction
- b) Substitution reaction
- c) Rearrangement reaction
- d) Elimination reaction

Answer: A

154. In an addition reaction, the reactants combine to form a:

- a) Larger molecule
- b) Smaller molecule
- c) Different molecule
- d) No new molecule is formed

Answer: A

155. Which type of reaction involves the replacement of an atom or a group in a molecule?

- a) Addition reaction
- b) Substitution reaction
- c) Rearrangement reaction
- d) Elimination reaction

Answer: B

156. Which of the following is an example of a substitution reaction?

- a) Hydrogenation reaction
- b) Friedel-Crafts alkylation reaction

- c) Wittig reaction
- d) SN2 reaction

Answer: D

157. In a substitution reaction, the atom or group being replaced is usually called the:

- a) Leaving group
- b) Nucleophile
- c) Electrophile
- d) Solvent

Answer: A

158. Which type of reaction involves the rearrangement of atoms or groups within a molecule to form a different isomer?

- a) Addition reaction
- b) Substitution reaction
- c) Rearrangement reaction
- d) Elimination reaction.

Answer: C

159. In an elimination reaction, a molecule loses atoms or groups to form a:

- a) Smaller molecule
- b) Larger molecule
- c) Different molecule
- d) No new molecule is formed.

Answer: A

160. In an elimination reaction, the atoms or groups being eliminated are usually called:

- a) Leaving groups
- b) Nucleophiles
- c) Electrophiles
- d) Catalysts

Answer: A

161. Which type of reaction is commonly associated with the formation of alkenes or alkynes?

- a) Addition reaction

- b) Substitution reaction
- c) Rearrangement reaction
- d) Elimination reaction

Answer: D

162. In a substitution reaction, the attacking species is usually a:

- a) Leaving group
- b) Nucleophile
- c) Electrophile
- d) Solvent

Answer: B

163. Which type of reaction involves the breaking of a pi bond and the formation of a sigma bond?

- a) Addition reaction
- b) Substitution reaction
- c) Rearrangement reaction
- d) Elimination reaction

Answer: D

164. What is the purpose of reaction mechanisms in chemistry?

- a) To determine the rate of a reaction
- b) To identify the reactants and products
- c) To explain how a reaction occurs at the molecular level
- d) To balance chemical equations

Answer: C

165. Which of the following is NOT a step in a typical reaction mechanism?

- a) Initiation
- b) Termination
- c) Propagation
- d) Equilibrium

Answer: D

166. Which type of reaction mechanism involves the attack of a nucleophile on an electrophilic center?
- a) Substitution mechanism
 - b) Addition mechanism
 - c) Radical mechanism
 - d) Elimination mechanism

Answer: A

167. What is the role of arrows in a reaction mechanism?
- a) To indicate the direction of the reaction
 - b) To show the movement of electrons
 - c) To balance the equation
 - d) To indicate the pH of the reaction

Answer: B

168. Which type of reaction mechanism involves the transfer of a single electron between species?
- a) Substitution mechanism
 - b) Addition mechanism
 - c) Radical mechanism
 - d) Elimination mechanism

Answer: C

169. What is the purpose of using curved arrows in reaction mechanisms?
- a) To indicate the formation of a new bond
 - b) To indicate the breaking of a bond
 - c) To show the movement of electron pairs
 - d) To indicate the presence of a catalyst

Answer: C

170. Which of the following is NOT a type of reaction mechanism?
- a) Acid-base mechanism
 - b) Nucleophilic substitution mechanism
 - c) Electrophilic aromatic substitution mechanism
 - d) Equilibrium mechanism

Answer: D

171. Which type of reaction mechanism involves the removal of a leaving group and the formation of a double or triple bond? a) Substitution mechanism b) Addition mechanism c) Radical mechanism d) Elimination mechanism

Answer: D

172. What is the overall goal of studying reaction mechanisms?
- a) To predict the products of a reaction
 - b) To determine the enthalpy change of a reaction
 - c) To understand the factors that influence reaction rates

d) To balance chemical equations.

Answer: C

173. What does stereochemistry study in chemistry?

- a) The properties of molecules
- b) The behavior of chemical reactions
- c) The arrangement of atoms in space
- d) The formation of new compounds

Answer: C

174. Stereochemistry is concerned with the three-dimensional arrangement of:

- a. Electrons
- b. Ions
- c. Molecules
- d. Solvents

Answer: C

175. What is a stereoisomer?

- a) Isomers that differ in connectivity
- b) Isomers that have the same molecular formula but different arrangements in space
- c) Isomers that have different functional groups
- d) Isomers that have the same physical properties

Answer: B

176. Which of the following statements is true about chiral molecules?

- a) They have a plane of symmetry
- b) They are achiral
- c) They can exist as enantiomers
- d) They have the same arrangement of atoms in space

Answer: C

177. A molecule that has a chiral centre and its mirror image that are not superimposable is called:

- a) Diastereomer
- b) Enantiomer
- c) Isomer
- d) Racemic mixture

Answer: B

178. Which of the following is an example of a chiral molecule?

- a) Methane (CH₄)
- b) Ethane (C₂H₆)
- c) Ethanol (C₂H₅OH)
- d) Ethene (C₂H₄)

Answer: C

179. How can enantiomers be distinguished from each other?

- a) They have different boiling points
- b) They have different molecular weights
- c) They rotate plane-polarized light in opposite directions
- d) They have different colours

Answer: C

180. What is the term for a molecule that has no chiral centres?

- a) Achiral
- b) Mesocyclic
- c) Diastereomeric
- d) Racemic

Answer: A

181. Which of the following statements is true about cis-trans isomerism?

- a) It only occurs in molecules with chiral centers
- b) It is a type of geometric isomerism
- c) It involves the arrangement of atoms in space
- d) It can exist in meso compounds

Answer: B

182. In cis-trans isomerism, cis refers to:

- a) The same side of a molecule
- b) The opposite sides of a molecule
- c) The presence of a chiral center
- d) The absence of a plane of symmetry

Answer: A

183. Which of the following is an example of cis-trans isomerism?

- a) Enantiomers
- b) Diastereomers
- c) Geometric isomers
- d) Structural isomers

Answer: C

184. Which of the following is true about a racemic mixture?

- a) It consists of two enantiomers in equal amounts
- b) It consists of two diastereomers in equal amounts
- c) It has a plane of symmetry
- d) It is optically active

Answer: A

185. What is the relationship between enantiomers and optical activity?

- a) Enantiomers have the same optical activity
- b) Enantiomers have opposite optical activity
- c) Enantiomers do not exhibit optical activity
- d) Enantiomers have different colours

Answer: B

186. Which of the following is true about a plane-polarized light?

- a) It vibrates in multiple directions
- b) It is not affected by chiral molecules
- c) It can be rotated by chiral molecules

d) It does not interact with other molecules

Answer: C

187. How can the specific rotation of a compound be determined?

a) By measuring its boiling point

b) By measuring its molecular weight

c) By measuring its optical activity

d) By measuring its colour intensity

Answer: C

188. Which type of stereoisomerism can be observed in molecules with double bonds that cannot rotate?

a) Geometric isomerism

b) Optical isomerism

c) Conformational isomerism

d) Structural isomerism

Answer: A

189. What is the maximum number of stereoisomers a molecule with three chiral centres can have?

a) 2

b) 4

c) 8

d) 16

Answer: D

190. Which of the following is true about diastereomers?

a) They have the same physical properties

b) They have the same arrangement of atoms in space

c) They can exist as enantiomers

d) They are not mirror images of each other

Answer: D

191. Which of the following is NOT a type of stereoisomerism?

a) Geometric isomerism

b) Optical isomerism

c) Constitutional isomerism

d) Conformational isomerism

Answer: C

192. Which type of isomerism involves different connectivity of atoms in a molecule?

a) Geometric isomerism

b) Optical isomerism

c) Conformational isomerism

d) Constitutional isomerism

Answer: D

193. Which type of isomerism can be observed in compounds that have different spatial arrangements due to the rotation around single bonds?

- a) Geometric isomerism
- b) Optical isomerism
- c) Conformational isomerism
- d) Structural isomerism

Answer: C

194. Which of the following is NOT true about optical isomers?

- a) They have the same physical properties
- b) They rotate plane-polarized light in opposite directions
- c) They are mirror images of each other
- d) They can be separated by using a chiral stationary phase in chromatography

Answer: A

195. How can the configuration of a chiral centre be determined using the Cahn-Ingold-Prelog priority rules?

- a) By assigning priorities based on atomic number
- b) By assigning priorities based on molecular weight
- c) By assigning priorities based on boiling points
- d) By assigning priorities based on colour intensity

Answer: A

196. Alcohols are characterized by the presence of which functional group?

- a) Carbonyl group
- b) Hydroxyl group
- c) Alkyl group
- d) Ester group

Answer: B

197. Which of the following is an ether?

- a) Ethanol
- b) Ethene
- c) Ethoxyethane
- d) Ethanal

Answer: C

198. Aldehydes are characterized by the presence of which functional group?

- a) Carbonyl group
- b) Hydroxyl group
- c) Alkyl group
- d) Ether group

Answer: A

199. Which of the following is a ketone?

- a) Ethanol

- b) Ethene
 - c) Acetone
 - d) Ethanal
- Answer: C

200. How many hydrogen atoms are present in a butane molecule?

- a) 8
- b) 10
- c) 12
- d) 14

Answer: B

201. Which of the following is a secondary alcohol?

- a) Ethanol
- b) Methanol
- c) Isopropanol
- d) Butanol

Answer: C

202. Which of the following is a primary alcohol?

- a) Ethanol
- b) Methanol
- c) Isopropanol
- d) Butanol

Answer: A

203. Which of the following is an unsaturated hydrocarbon?

- a) Propane
- b) Ethene
- c) Butane
- d) Pentane

Answer: B

204. What is the IUPAC name for the compound $\text{CH}_3\text{CH}_2\text{COCH}_3$?

- a) butanone
- b) Ethanal
- c) Acetone
- d) Propanone

Answer: A

205. What is the IUPAC name for the compound $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$?

- a) butanal
- b) Ethanal
- c) Acetone
- d) Propanal

Answer: A

206. What is the IUPAC name for the compound $\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_3$?

- a) Pentanone
- b) Pentanal

- c) Acetone
 - d) Butanone
- Answer: A

208. Which of the following is a metal?

- a) Oxygen
- b) Hydrogen
- c) Sodium
- d) Nitrogen

Answer: C

209. Metals are typically found in which state at room temperature?

- a) Solid
- b) Liquid
- c) Gas
- d) Plasma

Answer: A

210. Which of the following properties is NOT characteristic of metals?

- a) High electrical conductivity
- b) Ductility
- c) Brittle nature
- d) Metallic luster

Answer: C

211. Which metal is known for its high electrical conductivity and use in electrical wiring?

- a) Silver
- b) Gold
- c) Platinum
- d) Copper

Answer: D

212. Which metal is highly reactive and is stored under oil or water to prevent its reaction with air?

- a) Sodium
- b) Iron
- c) Nickel
- d) Chromium

Answer: A

213. Which metal is used in the production of steel and is an essential element for many industries?

- a) Silver
- b) Gold
- c) Iron

d) Copper
Answer: C

214. Which metal is highly resistant to corrosion and is commonly used in jewelry?

- a) Gold
- b) Silver
- c) Platinum
- d) Copper

Answer: A

215. Which metal is used as a reducing agent in metallurgical processes and is obtained from its ore bauxite?

- a) Aluminum
- b) Zinc
- c) Iron
- d) Copper

Answer: A

216. Which metal is used as a protective coating for iron and steel to prevent rusting?

- a) Aluminum
- b) Zinc
- c) Lead
- d) Chromium

Answer: B

217. Which metal is commonly used in the production of batteries and is highly toxic?

- a) Aluminum
- b) Zinc
- c) Lead
- d) Nickel

Answer: C

218. Which metal is commonly used in electrical transmission lines due to its low resistance to electric current?

- a) Aluminum
- b) Zinc
- c) Copper
- d) Silver

Answer: C

219. Which metal is used in the production of coins and is known for its antimicrobial properties?

- a) Silver
- b) Gold
- c) Platinum
- d) Nickel

Answer: A

220. Which metal is used in the production of aircraft due to its lightweight and high strength?
a) Aluminium
b) Zinc
c) Iron
d) Titanium
Answer: A
221. Which metal is commonly used in galvanizing to provide corrosion protection to steel?
a) Aluminium
b) Zinc
c) Lead
d) Chromium
Answer: B
222. Which metal is used in the production of mirrors and is known for its reflectivity?
a) Silver
b) Gold
c) Platinum
d) Copper
Answer: A
223. Which metal is known for its high melting point and is commonly used in high-temperature applications?
a) Copper
b) Aluminium
c) Iron
d) Tungsten
Answer: D
224. The purification method where solid substances change from solid to vapor state without passing through the liquid state is called which of the following?
A. Sublimation
B. Crystallization
C. Distillation
D. Differential extraction
Answer: A
225. Organic reaction that involves exchange of atoms or group of atoms are known as _____ reaction
A. addition
B. substitution

- C. elimination reaction
- D. rearrangement

ANSWER: B

226. Organic compounds that are polar generally have higher _____ than their corresponding compounds that are not polar.

- A. bonds
- B. electrons
- C. melting points
- D. boiling points

ANSWER: D

227. Which of these methods is used for the industrial production of ethers?

- A. dehydration of alcohols
- B. oxidation of alcohols
- C. reduction of alcohols
- D. hydration of alcohol

ANSWER: D

228. Which of these methods is the most reliable and versatile for the synthesis of ether?

- A. Alkoxymercuration-demercuration
- B. Williamson
- C. Friedel-Craft
- D. Markovnicov

ANSWER: B

229. Generally, ethers are unreactive because the linkage is quite _____ towards bases, oxidizing and reducing agents.

- A. unstable
- B. reactive
- C. stable
- D. neutral

ANSWER: C

230. The ether linkage can only be cleaved by _____.

- A. bases
- B. acids
- C. salts
- D. alkali

ANSWER: B

231. A chemical _____ is a transformation where one or more reactant(s) are partially or completely transformed into one or more product(s).
- A. reaction
 - B. equation
 - C. mechanism
 - D. bond.

ANSWER: A

232. _____ is a chemical substance which is added to the reaction mixture to bring about a reaction.
- A. bond
 - B. base
 - C. reagent
 - D. Acid

ANSWER: C

233. _____ is the actual process of the chemical transformation that shows how chemical species react and how the products are formed.
- A. reaction
 - B. mechanism
 - C. reagent
 - D. bond

ANSWER: B

234. _____ shows the motion of atoms and electrons, the bonds that are broken and formed and the number of elementary steps involved in the whole reaction.
- A. reaction
 - B. mechanism
 - C. reagent
 - D. bond

ANSWER: B

235. Which of the following rule is needed to ascertain the location of hydrogen atom in addition reaction? A. Proton
- B. Markovnikov
 - C. Methy shift
 - D. Hydride Shift

ANSWER: B

236. Identify the one which does not come under the organic addition reaction.

- A. Hydration
- B. Dehydration
- C. Halogenation
- D. Hydrohalogenation

ANSWER: B

237. The reaction; $C_2H_5Br \rightarrow C_2H_4 + HBr$ can be referred to as _____.
- A. addition
 - B. substitution
 - C. elimination
 - D. rearrangement

ANSWER: C

238. Which of the following groups does not contain oxygen atom?
- A. alcohol
 - B. ether
 - C. amine
 - D. alkanal

ANSWER: C

239. The product of this reaction $CH_3CH_2MgCl \xrightarrow{H_2O}$ is _____.
- A. an alkane
 - B. an alkene
 - C. an aldehyde
 - D. a ketone

ANSWER: A

240. A positive charge on an organic atom or group of atoms indicates _____ centre.
- A. electron rich
 - B. electron deficient
 - C. neutral
 - D. reaction

ANSWER: B

241. An organic reaction in which there is a constitutional change in carbon skeleton is called _____ reaction.
- A. addition
 - B. substitution
 - C. rearrangement

D. elimination

ANSWER: C

242. Curved arrows are used to show the direction of _____ movement.

- A. electrons
- B. Protons
- C. products
- D. reactants

ANSWER: A

243. One of the following is not a reaction of alkanes:

- A. Substitution
- B. Reduction
- C. Combustion
- D. Pyrolysis

ANSWER: B

244. One of the following is not an oxidizing agent:

- A. MnO_2
- B. KOC
- C. KMnO_4
- D. NH_3

ANSWER: D

245. Which of the following is a reducing agent?

- A. LiAlH_4
- B. KOC
- C. KMnO_4
- D. HCl

ANSWER: A

246. The compound $\text{CH}_3(\text{CH}_2)_4\text{OH}$ is best named as _____.

- A. 2-methylpentanal
- B. pentanol
- C. hexanol
- D. hexan-4-one

ANSWER: B

247. Organic functional groups that can be classified into 1°, 2° and 3° includes the following but _____.

- A. alcohol
- B. alkyl halide
- C. ether
- D. alcohols and alkyl halides

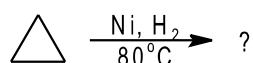
ANSWER: C

248. The reaction $C_6H_6 + HNO_3 \rightarrow C_6H_5NO_2 + H_2O$ can specifically be described as _____.

- A. substitution
- B. addition
- C. elimination
- D. rearrangement

ANSWER: A

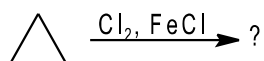
249. The product of the reaction below is an _____.



- A. alkane
- B. alcohol
- C. alkyl halide
- D. alkene

ANSWER: A

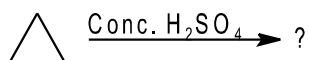
250. The product of the reaction below is an _____



- A. alkane
- B. alcohol
- C. alkyl halide
- D. alkene

ANSWER: C

251. The product of the reaction below is an _____



- A. alkane
- B. alcohol
- C. alkyl halide
- D. alkene

ANSWER: B

252. One of the following is not a reaction of alcohol.

- A. addition
- B. oxidation
- C. ester formation
- D. dehydration.

ANSWER: A

253. Which of the following reactions is common to all hydrocarbons?

- A. Addition
- B. combustion
- C. reduction
- D. substitution

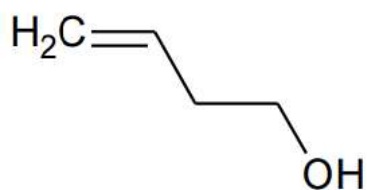
ANSWER: B

254. Ring opening reactions of cyclopropanes are due to their _____.

- A. reactivity
- B. instability
- C. ring strain
- D. all of the options

ANSWER: D

255. The name of the structure below is _____.



- A. 2-butanol
- B. butenol
- C. but-3-en-1-ol
- D. but-1-en-3-ol

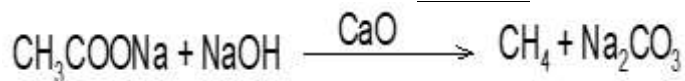
ANSWER: C

256. Alkanes can be prepared by the following methods except _____.

- A. Decarboxylation
- B. Hydrogenation
- C. Hydrolysis
- D. Grignard reagent

ANSWER: C

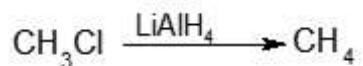
257. The reaction below is known as _____



- A. Decarboxylation
- B. Hydrogenation
- C. Hydrolysis
- D. Grignard reagent

ANSWER: A

258. The reaction below is known as _____



- A. Decarboxylation
- B. Reduction
- C. Hydrolysis
- D. Grignard reagent

ANSWER: B

259. Alkanes are involved in few and specific reactions because they are _____
- A. Hydrocarbon
 - B. Saturated
 - C. Unsaturated
 - D. All of the above

ANSWER: B

260. All of these are reactions of alkanes except _____
- A. Pyrolysis
 - B. Combustion
 - C. Ring opening
 - D. Elimination

ANSWER: D

261. Dehydrohalogenation reaction of alkyl halide yields _____
- A. Alkanes
 - B. Alkenes
 - C. Alkynes
 - D. Alcohol

ANSWER: B

262. Alkenes are _____ than alkanes due to the presence of a double bond.
- A. Less reactive
 - B. More reactive
 - C. More resistance
 - D. Less reactive

ANSWER: B

263. The C=C consists of a strong _____ bond and a weak _____ bond.
- A. Sigma and pi
 - B. Pi and sigma
 - C. Pi and pi

D. Sigma and sigma

ANSWER: A

264. The typical reactions of alkenes involve the breaking of _____ bond.

- A. Sigma
- B. Pi
- C. Double
- D. Single

ANSWER: B

265. The following hydrocarbons are highly combustible except _____

- A. Alkanes
- B. Alkenes
- C. Alkynes
- D. None of the above

ANSWER: D

266. The combustion reactions of hydrocarbons are _____

- A. Catalytic
- B. Endothermic
- C. Exothermic
- D. Endemic

ANSWER: C

267. Which of the following does not undergo substitution reaction?

- A. Alcohols
- B. Alkanes
- C. Alkenes
- D. None of the options

ANSWER: D

268. Which of the following functional groups go through substitution reaction at elevated temperature?

- A. Alkanes
- B. Alkynes

- C. Alkyl halides
- D. Alkenes

ANSWER: D

269. Alkenes when heated alone at high temperatures (500-700°C) or at lower temperatures (200-300°C) _____.
- A. Polymerizes
 - B. Combusts
 - C. Pyrolyzes
 - D. Isomerizes

ANSWER: D

270. Glycerol is an example of _____ alcohol.
- A. Primary
 - B. Secondary
 - C. Tertiary
 - D. Trihydric

ANSWER: D

271. Alcohols containing more than one -OH groups are classified as _____
- A. Primary
 - B. Secondary
 - C. Tertiary
 - D. Polyhydric

ANSWER: D

272. Which of the following is/are not a physical property (ies) of alcohols?
- A. Solids
 - B. Gases
 - C. Solids and liquids
 - D. All of the above

ANSWER: D

273. Which of the following alcohols cannot be oxidized?
- A. Primary

- B. Secondary
- C. Tertiary
- D. Primary and secondary

ANSWER: C

274. Oxidation of tertiary alcohol gives _____

- A. Aldehyde
- B. Ketone
- C. None of the above
- D. All of the above

ANSWER: C

275. Dehydration, ester formation, oxidations are all reactions of _____

- A. Alcohols
- B. Alkyl halides
- C. Alkenes
- D. Alcohols and alkyl halides

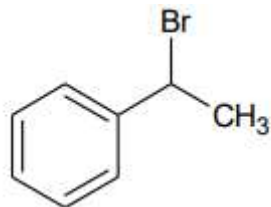
ANSWER: A

276. Alkyl halides can be formed from _____

- A. Alkanes
- B. Alkenes
- C. Alcohols
- D. All of the above

ANSWER: D

277. The structure below can be better named as _____

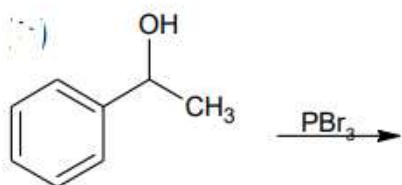


- A. 1-Bromo-1-methylbenzene
- B. 1-Bromo-1-phenyl ethane
- C. 1-Bromo-methylbenzene

D. 2-Bromo-2-phenylethane

ANSWER: B

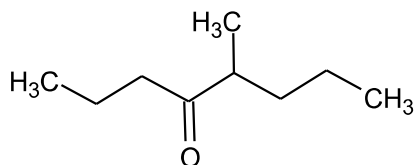
278. The product of the reaction below is _____



- A. Alcohol
- B. Alkyl halide
- C. Alkene
- D. Amine

ANSWER: B

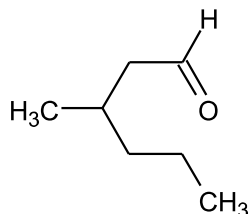
279. The correct name for the structure below is _____



- A. Methyloctanone
- B. 4-methyloctan-5-one
- C. 5-methyloctan-4-one
- D. Methylketoneoctane

ANSWER: C

280. The correct IUPAC name for the structure below is _____

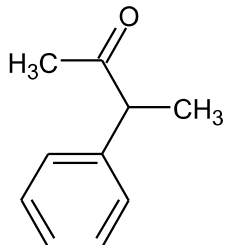


- A. 2-propylbutanone
- B. 3-methylhexanal
- C. 3-methylhexanone

D. 2-propylbutanal

ANSWER: C

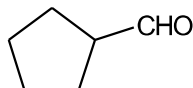
281. The most appropriate for the structure below is _____



- A. 3-phenylbutan-2-one
- B. 3-phenyl-3-methylpentanone
- C. 3-benzenebutan-2-one
- D. 3-benzene-3-methylpentanone

ANSWER: A

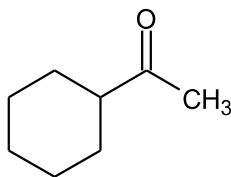
282. The most appropriate name for the structure below is _____



- A. Cyclopentanecarbaldehyde
- B. Cyclopentanone
- C. Cyclopentanemethanal
- D. Cyclohexanone

ANSWER: A

283. The correct name for the structure below is _____

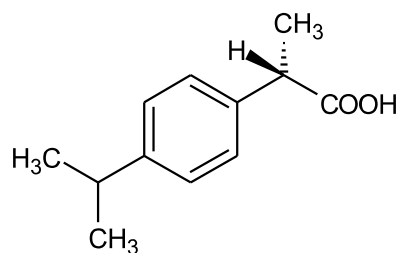


- A. Cyclohexylethanone
- B. 2-cyclohexylethanone
- C. Methybenzone
- D. cyclohexaneketone

ANSWER: A

Answer B

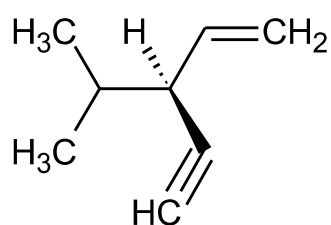
284. What is the correct configuration of the structure below?



- A. R
- B. S
- C. E
- D. Z

ANSWER: B

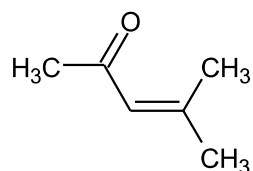
285. What is



- A. R
- B. S
- C. E
- D. Z

ANSWER: B

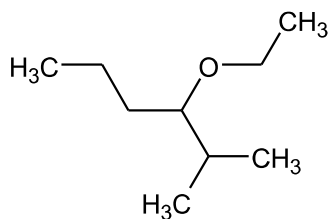
286. What is the most suited IUPAC name for the compound below?



- A. 4-methylpent-3-en-2-one
- B. 2-methylpent-2-en-4-one
- C. 3-methylpent-3-en-2-one
- D. 3-methylpent-2-en-4-one

ANSWER: A

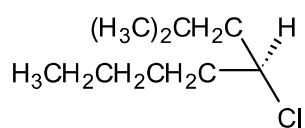
287. Give the correct name for the compound below.



- A. Isopropyl, ethylpropyl ether
- B. 3-ethoxy-2-methylhexane
- C. Ethylhexyl ether
- D. None of the options

ANSWER: B

288. What is the correct configuration of the structure below?



- A. R
- B. S
- C. E
- D. Z

ANSWER: B

289. The following functional groups contain carbonyl group except _____

- A. Ether
- B. Aldehyde
- C. Ketone
- D. Esther