Name:

Chapter 15 Review Quiz

Multiple Choice

Identify the choice that best completes the statement or answers the question.

▼ 1. The product formed when bromine is added to propene is:
   a. $CH_3CH_2CH_2Br$
   b. $CH_3CHBrCH_2Br$
   c. $CH_2BrCH_2CH_2Br$
   d. $CH_3CH_2CH_3$

▼ 2. Which of the following is NOT a test for an alcohol?
   a. reaction with sodium metal
   b. reaction with a carboxylic acid
   c. reaction with sodium carbonate
   d. reaction with acidified potassium permanganate

▼ 3. An alcohol and carboxylic acid react to produce:
   a. an ester.
   b. a condensation polymer.
   c. an amide.
   d. an alkoxide.

▼ 4. A compound has the following chemical properties:
   I a gas is produced on addition of sodium carbonate.
   II a gas is produced on addition of sodium.
   Which of the following could the compound be?
   a. CH_3CH_2OH
   b. HCOOH
   c. CH_3CHO
   d. CH_3COONa

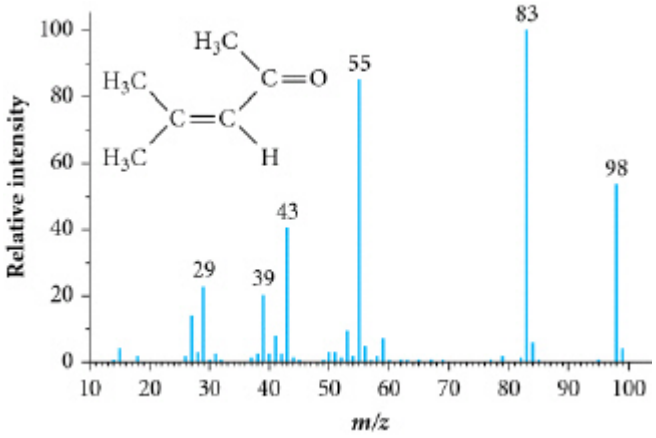
▼ 5. To determine the identity of three unknown organic liquids the following tests were conducted.

Liquid	Reaction with sodium metal	Reaction with bromine water in dichloromethane	Reaction with acidified potassium permanganate
I	No reaction	Decolourised	Decolourised
II	Bubbles produced	No reaction	Decolourised
III	Bubbles produced	No reaction	No reaction

   Which of the following shows the correct identification of each of the liquids?
   a. I – alcohol, II – carboxylic acid, III – alkene
   b. I – alkene, II – carboxylic acid, III – alcohol
   c. I- alkene , II – alcohol, III –carboxylic acid
   d. I – alcohol, II – alkene, III –carboxylic acid

▼ 6. In mass spectrometry:
   a. only anions are detected.
   b. the smaller cations are deflected more by the magnetic field.
   c. anions, cations and neutral atoms produce individual peaks.
   d. cations with a larger mass produce a higher peak.

▼ 7. Below is a mass spectrum for 4-methyl-3-pentene-2-one.



The base peak is found at:
a. 98 *m/z*.
b. 83 *m/z*.
c. 43 *m/z*.
d. 39 *m/z*.

▼ 8. Which relative mass could not be produced by the fragmentation of propene?
a. 30 *m/z*
b. 27 *m/z*
c. 15 *m/z*
d. 14 *m/z*

▼ 9. The charge of most ions produced in the ionisation step of mass spectroscopy is:
a. –1
b. 0
c. +1
d. +2

▼ 10. A molecule with an unpaired electron is called:
a. an ion.
b. a radical.
c. a cation.
d. a radion.

▼ 11. How many H environments would exist for propanoic acid?
a. 1
b. 2
c. 3
d. 4

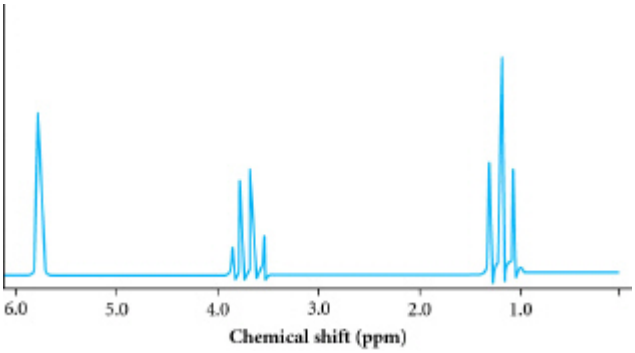
▼ 12. How many peaks will a signal from a CH_2 group on bromoethane split into on a high-resolution ^1H NMR spectrum?
a. 1
b. 2
c. 3
d. 4

▼ 13. How many C environments would exist for propanoic acid?
a. 1
b. 2
c. 3
d. 4

▼ 14. Which one of the following statements regarding ^{13}C NMR spectrum is incorrect?
a. The height of the peaks relates to the number of carbons in each environment.
b. The type of carbon is indicated by the chemical shift of the peak.
c. There is no splitting of the peaks.
d.

The spectra do not provide as much detail as the ^{1}H NMR spectrum.

▼ 15. A ^{1}H NMR of compound X is shown below.



Which of the following could be compound X?

a. ethyl ethanoate
b. propanoic acid
c. ethanol
d. propanone

▼ 16. Which statement regarding the movement of atoms in a molecule is *false*?

a. A polyatomic molecule has both stretching and bending vibrations.
b. The vibrations in polyatomic and diatomic molecules will always be symmetrical.
c. When a molecule absorbs infrared energy the degree of bending will increase.
d. Diatomic molecules have only stretching vibration.

▼ 17. An infrared spectra can:

a. identify the presence of certain functional groups.
b. identify the absence of certain functional group.
c. be used to confirm the identity of an unknown sample by comparing it to a known sample.
d. perform all of the above.

▼ 18. What wavenumbers correspond to the fingerprint region of an infrared spectrum?

a. $<1500\ cm^{-1}$
b. $1500–2000\ cm^{-1}$
c. $2000–3000\ cm^{-1}$
d. $>4000\ cm^{-1}$

▼ 19. UV-visible spectroscopy is based on:

a. electrons emitting a certain amount of energy all the time.
b. the colour of a molecule.
c. electrons in the molecule being excited to a higher energy level.
d. protons absorbing energy and moving faster.

▼ 20. Which analysis technique would be most suitable to identify the isotopes of an element?

a. NMR
b. UV-vis
c. Infrared spectroscopy
d. Mass spectroscopy

Check Your Work Start Over