قائمة الاسئلة

امتحان نهائي C3 الأول - للعام الجامعي 1446 هـ - الموافق -2025/2024مـ-مركز الاختبارات الالكترونية :: التحليل الالي الصيدلاني (2) - ()

د محمد عباس

1) In mass spectrometry Separation and analysis of the fragments provides information about:
   1) - a) Structure
   2) + b) Molecular weight and structure
   3) - c) Molecular weight
   4) - d) Radical Carbocation
2) A radical cation is:
   1) - a) A species with a negative charge and one unpaired electron
   2) - b) A species with a positive charge and two unpaired electrons
   3) + c) A species with a positive charge and one unpaired electron
   4) - d) A species with a neutral charge and one unpaired electron
3) Which of the following is wrong:
   1) - a) The radical cation corresponding to the mass of the original molecule
   2) - b) The molecular ion is usually the highest mass in the spectrum with some exceptions.
   3) - c) Some molecular ion peaks are absent.
   4) + d) The molecular ion is always the tallest (highest) peak in the spectrum.
4) All the following are True about The Base peak EXCEPT:
   1) - a) The molecular ion peak
   2) - b) The peak with the highest mass in the spectrum.
   3) - c) The most intense peak in the spectrum.
   4) + d) Both (a) and (b).
5) The most common fragments of 2-methylpentane:
   1) - a) M-43
   2) - b) M-29
   3) - c) M-15
   4) + d) All of the above
6) Formation of resonance stabilized allylic carbocations is the main fragmentation pathway of:
   1) - a) Alkane
   2) - b) Alkynes
   3) + c) Alkenes
   4) - d) Aromatics
7) The main fragmentation pathway for aromatics is the formation of :
   1) - a) Oxonium ion
   2) + b) tropylium ion
   3) - c) tropylium ion and oxonium ion
   4) - d) Acylium ion
8) The main fragmentation pathway for Aldehydes (RCHO) is the formation of :
   1) - a) Oxonium ion
   2) - b) tropylium ion
   3) - c) tropylium ion and oxonium ion
   4) + d) Acylium ion
9) The main fragmentation pathway for Esters (RCO2R') is the:
   1) - a) Loss of OR'
   2) - b) Loss of R'
   3) - c) α-cleavage forming oxonium ion
   4) + d) Both (a) and (b)
10) The main fragmentation pathway for ethers (ROR') is the:

1) - a) Loss of alkyl group forming oxonium ion
2) - b) Loss of alkyl group forming a carbocation Acylium ion
3) - c) α-cleavage forming oxonium ion
4) + d) all of the above

11) NMR is the study of absorption of _____ by nuclei in a magnetic field?
1) - a) Radioactive radiation
2) - b) IR radiation
3) + c) Radio frequency radiation
4) - d) Microwaves

12) NMR spectroscopy indicates the chemical nature of the _____ and spatial positions of _____
1) - a) Electrons, Protons
2) - b) Neutrons, electrons
3) - c) Nuclei, electrons
4) + d) Nuclei, neighbouring nuclei

13) Chemical shift allows a chemist to obtain the idea of how atoms are joined together.
1) + a) True
2) - b) False

14) NMR spectrometer provides _____ and _____ method of determining structure in soluble chemical compounds.
1) - a) Accurate, destructive
2) + b) Accurate, non-destructive
3) - c) Inaccurate, destructive
4) - d) Inaccurate, non-destructive

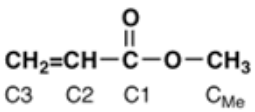
15) In 1H NMR all hydrogen atoms:
1) - a) have the same resonance frequency
2) + b) resonate at different frequencies depending on their environment
3) - c) are attached to carbon
4) - d) resonate at about the same frequency as carbon

16) Spin-spin splitting causes the peaks in 1H NMR spectra to be split into
1) - a) two peaks
2) - b) multiple peaks equal to the number of hydrogens on surrounding atoms
3) - c) multiple peaks equal to the number of surrounding carbon atoms
4) + d) multiple peaks equal to the number of hydrogen on surrounding atoms, plus one

17) The resonate frequency of the nucleus relative to a resonance standard is called:
1) - a) Field shift
2) - b) Matrix effects
3) + c) Chemical shift
4) - d) Resonance shift

18)

18- Which of indicates the correct order of carbon chemical shifts of the four carbons of the following compound.

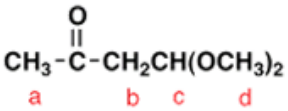


1) + a) CMe < C2 < C3 < C1
2) - b) CMe < C3 < C2 < C1

3) - c) CMe < C2 < C1 < C3
4) - d) CMe < C1 < C2 < C3

19)

19- Which of hydrogens a-d in the following molecule gives a triplet signal in a normal ^{1}H NMR spectrum?



1) - a) hydrogen a
2) - b) hydrogen b
3) + c) hydrogen c
4) - d) hydrogen d

20) Which hydrogen of 1-chloropent-2-ene shows the largest chemical (downfield) shift in its NMR spectrum?
1) - a) the H on C1
2) + b) the H on either C2 or C3
3) - c) the H on C4
4) - d) the H on C5

21) How many signals does the aldehyde (CH3)3CCH2CHO have in 1H NMR spectra?
1) - a) five 1H signals
2) + b) three 1H signals
3) - c) five 1H signals
4) - d) three 1H signals

22) Which carbon of hex-3-en-2-one shows the largest (most downfield) chemical shift in the NMR spectrum?
1) - a) C1
2) + b) C2
3) - c) C4
4) - d) C6

23) The source of energy in NMR is radio wave which have …….. wavelength, and.....…….?
1) - Long, high energy and frequency
2) - Short, high energy and frequency
3) - Short, low energy and frequency
4) + long, low energy and frequency

24) Which of the following statements in the context of 1H NMR spectroscopy is true?
1) + a) Arene C-H (aromatic hydrocarbon) chemical shift (δ) values are greater than simple alkenes C-H chemical shift values because of the aromatic ring current.
2) - b) Arene C-H chemical shift (δ) values are smaller than simple alkenes C-H chemical shift values because of the aromatic ring current.
3) - c) Arene C-H signals are always multiplets.
4) - d) Arene C-H signals are always singlets.

25) Which carbon of hex-3-en-2-one has the smallest (most up-field) chemical shift in the NMR spectrum?
1) - a) C1
2) - b) C2
3) - c) C4
4) + d) C6

26) Which of the following organic compound with molecular formula C3H6Cl2 exhibits only one signal in the IH NMR spectrum?
1) + a) 2, 2-dichloropropane

2) - b) 1, 2-dichloropropane
3) - c) 1, 3-dichloropropane
4) - d) 1, 1-dichloropropane

27) The 1H NMR spectrum of CH3OCHCICH2Cl will exhibit _____
1) - a) A three-proton doublet. One proton singlet and a two-proton doublet
2) - b) A three-proton singlet. One proton singlet and a two-proton doublet
3) + c) A three-proton singlet. One proton triplet and a two-proton doublet
4) - d) A three-proton triplet. One proton triplet and a two-proton triplet

28) Which of the following has three types of hydrogens in the following compounds?
1) + a) Br-CH = CH2
2) - b) CH3 – CH2 – CH3
3) - c) C6H5CH2
4) - d) CH3– CH2 – CH(CH3) – N02

29) H2, CH4, C2H6 and C6H6 exhibit which IH NMR spectra?
1) + a) Singlet
2) - b) Doublet
3) - c) Triplet
4) - d) Quintet

30) Mass spectrometry (Mass Spec or MS) uses _____ electrons to break a molecule into _____?
1) - a) Low energy, fragments
2) + b) High energy, fragments
3) - c) Radio frequency radiation, fragments
4) - d) Microwaves radiation, radical cation

31) _____ Identifies the arrangement of H&C atoms and their number ?
1) - a) UV
2) - b) IR
3) + c) NMR
4) - d) Mass

32) How many types of protons are in the following compound C6H6 by mean IH-NMR?
1) + a) One Signal
2) - b) Three Signals
3) - c) Four Signals
4) - d) Five Signals

33) The _____ spectroscopy gives information about the number and type of hydrogen atom?
1) - a) IR
2) - b) MS
3) - c) 13C NMR
4) + d) HNMR

34) How many types of protons are in the following structure. CH3-CH2-CO-CH3 ?
1) - a) Tow Signals
2) + b) Three Signals
3) - c) Four Signals
4) - d) Five Signals

35) How many types of protons are in the following structure CH3-CH(CH3)-CH2-CH3?
1) - a) Tow Signals
2) - b) Three Signals
3) + c) Four Signals
4) - d) Five Signals

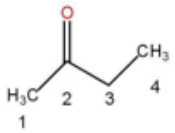
36) How many types of proton are in the following structure. Cl-CH2-CH2-COOH ?

1) - a) Tow Signals
2) + b) Three Signals
3) - c) Four Signals
4) - d) Five Signals

37) How many types of protons are in the following structure. CH3-CH2-CO-CH2-CH3 by mean IH NMR?
1) + a) Tow Signals
2) - b) Three Signals
3) - c) Four Signals
4) - d) Five Signals

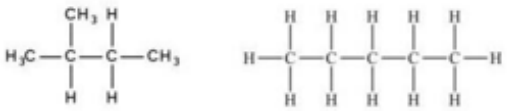
38) How many types of protons are in the following structure CH3-(C6H5) by mean IH NMR ?
1) - a) Tow Signals
2) - b) Three Signals
3) + c) Four Signals
4) - d) Five Signals

39) **39- Which of the following indicates the multiplicities of different hydrogens of butanone in 1H NMR spectrum ?**



1) - a) C1-singlet , C3-doublet , C4-triplet
2) - b) C1-singlet , C3-triplet , C4-quartet
3) + c) C1-singlet , C3-quartet , C4-triplet
4) - d) C1-triplet , C3-doublet , C4-triplet

40) **40- How many signals the following compounds have in 1H NMR spectra ?**



1) - a) 4 and 2
2) - b) 5 and 3
3) + c) 4 and 3
4) - d) 5 and 5