A

23104 **120 MINUTES**

1. Which of the following is a weak Lewis acid?
   A) HCl B) H_2O C) CH_4 D) $B(OH)_3$

2. Identify the wrong statement among the following.
   A) Manganese (II) is a weaker reducing agent than chromium(II)
   B) Oxygen is superior to fluorine in stabilizing higher oxidation states of transition metals.
   C) Oxo-anions of vanadium are unstable
   D) Copper(I) undergoes disproportionation in aqueous medium.

3. List I contains the formulae of some boranes and list II contains the classes of boranes. Match List I with List II

List I	List II
a. $B_6H_6^{2-}$	1. arachno
b. B_5H_9	2. closo
c. B_4H_{10}	3. nido

   A) a-2, b-3, c-1 B) a-2, b-1, c-3
   C) a-3, b-1, c-2 D) a-3, b-2, c-1

4. The spin only magnetic moments of the species:
   1. $[Cr(NH_3)_6]^{3+}$ 2. $[Fe(CN)_6]^{3-}$
   3. $[Mn(H_2O)_6]^{2+}$ 4. $[Co(NH_3)_6]^{3+}$
   are in the order :

   A) 1 > 2 > 3 > 4 B) 2 > 3 > 4 > 1
   C) 3 > 1 > 2 > 4 D) 3 > 2 > 4 > 1

5. Consider the reaction,
   $[(CO)_5MnCH_3]+CO \rightarrow [(CO)_5Mn-COCH_3]$
   This is an example of:

   A) migratory insertion B) oxidative addition
   C) electrophilic addition D) nucleophilic addition

6. Which of the following metal carbonyls contain both terminal and bridging carbonyl groups?
   1. $Os_2(CO)_9$ 2. $Fe_3(CO)_{12}$ 3. $Ir_4(CO)_{12}$ 4. $Co_4(CO)_{12}$

   A) 1, 2 & 3 only B) 1, 2 & 4 only
   C) 2, 3 & 4 only D) 1, 3 & 4 only

7. Each of the following pairs contain a metal ion and the reagent used for the quantitative precipitation of the metal ion. Identify the wrongly matched pair.
   A) Nickel: Dimethyl glyoxime
   B) Zinc: 8-hydroxy quinoline
   C) Calcium: Ammonium oxalate
   D) Copper: Ammonium molybdate

8. Oxidative addition of the square planar complex $[IrCl(PPh_3)_3]$ gives two products. They are:
   A) cis and trans- isomers B) fac and mer- isomers
   C) enantiomers D) linkage isomers.

9. List I contains some organometallics and List II contains some processes associated with them. Match List I with List II

List I	List II
a. $[(PPh_3)_3RhCl]$	1. Monsanto process
b. $[Rh(CO)_2I_2]^-$	2. Hydrogenation
c. $[PdCl_4]^{2-}$	3. Hydroformylation
d. $[HCo(CO)_4]$	4. Wacker process

   A) a-1, b-2, c-4, d-3 B) a-3, b-4, c-2, d-1
   C) a-4, b-3, c-1, d-2 D) a-2, b-1, c-4, d-3

10. The metal ion present in the enzyme carboxy peptidase-A:
   A) Fe^{2+} B) Mo^{3+} C) Zn^{2+} D) Mg^{2+}

11. Identify the **wrong** statements about hemocyanin found in many species in the Arthropoda and Mollusca
   1. It is a Cu(I)/Cu(II) system
   2. Copper is in the +1 state in the oxy-form
   3. Each copper atom is bound by three histidine ligands
   4. It contains neither heme nor cyanide ion

   A) 1, 2& 3 only B) 1, 3& 4 only C) 2, 3& 4 only D) 1, 2& 4 only

12. Oxygen binding curve plotted between percentage of saturation and partial pressure of oxygen for haemoglobin is:
   A) sigmoidal B) linear C) parabolic D) hyperbolic

13. Which of the following properties is measured in derivative thermogravimetric analysis?
   A) Change in weight B) Change in temperature
   C) Rate of change of weight D) Change in enthalpy

14. In neutron activation analysis, the atom is identified by:
A) decay characteristics of daughter element
B) velocity of neutron
C) threshold energy of reaction
D) nuclear recoil

15. The separation of lanthanides using ion exchange method is based on:
A) oxidation state of the ion B) solubility of their chlorides
C) solubility of their nitrates D) size of the hydrated ion

16. Which of the following metal ions are involved in transmission of nerve impulses in living systems?
1. K^+ 2. Fe^{2+} 3. Mg^{2+} 4. Na^+

A) 1 & 2 only B) 2 & 3 only C) 3 & 4 only D) 1 & 4 only

17. The gas commonly used in ICP-AES:
A) argon B) hydrogen
C) nitric oxide D) carbon dioxide

18. Which of the following is **wrongly** matched?
A) Atomic absorption spectroscopy : Hollow cathode lamp
B) Conductometric titration : Redox reaction
C) Turbidimetry : Air pollution
D) HPLC : Petroleum industry

19. In four different measurements, the mass of a particular object is found to be 5.7 g, 5.4 g,5.3 g and 5.6 g. The mean deviation is:
A) 0.05 B) 0.10 C) 0.15 D) 0.20

20. The number of NaCl units in its unit cell and the coordination number of sodium ion in the crystal are respectively :
A) 4,4 B) 4, 6 C) 6, 4 D) 6, 6

21. Barbituric acid is prepared by the condensation of:
A) Urea with diethyl malonate
B) Urea with Diethyl succinate
C) Hydrazine and diethyl malonate
D) Guanidine and thiourea

22. The equation, $\left[\frac{\partial(\Delta G/T)}{\partial T}\right]_P = -\frac{\Delta H}{T^2}$ is known as:
A) Maxwell relation B) Joule-Thomson equation
C) Gibbs-Helmholtz equation D) Duhem-Margules equation

23. Which of the following are assumptions of Debye theory of heat capacity of solids?

1. A solid is an aggregate of atomic oscillators each of which is vibrating with a common mean frequency
2. A solid is an elastic body and the vibrations of the whole should be considered
3. The $3N_0$ modes of vibration of one mole of a monatomic solid are distributed among a spectrum of frequencies.

A) 1 & 2 only B) 1 & 3 only C) 2 & 3 only D) 1, 2 & 3

24. A particular reaction completes its 50% in 30 minutes and 75% in 90 minutes. The order of the reaction is:

A) zero B) 1 C) 2 D) 3

25. List I contains certain properties of gases and List II contains their expressions. Match List I with List II. [N: number of molecules per cubic metre, c: average velocity, k: Boltzmann constant, λ :mean free path, σ : molecular diameter, m: mass of a molecule.

List I	List II
a. Mean free path	1. $\frac{1}{3}c\lambda$
b. Coefficient of thermal conductivity	2. $\frac{1}{3}Nmc\lambda$
c. Coefficient of viscosity	3. $\frac{1}{2}Nck\lambda$
d. Coefficient of diffusion	4. $\frac{1}{\sqrt{2}\pi\sigma^2 N}$

A) a-4, b-3, c-2, d-1 B) a-3, b-4, c-1, d-2
C) a-3, b-4, c-2, d-1 D) a-4, b-3, c-1, d-2

26. Equal quantity of electricity is passed for same length of time through solutions of $FeCl_3$ and $ZnSO_4$. The ratio of the number of moles of iron, zinc and chlorine liberated at the electrodes is:

A) 2:3:6 B) 1:2:3 C) 3:2:1 D) 6:3:2

27. The EMF of the cell, $Pb|PbSO_4(s),SrSO_4(s), SrCl_2(aq)|Pt$ depends on the concentration of:

A) Pb^{2+} B) $PbSO_4$ C) Sr^{2+} D) All of these

28. Zeta potential is also known as:

A) Streaming potential B) Electro kinetic potential
C) Sedimentation potential D) Electrophoresis

29. Which of the following statements are correct?
1. A very minute quantity of a catalyst is sufficient in a reaction.
2. A catalyst does not affect the standard free energy change of the reaction
3. A catalyst cannot initiate a reaction

A) 1 & 2 only B) 1 & 3 only C) 2 & 3 only D) 1, 2 & 3

30. The accumulation of the solvent on the surface of a gel is known as:
A) thixotropy B) syneresis C) imbibition D) precipitation

31. If the ground state energy of a particle in a 3-dimensional box is 15 eV, the minimum energy of the most degenerate level of the system is:
A) 70 eV B) 45 eV C) 90 eV D) 350 eV

32. The kinetic energy of a photoelectron emitted from a metal surface when a radiation of wavelength 4.0 $x10^{-7}$ m was used is 2.5$x10^{-19}$ J. The threshold energy of the metal is: (take hc=2.0$x10^{-25}$ J m)

A) 1.5 $x10^{-19}$ J B) 2.5$x10^{-19}$ J C) 2.0$x10^{-19}$ J D) 3.0$x10^{-19}$ J

33. The ground state term symbol for oxygen atom is:
A) $^2P_3$ B) $^3P_2$ C) $^3P_3$ D) $^3P_4$

34. The wave function of an orbital is $\Psi = A\frac{r^2}{a_0^2}e^{-r/2a_0}\sin\theta\cos\theta\cos\phi$. The orbital is:

A) $3d_{xy}$ B) $3d_{yz}$ C) $3d_{xz}$ D) $3d_{x^2-y^2}$

35. IF Ψ_1 and Ψ_2 are the wave functions of two hydrogen atoms, α and β are the spin wave functions and S is the overlap integral, according to the VB theory, the ground state wave function of H_2 molecule is:

A) $\frac{1}{\sqrt{2(1+S)^2}}(\Psi_1+\Psi_2)[\frac{1}{\sqrt{2}}\{\alpha(1)\beta(2)-\alpha(2)\beta(1)\}]$

B) $\frac{1}{\sqrt{2(1-S)^2}}(\Psi_1-\Psi_2)[\frac{1}{\sqrt{2}}\{\alpha(1)\beta(2)+\alpha(2)\beta(1)\}]$

C) $\frac{1}{\sqrt{2(1+S)^2}}(\Psi_1+\Psi_2)[\frac{1}{\sqrt{2}}\{\alpha(1)\beta(2)+\alpha(2)\beta(1)\}]$

D) $\frac{1}{\sqrt{2(1-S)^2}}(\Psi_1-\Psi_2)[\frac{1}{\sqrt{2}}\{\alpha(1)\beta(2)-\alpha(2)\beta(1)\}]$

36. According to the variation method, the energy of a helium atom is given as $E = Z^2 - \frac{27}{8}Z$. The minimum energy of helium atom is:

A) $-\left(\frac{27}{8}\right)^2$ B) $-\left(\frac{27}{16}\right)^2$ C) $-\left(\frac{27}{8}\right)\left(\frac{27}{16}\right)$ D) $-\left(\frac{27}{16}\right)\left(\frac{27}{32}\right)$

37. According to the MO theory, the bond orders of NO, NO^+ and NO^- are respectively:

A) 2, 2.5, 3 B) 2, 3, 2.5 C) 2.5, 3, 2 D) 2.5, 2, 3

38. List I contains some species and List II contains the type of interactive force in them. Match List I with List II

List I	List II
a. H_3O^+	1. ion-induced dipole
b. H_2F_2	2. ion-dipole
c. I_3^-	3. dipole-induced dipole
d. $Ar(H_2O)_n$	4. dipole-dipole

A) a-2, b-1, c-3, d-4 B) a-2, b-4, c-1, d-3
C) a-4, b-2, c-1, d-3 D) a-3, b-1, c-2, d-4

39. In the C_{3V} point group, the product $C_3\sigma_v^{'}$ generates (C_3 is in the counter clockwise direction):

A) $\sigma_v^{''}$ B) $\sigma_v^{'''}$ C) C_3^2 D) E

40. List I contains a few molecules and List II contains their point groups. Match List I with List II

List I	List II
a. BF_3	1. C_{3V}
b. NH_3	2. D_{3d}
c. C_2H_6 (staggered)	3. D_{3h}
d. Allene	4. D_{2d}

A) a-2, b-1, c-4, d-3 B) a-4, b-1, c-2, d-3
C) a-2, b-4, c-1, d-3 D) a-3, b-1, c-2, d-4

41. Identify the **incorrect** statement among the following.

A) The product of two elements of a group is always an element of the same group
B) The number of IR's in a group is equal to the number of classes of elements in the group
C) The inverse of an element A_n^m is always A_n^{n-m}
D) A molecule having no S_n will be optically active.

42. Part of the character table of the C_{3V} point group is given below along with a reducible representation, Γ.

C_{3V}	E	$2C_3$	$3\sigma_v$
A_1	1	1	1
A_2	1	1	-1
E	2	-1	0
Γ	7	1	-1

The total representation reduces as:

A) $\Gamma = 2A_1 + A_2 + 2E$ B) $\Gamma = 2A_1 + 3A_2 + E$

C) $\Gamma = A_1 + 2A_2 + 2E$ D) $\Gamma = A_1 + 3E$

43. Some functional groups and their associated group frequencies are given below. Identify the **wrongly** matched pair:

A) -OH : 3600 cm^{-1} B) >C=O : 1700 cm^{-1}

C) $-CH_3$: 2970 cm^{-1} D) >C=S : 1800 cm^{-1}

44. When (S)-2-Methylcyclohexanone is treated with $NaBH_4$, the final product is:

A) (1S, 2S)-2-methyl cyclohexanol

B) (1S, 2R)-2-methyl cyclohexanol

C) (1R, 2S)-2-metyl cyclohexanol

D) (1R, 2R)-2-methyl cyclohexanol

45. The reaction,

$RCH = CH - CH_2OSOCl \xrightarrow{heat} RCHCl - CH = CH_2 + SO_2$ is mechanistically:

A) SN^1 reaction B) SN^i reaction with allylic rearrangement

C) SN^2 reaction D) a cheletropic reaction

46. Which of the following fails to give Cannizzaro reaction?

A) Di-O-substituted benzaldehyde

B) Benzaldehyde

C) β-Hydroxy butyraldehyde

D) Glyoxalic acid

47. Tutocaine, a local anaesthetic can be synthesized by:

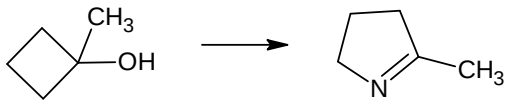
A) Michael reaction B) Malaprade reaction

C) Diels Alder reaction D) Mannich reaction

48. One can avoid the hazards in dealing with toxic CH_2N_2 during cyclopropanation reaction by using:

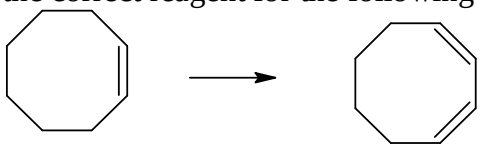
A) Cu, CH_2I_2 B) Mg, CH_2I_2 C) Zn, CH_2I_2 D) Cd, CH_2I_2

49. Identify, from the following, the best reagent for the conversion:



A) HN_3/H^+ B) HN_3/OH^- C) NH_3/H^+ D) NH_3/OH^-

50. Select the correct reagent for the following transformation,



A) $KMnO_4/H^+$, Ac_2O/Py, heat B) $KMnO_4/OH^-$, heat, Ac_2O/Py
C) OsO_4, heat, Ac_2O/Py D) $KMnO_4/OH^-$, Ac_2O/Py, heat

51. α-Terpineol on oxidative degradation by $KMnO_4$ followed by chromic acid gives:
A) terphenylic acid B) ketohydroxy acid
C) terephthalic acid D) terebic acid

52. Synthesis of vitamin A from β-ionone involves:
A) Reformatsky reaction B) RT reaction
C) Ritter reaction D) Robinson's reaction

53. Interaction in multi component system of supramolecular assembly is:
A) non-covalent B) $\sigma-\pi$ type
C) $\sigma-\sigma$ type D) covalent

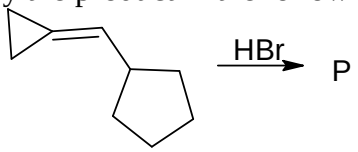
54. Match List I with List II

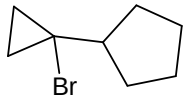
List I	List II
a. PETN	1. Secondary pollutant
b. Cavitands	2. Olefin metathesis
c. PAN	3. Molecular tweezer
d. Grubb's catalyst	4. Antianginal drug

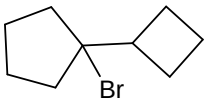
A) a-2, b-4, c-1, d-3 B) a-4, b-3, c-1, d-2
C) a-2, b-4, c-3, d-1 D) a-3, b-4, c-2, d-1

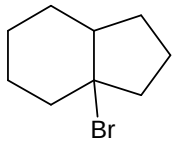
55. Which of the following statements is **wrong**?
A) Ergosterol is a steroid
B) Steroids contain a 1,2-cyclopentanophenanthrene ring system
C) α,β-Unsaturated ketonic group is present in testosterone
D) Progesterone does not give haloform reaction.

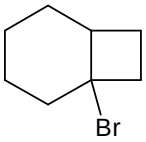
56. Identify the product in the following reaction.



A) 

B) 

C) 

D) 

57. 1. Synthons are idealized fragments resulting from a disconnection
2. Umpolung refers to the removal of normal polarity of a functional group.

A) Both 1 and 2 are true and 2is the correct explanation of 1
B) Both 1 and 2 are true, but 2 is not the correct explanation of 1
C) 1 is true, but 2 is false
D) 1 is false, but 2 is true.

58. Pick up the new environment friendly oxidant that has been suggested to effect the oxidation,Cyclohexanol ⟶ cyclohexanone

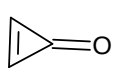
A) Ag_2O B) $KMnO_4/H^+$
C) PCC D) $NaOCl/CH_3COOH$

59. Match List I with list II

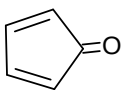
List I	List II
a. Phthaloyl peroxide	1. Free radical
b. Tetrazole	2. Benzyne
c. Benzoyl peroxide	3.Carbene
d. Allyl halide	4. Carbocation

A) a-1, b-2, c-3, d-4 B) a-2, b-3, c-4, d-1
C) a-1, b-2, c-4, d-3 D) a-2, b-3, c-1, d-4

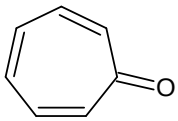
60. Which of the following carbonyl compounds form aromatic carbocation on protonation?



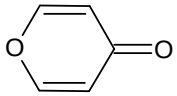
1



2



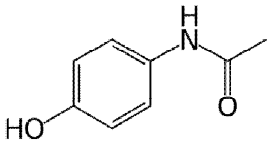
3

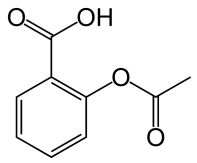


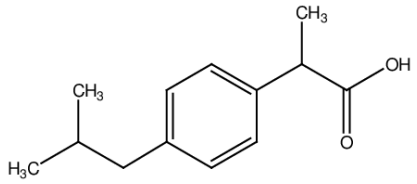
4

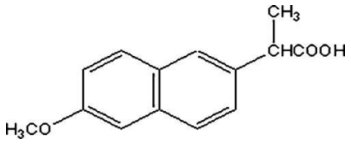
A) 1, 2 & 3 only B) 1, 3 & 4 only C) 1, 2, 3 & 4 D) 2 & 4 only

61. Which of the following is the correct structure of paracetamol?

A) 

B) 

C) 

D) 

62. Number of lone pairs present in Xenon in the structure of XeF_6 is:
A) 1 B) 2 C) 3 D) 4

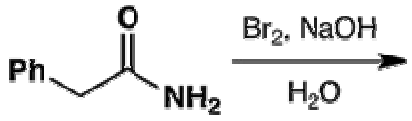
63. The ratio of weight average molecular mass to number average molecular mass is known as------ index.
A) polymorphic B) poly dispersity
C) ploy diversity D) poly density

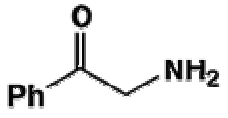
64. Which of the following is antiaromatic?
A) [4] annulene B) [6] annulene
C) [10] annulene D) [12] annulene

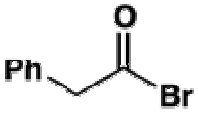
65. Which is the most stable conformation of Cis-1,4-Diterbutyl cyclohexane ?
A) chair B) boat C) half chair D) twist boat

66. The product obtained by Diels- Alder reaction of Butadiene with Diethyl maleate is then reduced with hydrogen in presence of platinum. Which compound is obtained finally?
A) Cis-Diethyl cyclohexane-1, 2-dicarboxylate
B) Trans-Diethyl cyclohexane-1, 2-dicarboxylate
C) Cis-Diethyl cyclohexene-1, 2-dicarboxylate
D) Trans-Diethyl cyclohexene-1, 2-dicarboxylate

67. Which is the main product of the following reaction of an amide?



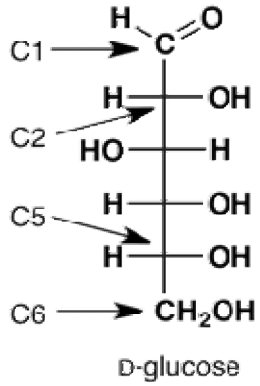
A) 

B) 

C) 

D) 

68. Which carbon becomes the anomeric carbon of glucose in its pyranose form?



D-glucose

A) C1 B) C2 C) C5 D) C6

69. Which is complementary to the DNA segment 5'-ACGTAATC-3'?

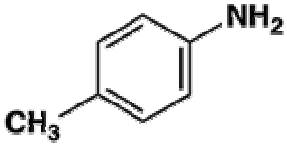
A) 3'-TGCATTCG-5', B) 3'-TGCATTAG-5',

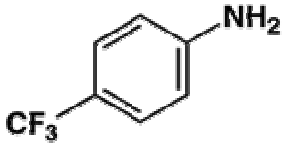
C) 5'-TGCATAAG-3' D) 5'-TGCATTAG-3'

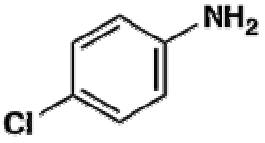
70. Which compound has a lower pKa value?

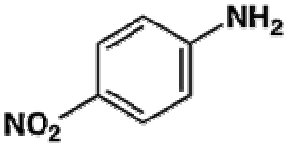
A) Fluoroacetic acid B) Chloroacetic acid
C) Bromoacetic acid D) Iodoacetic acid

71. Which substituted aniline is least basic?

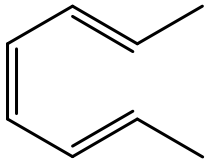
A) 

B) 

C) 

D) 

72. What is E-Z nomenclature of the following?



A) 2E,4Z,6E-Hexatriene B) 2E, 4Z, 6E-Octatriene
C) 2Z, 4Z, 6E-Octatriene D) 2E, 4Z, 6Z-Octatriene

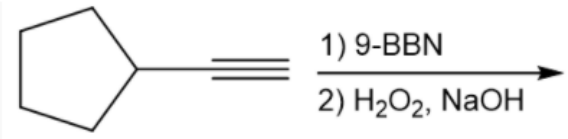
73. Which of the following is the strongest intermolecular force?
A) London dispersion forces B) Covalent bond
C) Hydrogen bonding D) Dipole-dipole interactions

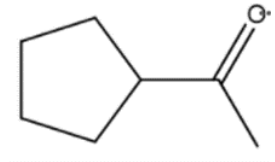
74. Bromine has two naturally occurring isotopes, approximately 50% each of ^{79}Br and ^{81}Br. In the mass spectrum of naturally occurring Br_2, the parent ion will appear as:
A) Two peaks of equal intensity
B) Three peaks of equal intensity
C) Three peaks of intensity 1:2:1
D) One peak only

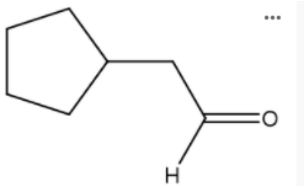
75. Which of the following species form an isoelectronic series?
A) $[NO]^+$, $[CN]^-$ and N_2 B) NO, $[CN]^-$ and $[O_2]^+$
C) O_2, $[O_2]^-$ and $[O_2]^{2-}$ D) O_2, $[NO]^+$ and $[CN]^-$

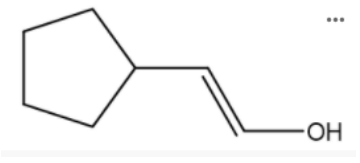
76. Which of the following molecules or ions possesses a C4 principal axis?
A) XeF_4 B) CF_4 C) SF_4 D) $[PF_4]^+$

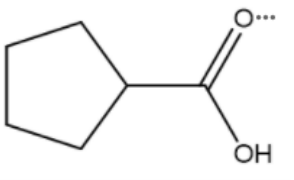
77. Which of the following is the final product of the reaction shown below?



A) 

B) 

C) 

D) 

78. How many signals does the aldehyde $(CH_3)_3CCH_2CHO$ have in ^1H NMR and ^{13}C NMR spectra?

A) Five ^1H signals and six ^{13}C signals
B) Three ^1H signals and four ^{13}C signals
C) Five ^1H signals and four ^{13}C signals
D) Three ^1H signals and six ^{13}C signals

79. A pressure vessel contains a gaseous mixture made up of 88 kg carbon dioxide and 56 kg nitrogen. Determine the mole fraction of carbon dioxide.

A) 0.05 B) 0.5 C) 0.25 D) 0.75

80. Which of the following would be correct units for the rate constant of a reaction that is second order overall?

A) s^{-1} B) $mol^{-1}\ dm^3\ s^{-1}$ C) $mol\ cm^{-3}\ s^{-1}$ D) $mol^{-2}\ dm^6\ s^{-1}$

81. The time for half change of the acid catalysed hydrolysis of sucrose, which is first order overall, is 3.466 h at 25 °C. What is the rate constant for the reaction at this temperature?

A) 0.2 $hour^{-1}$ B) 6.932 $hour^{-1}$ C) 0.3 $hour^{-1}$ D) 2 $hour^{-1}$

82. How many normal modes of vibrational are possible for a benzene molecule?

A) 6 B) 30 C) 12 D) 36

83. In which of the following ways, absorption is related to transmittance?

A) Absorption is the logarithm of transmittance
B) Absorption is the reciprocal of transmittance
C) Absorption is the negative logarithm of transmittance
D) Absorption is a multiple of transmittance

84. In Beer-Lambert Law $A = \varepsilon bC$, A is absorbance, b is length of light path and C is concentration. Which of the following is represented by ε in the equation?

A) Transmittance B) Molar absorptivity
C) Specific rotation D) Absorption frequency

85. Which of the following is Nessler's reagent (used for detection of ammonia) ?

A) Potassium tetraiodomercurate(II)
B) Potassium tetracyanonickelate (II)
C) Potassium hexacyanoferrate (II)
D) Potassium tetraiodomercurate (III)

86. How many types of hybridisation are possible for complexes with a coordination number of 4?

A) 1 B) 2 C) 3 D) 4

87. The products obtained at anode and cathode during electrolysis of aqueous NaCl are------ respectively.

A) Na and Cl_2 B) Cl_2 and Na C) H_2 and Cl_2 D) Cl_2 and H_2

88. The substance which caused Bhopal tragedy:

A) Methyl cyanide B) Methyl isocyanide
C) Methyl isocyanate D) Methyl cyanate

89. Identify a biodegradable polymer from the following.

A) Polyurethane B) polylactic acid
C) nylon-6 D) PVC

90. Which of the following statement is **not** true about ozone?

A) Both O-O bond distances are equal
B) Ozone is bent (V) shaped
C) Hybridisation of central oxygen atom is sp^3
D) Bond angle is 116.8^0

91. ------ is **not** a greenhouse gas.

A) CO_2 B) CH_4 C) N_2 D) SO_2

92. The unit of COD and BOD is:

A) mgL B) mgL^{-1} C) $molL^{-1}$ D) $molKg^{-1}$

93. Which of the following is a top-down process?

A) High energy ball milling B) Sol-Gel method
C) Hydrothermal synthesis D) Chemical vapour deposition

94. ------- is a green solvent.

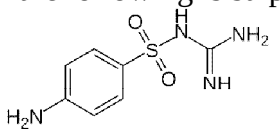
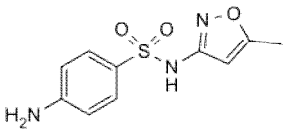
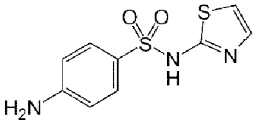
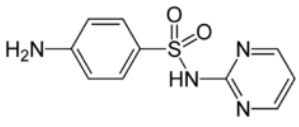
A) Acetonitrile B) Acetic acid
C) Super critical CO_2 D) Dioxane

95. Calculate the percentage atom economy for the fermentation of glucose producing ethanol and carbon dioxide

$C_6H_{12}O_6 \rightarrow 2\ C_2H_5OH + 2\ CO_2$

A) 100 % B) 51.1% C) 25.5% D) 53.3%

96. Which of the following is sulphamethoxazole?

A) 
B) 
C) 
D) 

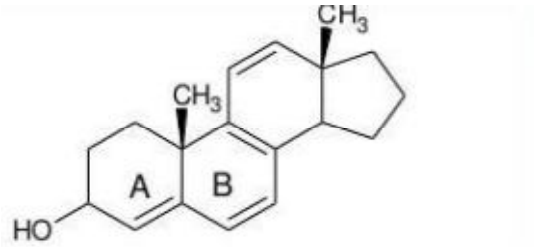
97. The electroanalytical technique that involves the measurement of electricity consumed in a redox reaction of the analyte is:

A) Potentiometry B) Conductometry
C) Polarography D) Coulometry

98. Which among the following on which Half wave potential of polarograph depends?

A) Concentration of electro active species
B) Natutre of supporting electrolyte
C) Dissolved oxygen
D) Nature of electro active species

99. Calculate λ max of the compound given below:



A) 273 nm B) 303 nm C) 313 nm D) 343 nm

100. Which is the correct order of increasing wave number of the stretching vibrations of (1) C-H (alkane), (2) O-H (alcohol), (3) C=O (ketone), and (4) C≡C (alkyne)?

A) (4) < (3) < (2) < (1) B) (3) < (4) < (2) < (1)
C) (3) < (4) < (1) < (2) D) (4) < (3) < (1) < (2)

101. Identify the compound from the following spectral data
Molecular formula -**C_7H_7Br , EI** Mass spectral data- m/z (%)- 172 (12%), 170 (12%) , 91 (100%), 65(15%). ^{1} H NMR δ ppm ($CDCl_3$)- 7.1- 7.5 (5 H, multiplet), 4.4 (2H, singlet), ^{13}C NMR δ ppm ($CDCl_3$) -137-128 (3 peaks), 33 (1 peak)

A) P-bromotolune B) Benzyl bromide
C) m-bromotolune D) 3- Bromoheptane

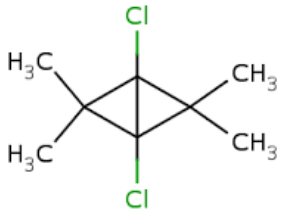
102. Discrete lines in the emission spectrum of hydrogen atoms suggest that:

A) Electrons can occupy only certain, discrete energy levels in the atom.
B) Electrons occupy continuous energy levels (i.e., any levels) in the atom.
C) Emission spectral lines do not tell us anything about the energy levels of the electrons in atoms.
D) Emission spectrum is not discrete but continuous

103 Which of the following coordination complex is paramagnetic?

A) $[Ni(CN)_4]^{2-}$ B) $[Ni(CO)_4]$ C) $[NiCl_4]^{2-}$ D) $[Co(NH3)_4]^{3+}$

104. What is IUPAC name of the following?



A) 1,1,3,3,Tetramethyl- 2, 4 dichlorobicyclo[1,1,0] butane
B) 1,3-Dichloro-2,2,4,4-Tetramethyl bicyclo[1,1,0] butane
C) 1,3-Dichloro-2,2,4,4-Tetramethyl bicyclo[1,1] butane
D) 1,3-Dichloro-2,2,4,4-Tetramethyl bicyclo[1,1,0] propane

105. Which of the following statement is true for CF_4, XeF_4 and SF_4?
A) All are tetrahedral
B) CF_4 is square planar, XeF_4 is T shaped and SF_4 is tetrahedral
C) CF_4 is tetrahedral, XeF_4 square planar and SF_4 is see-saw
D) CF_4 is square planar, XeF_4 square planar and SF_4 pyramidal

106. The point group of PCl_5 is:
A) D_{3v} B) D_{3h} C) C_{3v} D) C_{3h}

107. The thermal stability of hydrides of group 14 are in the order
A) $CH_4 > SiH_4 > GeH_4 > SnH_4 > PbH_4$
B) $CH_4 < SiH_4 < GeH_4 < SnH_4 < PbH_4$
C) $CH_4 > SiH_4 = GeH_4 > SnH_4 > PbH_4$
D) $SiH_4 > CH_4 > GeH_4 > SnH_4 > PbH_4$

108. The ratio of lone pair and bond pair electrons on central atom in I_3^- and XeF_4 are respectively
A) 1.5, 0.5 B) 0.5, 1.5 C) 2, 0.5 D) 0.5,2

109. The product obtained when p-nitrotoluene is nitrated with concentrated nitric acid and sulphuric acid
A) 1-Methyl-2,4-dinitrotoluene
B) 1-Methyl-3,4- dinitro toluene
C) 1-methyl-3,4,5-trinitrotoluene
D) 1-methyl-3,5-dinitrotoluene

110. Which of the following is a mono basic acid?
A) H_3BO_3 B) H_2SO_4 C) H_3PO_4 D) $H_2C_2O_4$

111. Which among the following is the strongest Bronstead Base?
A) ClO^- B) ClO_2^- C) ClO_3^- D) ClO_4^-

112. Among the following ions, which one has highest magnetic moment?

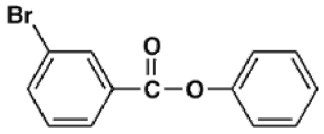
A) $[Co(NH_3)_6]^{3+}$ B) $[Ni\ (CN)_4]^{2-}$

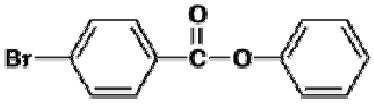
C) $[CoF_6]^{3-}$ D) $Ni(CO)_4$

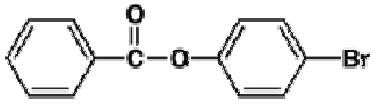
113. The compound 1E,5E- hexadiene reacts with excess of bromine in CCl_4. How many stereoisomeric tetrabromides will be formed?

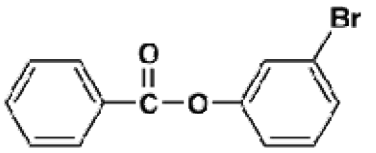
A) 2 B) 3 C) 4 D) 5

114. The major product of mono bromination of phenyl benzoate with bromine and aluminium bromide is:

A) 

B) 

C) 

D) 

115. The reagent used for coupling amino acids in the solid phase peptide synthesis (SPPS) is:

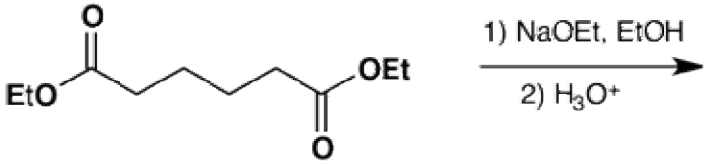
A) 1,4-Dicyclohexylcarbodiimide

B) 1,3-Dicyclohexylcarbodiimide

C) 2,3-Dicyclohexylcarbodiimide

D) 1,2-Dicyclohexylcarbodiimide

116. Which is the main product of the following reaction?



A) 2-oxycyclopentanoc acid B) cyclopentanone

C) cyclohexanone D) 2-oxocyclohexanoic acid

117. The standard reduction potentials at 298K of the electrodes Li+/Li, Ba^{2+}/Ba, Na^{+}/Na and Mg^{2+}/Mg are - 3.05, -2.73, -2.71 and -2.37 V respectively. The strongest oxidizing agent among the following is:

A) Li^{+} B) Ba^{2+} C) Na^{+} D) Mg^{2+}

118. Which list below gives only NMR active nuclei?

A) ^{1}H, ^{12}C, ^{19}F B) ^{1}H, ^{2}H, ^{12}C

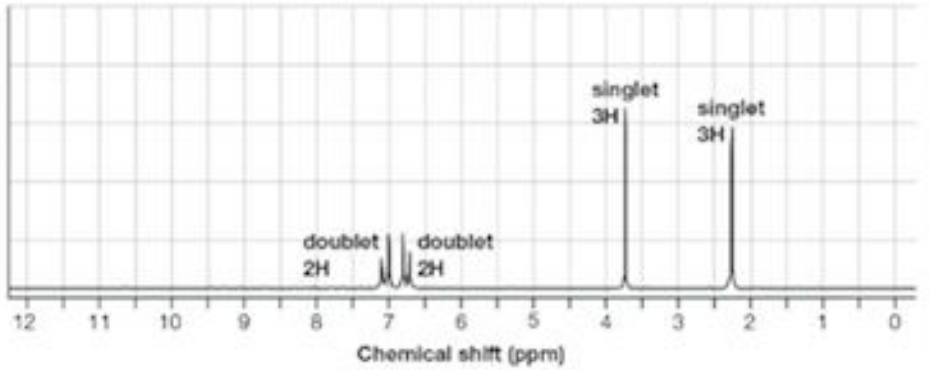
C) ^{2}H, ^{12}C, ^{19}F D) ^{1}H, ^{13}C, ^{19}F

119. Which of the compound show only one singlet signal in the PMR spectra?

A) neopentane B) 2-butyne

C) Methoxy methane D) All of these

120. A compound with molecular formula $\mathbf{C_8H_{10}O}$ that produced the ^{1}H NMR spectra shown below. The IR spectra does not show a broad absorbance at 3300 cm^{-1} or a strong absorbance at 1710 cm^{-1}. Which of the following is the compound?



A) 2-Phenyl ethanol B) 4-Methyl anisole

C) Phenetole D) 3-Methyl anisole