Kerala SET (4)

A

20204 **120 MINUTES**

1. Electronic spectra of atoms and molecules are associated with radiation in
   A) UV-Visible region B) Infrared region
   C) Microwave region D) X-ray region

2. Which of the following is a **wrong** statement?
   A) Every metal has a characteristic threshold frequency below which no electron will be ejected
   B) The average energy per oscillator calculated by Max Planck for a black body was taken to be a constant.
   C) The incoherent scattering of X-rays by a gas is called Compton effect.
   D) According to Pauli principle, all electronic wave functions should be antisymmetric with respect to the interchange of electrons.

3. Which of the following transitions will give a line in the Lyman series?
   A) $^2D_{1/2} \rightarrow {}^2S_{1/2}$ B) $^2F_{1/2} \rightarrow {}^2P_{1/2}$
   C) $^2P_{1/2} \rightarrow {}^2P_{1/2}$ D) $^2P_{1/2} \rightarrow {}^2S_{1/2}$

4. Which of the following sets contain molecules all of which have the same bond order?
   A) CO, NO, O_2^+ B) NO, N_2, O_2^+
   C) O_2^{2+}, NO, CO D) NO^+, O_2^{2+}, CO

5. The intermolecular forces existing between argon and water in argon hydrate is
   A) ion-dipole B) dipole-dipole
   C) dipole-induced dipole D) dispersion

6. Combination of C_{2z} and $\sigma_{V(xz)}$ generates
   A) C_{2y} B) i C) $\sigma_{V(yz)}$ D) σ_h

7. The inverse element of S_3 is
   A) S_3^2 B) S_3^3 C) S_3^4 D) S_3^5

8. A one-dimensional irreducible representation antisymmetric to principal axis, symmetric to subsidiary axis and antisymmetric to centre of symmetry will be denoted as:
   A) B_{2u} B) A_{2u} C) B_{1u} D) A_{1u}

9. Identify the symmetric top molecules among the following:
   I. SO_2 II. BF_3 III. CO_2 IV. CH_3Cl

   A) I, III B) II, IV C) I, II, III D) II, III, IV

10. Which of the following statements are wrong?
I. Water molecule is not microwave active
II. The rotational selection rule for a diatomic molecule is $\Delta J = \pm 1$
III. The degeneracy of a rotational energy level J is $2J+1$
IV. For a linear non-rigid rotator, the selection rule changes to $\Delta J = 0, \pm 1$
A) I, II B) I, III C) I, IV D) II, III

11. The nucleus with zero spin among the following is:
A) ${}^{14}_{7}N$ B) ${}^{10}_{5}B$ C) ${}^{32}_{16}S$ D) ${}^{30}_{15}P$

12. The mass spectrum of organic bromine compounds will contain
A) the M and M+2 peaks of almost equal intensity
B) the M and M+1 peaks of almost equal intensity
C) the molecular ion peak with odd molecular mass
D) the molecular ion peak which will also be the base peak

13. A Mossbauer active nucleus has a spin I= ½ in the ground state and I= 3/2 in the excited state. If the compound of the element has an internal electric field and subjected to an external magnetic field, the number of peaks obtained will be:
A) 6 B) 5 C) 7 D) 1

14. The compound having a simple cubic structure among the following is:
A) NaCl B) KCl C) CsCl D) ZnS

15. Match the items in List I with those in List II and identify the correct match.

List I		**List II**
I.	$\left(\frac{\partial U}{\partial S}\right)_V$	a) -S
II.	$\left(\frac{\partial H}{\partial P}\right)_S$	b) T
III.	$\left(\frac{\partial G}{\partial T}\right)_P$	c) -P
IV.	$\left(\frac{\partial A}{\partial V}\right)_T$	d) V

A) I-b, II-c, III-d, IV-a B) I-b, II-d, III-a, IV-c
C) I-c, II-d, III-b, IV-a D) I-d, II-a, III-b, IV-c

16. If K_f of water is 1.86 K kg mol^{-1}, the freezing point of a -0.2 molal $CaCl_2$ solution will be:
A) -1.116°C B) -0.372°C C) -0.744°C D) -0.186°C

17. Identify the wrong statement among the following:
A) The maximum number of phases that can coexist at equilibrium in a one-component system is three.
B) In a two-component simple eutectic system, the number of phases at equilibrium in the eutectic point is two
C) The entropy of the universe is increasing
D) For an ideal gas, $\left(\frac{\partial U}{\partial V}\right)_T = 0$

18. Which of the following is a fermion?
A) Neutron B) Deutron C) Alpha particle D) Photon

19. A reaction A $\rightarrow$Products is second order. Its half life will be-----.
A) proportional to concentration
B) independent of concentration
C) inversely proportional to concentration
D) inversely proportional to square of concentration.

20. Identify the **incorrect** statement from the following:
A) According to Lindemann mechanism, a unimolecular reaction is first order at high pressure.
B) The kinetic law of H_2-I_2 reaction is much more complicated than H_2-Br_2 reaction.
C) There are three explosion limits in the H_2-O_2 reaction
D) Reactions of order greater than three are uncommon.

21. Fast reactions cannot be studied using-----.
A) flash photolysis B) flow technique
C) relaxation method D) colorimetric method

22. The ionic strength of an aqueous solution of a mixture containing 0.2 M NaCl and 0.1M $MgCl_2$ is:
A) 0.5 B) 0.45 C) 0.4 D) 0.3

23. A substance which can be used as electrolyte in the hydrogen-oxygen fuel cell is
A) zinc sulphate solution B) potassium hydroxide solution
C) potassium chloride solution D) pure water

24. From the following identify the statements which are valid for chemisorption:

I. It is associated with a high enthalpy of adsorption
II. It forms multilayer adsorption
III. There is chemical interaction between the adsorbent and the adsorbate
IV. The extent of adsorption increases with increasing temperature.

A) I, II, III B) I, III, IV C) II, III, IV D) I, II, IV

25. According to the BET adsorption isotherm, for gas adsorption, a straight line is obtained when (P is equilibrium pressure, P^0 is saturated vapour pressure, V is specific adsorption)

A) $\frac{P}{V(P^0 - P)}$ is plotted against $\frac{P}{P^o}$

B) $\frac{P}{V}$ is plotted against $\frac{1}{P^o}$

C) $\frac{P}{(P^0 - P)}$ is plotted against $\frac{P}{P^o}$

D) $\frac{P}{P^o}$ is plotted against V

26. Match List I which contains some substances with List II which contains the type of colloids each of the substances can form with water under appropriate conditions.

List I		**List II**	
I.	Starch	a)	Emulsion
II.	Gold	b)	Micelle
III.	Sodium stearate	c)	Lyophobic colloid
IV.	Coconut oil	d)	Lyophilic colloid

A) I-d, II-c, III-b, IV-a B) I-c, II-d, III-b, IV-a
C) I-d, II-a, III-b, IV-c D) I-c, II-d, III-a, IV-b

27. Which of the following halides crystallises from its aqueous solution as hydrate?
A) LiCl B) KCl C) NaCl D) CsCl

28. The isomers $[Co(NH_3)_5Br]SO_4$ and $[Co(NH_3)_5SO_4]Br$ can be distinguished by treating with a solution of:
A) $BaCl_2$ B) NaOH C) NH_4OH D) Na_2CO_3

29. In pyrophosphoric acid, the number of hydroxyl groups present are:
A) 3 B) 5 C) 4 D) 2

30. Arrange NO_2, NO_2^- and NO_2^+ in the increasing order of bond angle.
A) $NO_2^+ > NO_2^- > NO_2$ B) $NO_2^+ > NO_2 > NO_2^-$
C) $NO_2^- > NO_2 > NO_2^+$ D) $NO_2 > NO_2^+ > NO_2^-$

31. The spin only magnetic moment of $Hg\{Co(SCN)_4\}$ is:
A) $\sqrt{15}$ B) $\sqrt{8}$ C) $\sqrt{3}$ D) $\sqrt{24}$

32. Half –wave potential is a parameter associated with:
A) Polarimetry B) Potentiometry
C) Conductometry D) Polarography

33. Calcium ion can be estimated gravimetrically by precipitating it as:
A) Sulphate B) Chloride C) Oxalate D) Carbonate

34. The d_{x2-y2} orbital is not occupied by electrons in the complex ion:
A) $[PdCl_4]^{2-}$ B) $[NiCl_4]^{2-}$ C) $[CdCl_4]^{2-}$ D) $[CuCl_4]^{2-}$

35. Nephelauxetic effect is related to:
A) Abnormal magnetic properties
B) Jahn- Teller distortion
C) Covalent interaction between metal ion and ligand
D) Splitting of d – orbital in a ligand field

36. The metal present in Wilkinson's catalyst is
A) Rhenium B) Ruthenium C) Iridium D) Rhodium

37. Match the molecules in list I with the hybridisation in list II

	List I		**List II**
a)	SF_4	i.	sp^3
b)	XeF_4	ii.	sp^3d
c)	PCl_3	iii.	sp^3d^2
d)	BeH_2	iv	sp

A) a – iv, b – i, c – ii, d – iii B) a – ii, b – iv, c –i, d – iii
C) a – ii, b – iii, c – i, d – iv D a – iii, b – iv, c – ii, d – i

38. In the compound $[W(Cp)_2 (CO)_2]$ the hapticity of two Cp groups are:
A) 5,5 B) 5,3 C) 3,3 D) 5,1

39. Eosin is used as an indicator in:
A) Dichrometry B) Argentometry
C) Cerimetry D) Complexometry

40. Normality of a solution prepared by mixing 10ml of 0.1N hydrochloric acid, 40ml of 0.2 N nitric acid and 50 ml of 0.5 N sulphuric acid will be:
A) 0.4 B) 0.8 C) 0.17 D) 0.34

41. Nephelometry and turbidimetry involve:
A) absorption of light B) Scattering of light
C) Optical density measurement D) Viscosity measurements

42. Instability constants of complexes can be determined by:
A) Potentiometry B) Coulometry
C) Thermometric titration D) Calorimetric DTA

43. A solution of Mg^{2+} is titrated against a standard solution of disodium hydrogen phosphate containing radioactive ^{32}P and the radioactivity of precipitate formed is measured at regular intervals. Nature of the titration curve is such that:

A) radioactivity increases regularly and becomes constant after the end point.
B) radioactivity decreased regularly and becomes constant after the end point
C) radioactivity remains constant and increases after the end point
D) radioactivity remains constant and decreases after the end point.

44. The percentage of constituent x in a compound was found to be 48.32, 48.36 and 48.22. Mean deviation would be

A) 0.053 B) 0.53 C) 5.3 D) 0.0053

45. The thermo analytical technique which records the energy needed to establish a zero temperature difference between a test sample and reference material is.

A) Thermo gravimetry
B) Differential thermal analysis
C) Derivative thermo gravimetry
D) Differential scanning calorimetry

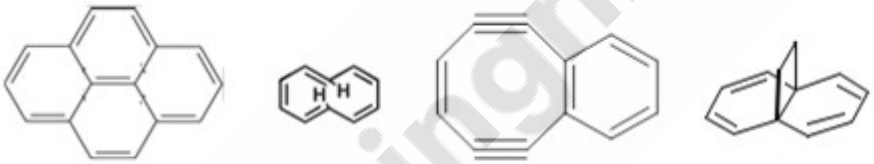
46. Choose the correct order of –I effect of NO_2, F,OH and Ar groups.

A) F > NO_2 > Ar > OH B) NO_2 > F > Ar > OH
C) F > OH > NO_2 > Ar D) NO_2 > F > OH > Ar

47. The number of uncharged canonical forms possible for anthracene and phenanthrene are respectively:

A) 3 &4 B) 4 each C) 4 &5 D) 5 each

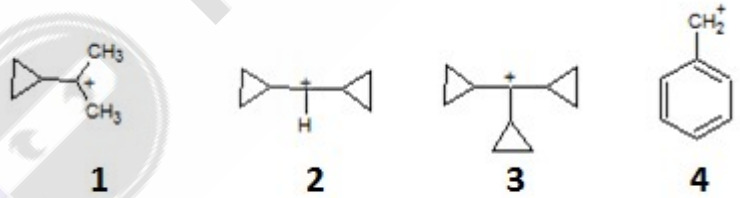
48. Identify the compound(s) that is(are) aromatic



1 2 3 4

A) 1 is aromatic, 2, 3 & 4 are non-aromatic
B) 3 & 4 are aromatic, 1 & 2 are non-aromatic
C) 1 & 2 are aromatic, 3 & 4 are non –aromatic
D) 2 & 3 are aromatic, 1 & 4 are non-aromatic

49. Arrange the following carbocations in the order of their stabilities:



1 2 3 4

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

50. Dehydrohalogenation of meso 2,3-dibromobutane using base gives:

A) Trans alkene
B) Cis alkene
C) Mixture of cis and trans in equal amounts
D) Mixture of cis and trans in unequal amounts

51. The correct order of Lewis acidic strength of boron halides is

A) $BI_3 > BBr_3 > BCl_3 > BF_3$

B) $BF_3 > BCl_3 > BBr_3 > BI_3$

C) $BI_3 < BCl_3 < BBr_3 < BF_3$

D) $BBr_3 > BF_3 > BCl_3 > BI_3$

52. The major product resulting from the addition of HI to3, 3-Dimethyl-1-butene is:

A) 3-Iodo-2, 2-dimethylbutane
B) 2-Iodo-2, 3-dimethylbutane
C) 1-Iodo-3, 3-dimethylbutane
D) 1-Iodo-2, 3-dimethylbutane

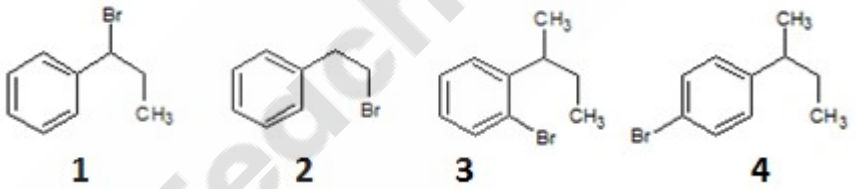
53. Gilman reagent is:

A) OsO_4 in THF B) Lithium dialkylcopper
C) Alkyl titanium halides D) Alkyl palladium salts

54. Identify the reagent that can convert methane to ethane in one step.

A) Methyllithium B) Methylmagnesium bromide
C) Diazomethane D) NBS

55. Identify the product of bromination of ethyl benzene with N-bromosuccinimide.



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

56. Formylation of phenol using chloroform and base is called:

A) Duff reaction B) Kolbe- Schmidt reaction
C) Gatterman-Koch reaction D) Reimer Tiemann reaction

57. What is the major product in the condensation between 3- pentanone and acetone?

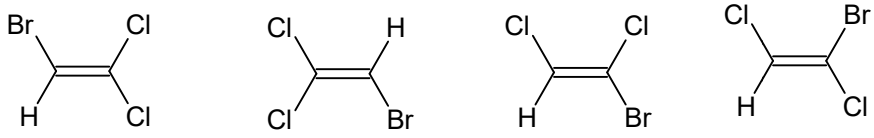
A) $CH_3CH_2CHOHCH_2CH_2COCH_3$

B) $CH_3CH_2COCH(CH_3)C(OH)(CH_3)_2$

C) $CH_3CH_2CH_2COCH_2CH(OH)(CH_3)_2$

D) $CH_3CH_2COC(CH_3)=C(CH_3)_2$

58. Which is the compound having the name (Z) -1 –bromo-1-2 –dichloroethane? Choose the correct answer:



1 2 3 4

A) 2 & 3 represent the compound B) 1 alone is the true representation
C) 3 & 4 represent the compound D) 4 alone represents the compound

59. Norrish type 1 process with cyclohexanone results in a:
1. Lower aldehyde and ketone 2. Cyclopentane
3. Dimer 4. Unsaturated aldehyde
Which of these is/are correct?

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

60. Penicillin is a:
A) Glycosidic antibiotic B) Macrolide antibiotic
C) ß-lactum antibiotic D) Polypeptide antibiotic

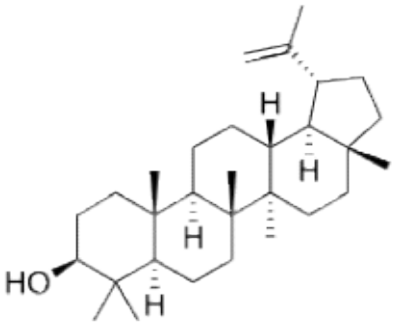
61. Choose the option that gives the correct match of the drugs in List I with their action in List II

	List I		**List II**
a)	Tollumide	1.	Psychotropic
b)	Digitoxin	2.	Anti-diabetic
c)	Amphetamine	3.	Cardio stimulant
d)	Pethidine	4.	Analgestic

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

62. Taxol is a natural product used for the treatment of:
A) Diabetes mellitus B) Cancer
C) Tuberculosis D) Hypertension

63. The natural product represented below is:



A) Diterpenoid B) Steroid C) Triterpenoid D) Lipid

64. Self-ionization of BrF_3 gives $[BrF_2]^+$ and $[BrF_4]^-$. Which list of species and molecular shape is correct?

A) BrF_3, T-shaped; $[BrF_2]^+$, linear; $[BrF_4]^-$, tetrahedral
B) BrF_3, trigonal planar; $[BrF_2]^+$, linear; $[BrF_4]^-$, square planar
C) BrF_3, T-shaped; $[BrF_2]^+$, non-linear; $[BrF_4]^-$, square planar
D) BrF_3, trigonal pyramidal; $[BrF_2]^+$, non-linear; $[BrF_4]^-$, square planar

65. In the solid-state structure of spinel, $MgAl_2O_4$:

A) The Mg^{2+} ions are in tetrahedral sites surrounded by O^{2-} ions
B) The Al^{3+} ions are in tetrahedral sites surrounded by O^{2-} ions
C) The Mg^{2+} ions are in octahedral sites surrounded by O^{2-} ions
D) Both the Mg^{2+} and Al^{3+} ions are in octahedral sites surrounded by O^{2-} ions

66. Which of the following represents the structure of Cp_4Ti (where *Cp* = cyclopentadienyl anion)?

A) All *Cp* rings are *penta hapto*
B) Two *Cp* rings are *mono hapto* and other two are *penta hapto*
C) Two *Cp* rings are *di hapto* and other two are *penta hapto*
D) All *Cp* rings are *di hapto*

67. The reaction: $Mn(CO)_5Me + CO \rightarrow Mn(CO)_5(COMe)$ is an example of:

A) Ligand addition B) β-elimination
C) Oxidative addition D) Alkyl migration

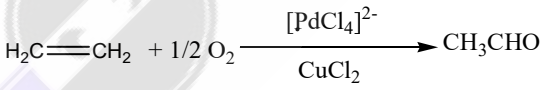
68. A dilute solution of sodium metal in liquid ammonia is blue in colour due to the presence of

A) Hydrated and ammoniated Na^+ ions
B) Ammoniated Na^+ ion
C) Hydrated and ammoniated electrons
D) Ammoniated electrons

69. The number of terminal and bridging carbonyl groups in $Fe_2(CO)_9$ are respectively:

A) 8 and 1 B) 6 and 3 C) 7 and 2 D) 9 and 0

70. The reaction shown below represents the Wacker process:



What is the role of Cu(II) in this reaction?

A) It act as the catalyst B) It reduces Pd(II) to Pd
C) It act as the catalytic poison D) It oxidizes Pd to Pd(II)

71. The metal-metal bond order of in $[Re_2Cl_4(PMe_2Ph)_4]$ is:

A) 4 B) 3.5 C) 3 D) 2.5

72. In *met-hemoglobin*, iron is present as:

A) Fe((II) in low spin state B) Fe(II) in high spin state
C) Fe(II) in both spin states D) Fe(III)

73. The complexes $[PdCl_4]^{2-}$ and $[NiCl_4]^{2-}$ are:
A) $[PdCl_4]^{2-}$ is tetrahedral and paramagnetic; $[NiCl_4]^{2-}$ is square planar and diamagnetic
B) $[PdCl_4]^{2-}$ is square planar and diamagnetic; $[NiCl_4]^{2-}$ is tetrahedral and paramagnetic
C) $[PdCl_4]^{2-}$ is square planar and paramagnetic; $[NiCl_4]^{2-}$ is square planar and diamagnetic
D) $[PdCl_4]^{2-}$ is tetrahedral and paramagnetic; $[NiCl_4]^{2-}$ is tetrahedral and paramagnetic

74. Jahn -Teller distortion is *not* observed in
A) $[Fe(CN)_6]^{3-}$ B) $[Mn(H_2O)_6]^{2+}$ C) $[CoF_6]^{4-}$ D) $[Co(CN)_6]^{4-\backslash}$

75. Which among the following exhibit *nido* structures?
I. $C_2B_9H_{13}$ II. $C_2B_7H_{13}$ III. $C_4B_2H_6$ IV. $C_2B_{10}H_{12}$

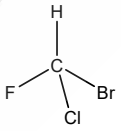
A) I and II B) II and III C) II and IV D) I and III

76. The ground state term symbol for Ni(II) ion is
A) $^3F_2$ B) $^3D_2$ C) $^4D_{3/2}$ D) $^3F_4$

77. According to the Huckel Molecular Orbital (HMO) theory, the delocalization energy of 1,3-butadiene will be:
A) 0.828 β B) Zero C) 2 β D) 0.472 β

78. The number of irreducible representations will be equal to
A) Order of the group B) Order of the class
C) Number of the classes D) Sum of dimensions

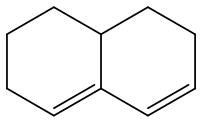
79. The point group of the molecule



will be:

A) C_{2v} B) C_i C) C_s D) C_1

80. According to the Woodward –Fieser rules, the value of λ_{max} the following molecule will be:



A) 234 nm B) 229 nm C) 272 nm D) 267 nm

81. The formula of basic beryllium nitrate is:
A) $[Be_4O(NO_3)_4]$ B) $[Be_4O_2(NO_3)_4]$
C) $[Be_4O(NO_3)_6]$ D) $[Be_4O_3(NO_3)_3]$

82. The absorbance of a homogeneous solution having 20% transmittance will be nearly equal to:
A) 0.7 B) 0.3 C) 1.3 D) 0.8

83. In data analysis, variance denotes:
A) Square root of standard deviation
B) Square of standard deviation
C) Standard deviation divided with mean deviation
D) Percentage of standard deviation divided with mean deviation

84. The Wien effect refers to:
A) Increase in conductance with applied potential gradient
B) Decrease in conductance with applied potential gradient
C) Increase in conductance when the applied voltage has very high frequency
D) Decrease in conductance when the applied voltage has very high frequency

85. The real gases approach ideal behaviour at:
A) Low temperature and low pressure
B) High temperature and low pressure
C) High temperature and high pressure
D) Critical temperature

86. The ratio between the root mean square (RMS)velocity of H_2 at 50K and that of O_2 at 800K is:
A) 2 B) 1 C) ¼ D) 1/2

87. The relation between equilibrium constant K_1 for the reaction, $CO_{(g)} + 1/2\ O_{2\,(g)} \rightleftharpoons CO_{2\,(g)}$ and K_2 for the reaction $2CO_{(g)} + O_{2\,(g)} \rightleftharpoons 2CO_{2\,(g)}$ is

A) $2K_1 = K_2$ B) $K_1 = K_2^2$ C) $K_1 = K_2$ D) $K_1^2 = K_2$

88. Two acids HA and HB have the dissociation constants 1×10^{-3} and 1×10^{-5} respectively in water. How much HA is stronger than HB?
A) 10 times B) 100 times C) 1/10 times D) $\sqrt{10}$ times

89. The osmotic pressure method is used to determine ------.
A) Weight-average molecular weight
B) Sedimentation-average molecular weight
C) Number-average molecular weight
D) Viscosity-average molecular weight

90. One mole of an ideal gas is compressed reversibly from 100 liters to 10 liters at a: constant temperature of 27°C. The ΔS of the system will be equal to:
A) 300 R *ln* (10/100) B) 300 R *ln* (100/10)
C) R *ln* (100/10) D) R *ln* (10/100)

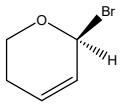
91. The relationship between $t_{1/2}$ and initial concentration of an 'n'th order reaction is:
A) $t_{1/2} \alpha a^n$ B) $t_{1/2} \alpha 1/a^n$ C) $t_{1/2} \alpha 1/a^{n-1}$ D) $t_{1/2} \alpha 1/a^{1-n}$

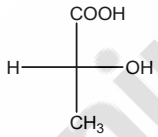
92. Identify the *incorrect* statement regarding photoelectron spectroscopy (PES):
A) The PES is based on photoelectric effect
B) In XPES, the valence electrons are ejected
C) In UV-PES valence shell electrons are ejected
D) In XPES, the core electrons are ejected

93. The Mossbauer spectrum of $K_4[Fe(CN)_6]$consists of:
A) One line without quadrupole splitting
B) Two lines with quadrupole splitting
C) Three lines with quadrupole splitting
D) Two lines with effect of isomer shift

94. The number of radial nodes in 3s and 3p orbital will be respectively
A) 2 and 0 B) 1 and 2 C) 0 and 1 D) 2 and 1

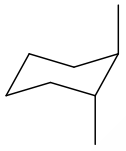
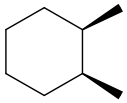
95. The absolute configurations of the following chiral compounds I and II are respectively:

Compound I 

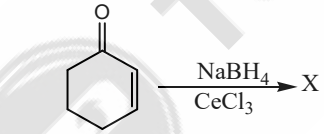
Compound II 

A) S and R B) Rand R C) S and S D) R and S

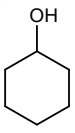
96. The more stable conformation of *1, 2- dimethyl cyclohexane* in the *cis* form will be:

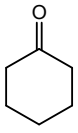
A)  B)  C)  D) 

97. The major product 'X' in the following reaction is:



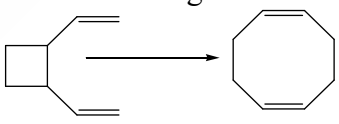
A) 

B) 

C) 

D) 

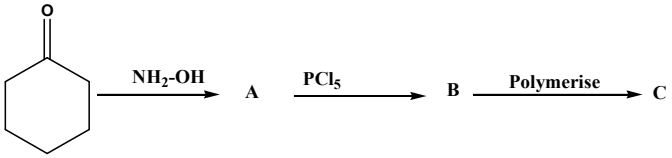
98. The concerted rearrangement shown below is:



A) [1,3] sigmatropic rearrangement
B) [2,3] sigmatropic rearrangement
C) [2,2] sigmatropic rearrangement
D) [3,3] sigmatropic rearrangement

99. The alkaloid nicotine is a derivative of which heterocyclic compound?
A) Pyridine B) Quinoline C) Piperidine D) Indole

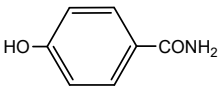
100. The products A,B and C in the following reaction are respectively

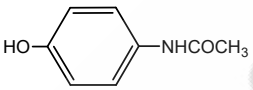


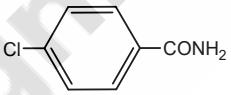
A) Oxime, caprolactum *and* nylon-66
B) Oxime, nitrile *and* poly nitrile
C) Oxime, caprolactum *and* nylon-6
D) Oxime, nitrile *and* PAN

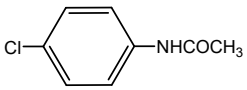
101. Semi-synthetic modification of which compound of the following compound yields Amoxicillin, a broad spectrum antibiotic?
A) Tetracycline B) Penicillin C) Streptomycin D) Chloromycetin

102. The structure of the drug acetaminophen is:

A) 

B) 

C) 

D) 

103. Smog is combination of smoke and fog. The sulphurous smog is also known under the name:
A) Photochemical smog B) London smog
C) Los Angeles smog D) Oxidizing smog

104. Which one the following is *not* an example of globular protein?
A) Collagen B) Insulin
C) Myoglobin D) Pancreatic α-amylase

105. Which statement about the structure of DNA is *incorrect*?
A) During cell replication, the double helix of DNA unwinds and templates the formation of new strands
B) Strands composed of nucleobases are associated by hydrogen-bonded base pairs
C) The double strands form a helical assembly, with a left-handed twist
D) Phosphate groups are present on the outside of the double helix

106. Identify the **incorrect** statement among the following:
A) Polarography is a kind of voltammetry
B) A polarogram is a plot of current against applied voltage
C) The higher flat region appear in the polarogram is called polarographic maxima
D) The polarographic maxima can be suppressed by surfactants like Triton X-100

107. The tranquilizer, which is **not** the derivative of barbituric acid is
A) Veronal B) Luminal C) Equanil D) Seconal

108. Which one of the following is not a green solvent?
A) Supercritical CO_2 B) Liquified NH_3
C) Water D) Ionic liquids

109. In differential thermal analysis (DTA) curve:
A) ΔT is plotted against T B) dW/dT is plotted against T
C) dH/dT is plotted against T D) Mass is plotted against T

110. Quantum dots are nanomaterials with:
A) 3D confinement B) 2D confinement
C) 1D confinement D) 0D confinement

111. Which one of the following method is *not* a 'bottom up' approach to the synthesis of nanomaterials?
A) Sol-gel synthesis
B) Co-precipitation method
C) Chemical Vapour deposition
D) Electron beam lithography

112. Which of the following is *incorrect* with respect to AAS?
A) It is based on the absorbance by ground state atoms present in solution
B) It is based on the absorbance by ground state atoms present in gaseous state
C) The resonance line source is hollow cathode lamp
D) The absorbance is in accordance with Beer-Lambert's law

113. Pick out the one which is *not* a chain- growth polymer:
A) Polyethene B) Terylene C) Orlon D) Teflon

114. The term 'dead time' in chromatography refers to:
A) The time required to flush one column of eluent through the column
B) The time required for the complete separation of all components
C) The time required for the complete separation of one selected component
D) The time between the separation of two components during elution

115. The colour of the gold nanoparticles is mainly related to:
A) Size dependent surface plasmon resonance
B) Size independent surface plasmon resonance
C) Size independent scattering of light by the nanoparticles
D) Mie scattering

116. The compound β – carotene can be considered as precursor of which vitamin?
A) Vitamin $-B_{12}$ B) Vitamin –A C) Vitamin –D D) Vitamin –K

117. Negative soil pollution is:
A) Reduction in soil productivity due to erosion and over use
B) Reduction in soil productivity due to addition of pesticides and other industrial waste
C) Increase in soil toxicity
D) Decrease in soil fertility

118. According to the HSAB principle, S^{2-} ion and K^{+} ions are respectively

A) Hard base, hard acid
B) Soft base, soft acid
C) Hard base, soft acid
D) Soft base, hard acid

119. Occlusion and inclusion are associated with which of the following in gravimetric analysis?

A) Post-precipitation
B) Co- precipitation
C) Drying of the precipitate
D) Solubility of precipitation

120. Which one of the following is *not* a metallochromic indicator?

A) Patton and Reeder's indicator
B) Murexide indicator
C) Solochrome black T indicator
D) Karl Fischer indicator
