A

16604 **120 MINUTES**

1. Which one of the following indicates the correct order of variation in atomic size?
   A) Be > B > C > N > F B) Be < B > C< N < F
   C) Be < B < C < N < F D) Be > B > C< N < F

2. The "styx" number of B_6H_{10} is
   A) 4202 B) 2402 C) 4220 D) 4620

3. Layer polymeric silicates have the formula
   A) $Si_3O_9^{6-}$ B) $[Si_4O_{10}]_n^{4n-}$
   C) $[Si_4O_{11}]_n^{6n-}$ D) $Si_6O_{18}^{12-}$

4. Which among the following has square pyramidal structure?
   A) XeF_4 B) XeO_4 C) XeO_3F_2 D) $XeOF_4$

5. The correct order of acidity among the transition metals hydroxides of Sc, Mn, Fe, Ni is
   A) $Sc(OH)_2 < Mn(OH)_2 < Fe(OH)_3 < Fe(OH)_2 < Ni(OH)_2$
   B) $Sc(OH)_2 < Mn(OH)_2 < Fe(OH)_2 < Fe(OH)_3 < Ni(OH)_2$
   C) $Sc(OH)_2 < Mn(OH)_2 < Fe(OH)_2 < Ni(OH)_2 < Fe(OH)_3$
   D) $Mn(OH)_2 < Fe(OH)_3 < Fe(OH)_2 < Ni(OH)_2 < Sc(OH)_2$

6. Which among the following transition metals, Ti, Mn, V, Cr, Mo, W, Zr form polyoxometallates?
   A) V, Cr, Mo &W B) Mn, Cr, Mo, W & Zr
   C) Ti, Cr, Mo & W D) All of these

7. Mischmetal is a mixture of
   A) Ce, Pr, La & Eu B) Ce, Pr ,Lu & Nd
   C) Ce, Pr, La & Nd D) La, Pr, Nd & Lu

8. The intense yellow colour of uranyl ion (UO_2^{2+}) in solution is due to
   A) MLCT B) LMCT
   C) f-f transition D) d-d transition

9. The number of isomers possible for the square planar complex $[PtBrCl(NH_3)(PH_3)]$ is
   A) 2 B) 3 C) 4 D) 5

10. The spin only magnetic moments in BM of $K_4[CoF_6]$ and $[Co(NH_3)_6]Cl_2$ complexes is/are respectively
    A) Both 1.73 B) Both 3.83
    C) 1.73 & 3.83 D) 3.83 &1.73

11. The products X & Y formed in the following reactions are

$[PtCl_4]^{2-} + 2NH_3 \longrightarrow X$

$[Pt(NH_3)_4]^{2+} + 2Cl^- \longrightarrow y$

A) Both X& Y = *cis*-$[PtCl_2(NH_3)_2]$
B) Both X& Y = *trans*-$[PtCl_2(NH_3)_2]$
C) X= *cis*-$[PtCl_2(NH_3)_2]$ & Y= *trans*-$[PtCl_2(NH_3)_2]$
D) X= *trans*-$[PtCl_2(NH_3)_2]$ & Y= *cis*-$[PtCl_2(NH_3)_2]$

12. The mechanism followed in the following reaction is

$$[W(CO)_6] + PPh_3 \longrightarrow [W(CO)_5(PPh_3)] + CO$$

A) Associative mechanism
B) Dissociative mechanism
C) Outer- sphere mechanism
D) Inner- sphere mechanism

13. Which among the following complexes does not obey the 18 electron rule?
(i) $[Fe(\eta^5\text{-}Cp)_2]$, (ii) $[Cr(\eta^5\text{-}Cp)_2]$, (iii) $[Cr(CO)_6]$, (iv) $[V(\eta^5\text{-}Cp)_2]$

A) i, ii & iv only B) i, iii & iv only
C) i & iii only D) ii & iv only

14. Which of the following has a nido structure?
A) $Ir_4(CO)_{12}$ B) $Fe_4(CO)_{15}$
C) $Os_5(CO)_{16}$ D) $Rh_6(CO)_{16}$

15. The hapticity of cyclopentadienyl is/are
A) 1 B) 3 C) 5 D) 1, 3 and 5

16. Match the following catalysts with the correct processes

Catalyst		Process	
(i)	Grubb's catalyst	(a)	Hydrogenation of alkenes
(ii)	Zeigler Natta catalyst	(b)	Hydroformylation
(iii)	Wilkinson's catalyst	(c)	Polymerisation
(iv)	$Co_2(CO)_8$	(d)	Alkene metathesis

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

17. Which of the following metal ions has a high concentration in cytoplasm?
A) K^+ B) Na^+ C) Ca^{2+} D) Fe^{2+}

18. Small polydentate ligands that have a high affinity for Fe (III) is known as
A) Apocalmodulin B) Ferritin
C) Siderophores D) Carboxypeptidase

19. A small iron-sulphur protein found in various sulphur-metabolizing bacteria is
A) Ferridoxin B) Cytochrome
C) Rubredoxin D) Haemerythrin

20. *Cis*-$[PtCl_2(NH_3)_2]$ known as cisplatin is used as
A) Anti cancer drug B) Anti- arthritis drug
C) Anti malarial drug D) Anti-histamine drug

21. The stability order of carbocations

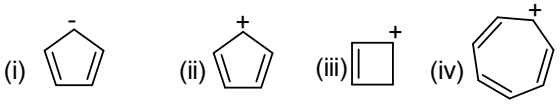
A) $C_6H_5^+ < p\text{-}ClC_6H_4\text{-}CH_2^+ < C_6H_5CH_2^+$ B) $C_6H_5^+ < C_6H_5CH_2^+ < p\text{-}ClC_6H_4\text{-}CH_2^+$

C) $C_6H_5CH_2^+ < C_6H_5^+ < p\text{-}ClC_6H_4\text{-}CH_2^+$ D) $p\text{-}ClC_6H_4\text{-}CH_2^+ < C_6H_5^+ < C_6H_5CH_2^+$

22. Arrange the following in the increasing order of reactivity in S_N2 solvolysis.
(a) $CH_3\text{-}CH_2\text{-}CH_2\text{-}Br$ (b) $CH_3\text{-}O\text{-}CH_2\text{-}Br$ (c) C_6H_5Br

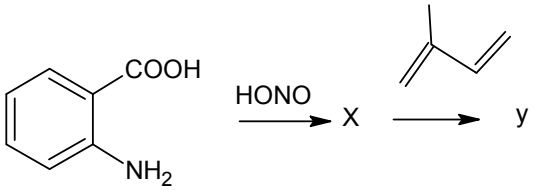
A) a < b < c B) b < a < c
C) c < b < a D) c < a < b

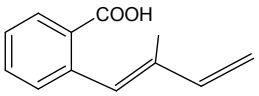
23. Which among the following is/are antiaromatic?

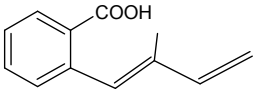


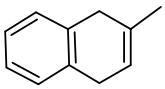
A) (i) & (ii) only
B) (ii) & (iii) only
C) (iv) only
D) (ii) only

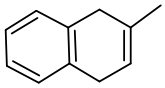
24. The intermediate X and the product Y formed in the following reaction is

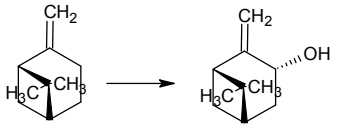


A) X is carbocation and Y is 

B) X is carbanion and Y is 

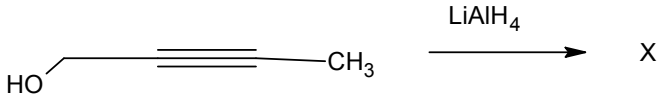
C) X is benzyne and Y is 

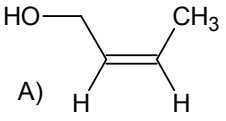
D) X is nitrene and Y is 

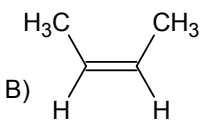
25. The best reagent for the conversion of 

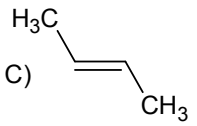
A) $NaIO_4$ B) $Pb(OAc)_4$ C) SeO_2 D) $KMnO_4$

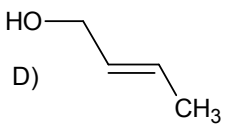
26. The major product of the following reaction is











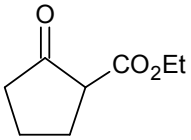
27. Match the following reagents with the correct reaction

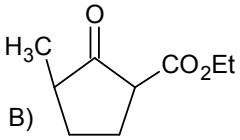
a)	$Zn(Hg)/HCl$	i)	Shapiro reaction
b)	$H_2N\text{-}NH_2$, KOH	ii)	Clemmensen reduction
c)	Tosyl hydrazone, RLi	iii)	Birch reduction
d)	Li/NH_3	iv)	WK reduction

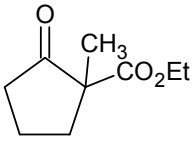
A) a- ii, b-i, c-iv, d-iii B) a- ii, b-iv, c-i, d-iii
C) a- ii, b-i, c-iii, d-iv D) a- iii, b-i, c-iv, d-ii

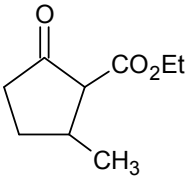
28. The major product of the following reaction is

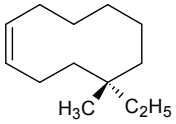
$$EtO_2C(CH_2)_4CO_2Et \xrightarrow[2.\ MeI]{1.\ NaOEt}$$

A) 

B) 

C) 

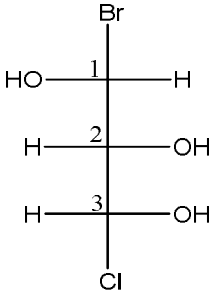
D) 

29. The IUPAC name of the compound 

is

A) (1E, 5R) 5-ethyl-5-methylclodec-1-ene
B) (1Z, 5S) 5-ethyl-5-methylclodec-1-ene
C) (1E, 5S) 5-ethyl-5-methylclodec-1-ene
D) (4E, 1S) 1-ethyl-1-methylcyclodec-4-ene

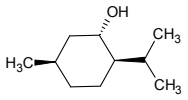
30. The R and S nomenclature of the following compound is



A) 1- R, 2- R, 3-S B) 1-S, 2-S, 3-R

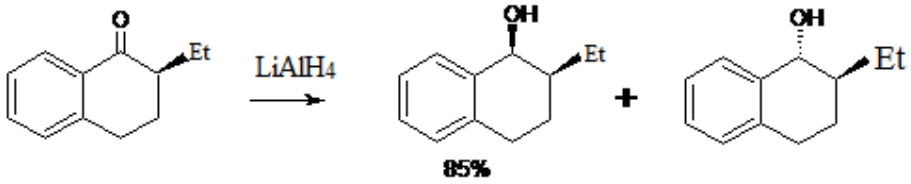
C) 1- S, 2- R, 3-S D) 1-R, 2-S, 3-R

31. The most stable conformation of the following compound is



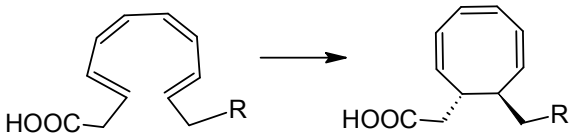
A) Chair with OH equatorial, Me & iPr axial
B) Boat with Me & iPr boat equatorial & OH at bowsprit
C) Chair with iPr and OH equatorial & Me axial
D) Chair with Me & OH equatorial, iPr axial

32. Which among the following is correct regarding the reaction



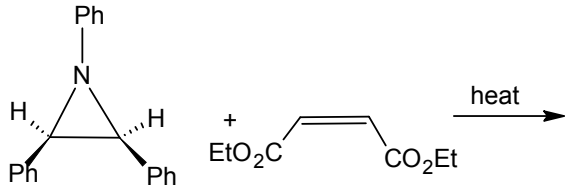
A) It is a stereo specific reaction
B) It is an enatio specific reaction
C) It is a regeo selective reaction
D) It is a diastereoselective reaction

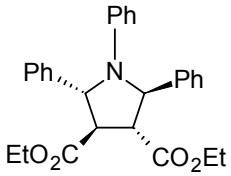
33. The following pericyclic reaction is

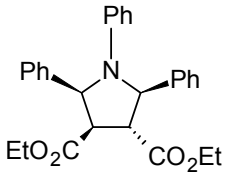


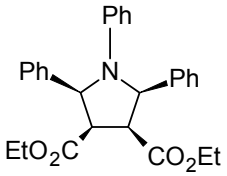
A) Thermal π^{8s} disrotatory reaction
B) Thermal π^{8a} conrotatory reaction
C) Photochemical π^{8a} conrotatory reaction
D) Photochemical π^{8s} disrotatory reaction

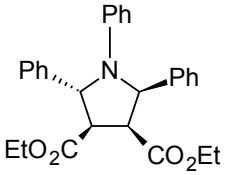
34. The major product of thefollowing reaction is



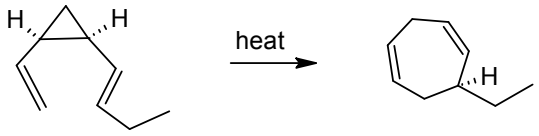
A)


B)


C)


D)


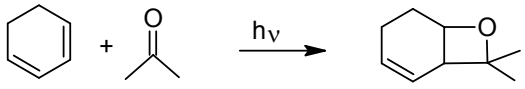
35. Which is /are the correct statements about the following reaction?



(i) It is a [3,3] sigmatropic rearrangement
(ii) It is an example of Claisen-Cope rearrangement
(iii) It is an example of Cope rearrangement

A) (i) & (iii) only
B) (i) & (ii) only
C) (ii) & (iii) only
D) All the three

36. The following photochemical reaction is an example of



A) Norrish type I reaction
B) Norrish type II reaction
C) Paterno-Buchi reaction
D) Barton reaction

37. Camphor ($C_{10}H_{16}O$) is an example of
A) Monoterpenoid
B) Diterpenoid
C) Sesquiterpenoid
D) Triterpenoid

38. Which of the following monosachharides give the same osazone?
(I) D- Glucose (II) D- Mannose (III) D- Ribose (IV) D- Fructose

A) Only I & II B) Only I,II & III
C) Only I, II & IV D) All the four

39. A vitamin which exists as an ene-diol is
A) Vitamin A B) Vitamin B_2
C) Vitamin C D) Vitamin K

40. A tripeptide present in almost all tissues of living things which removes dangerous oxidising agents is
A) Aspartame B) Glutathionine
C) Ala-Val-Leu D) Ser-Met-His

41. A metal crystallises as fcc lattice. Its atomic radius is 141.4 pm. The unit cell dimension of the cubic lattice is
A) 100 pm B) 242 pm C) 326 pm D) 400 pm

42. An example of a super ionic conductor is
A) NaCl B) $YBa_2Cu_3O_7$
C) $Na_{1+x}Zr_2P_{3-x}Si_xO_{12}$ D) Al_2O_3

43. The temperature at which the RMS velocity of methane gas is equal to the RMS velocity of helium at 300K is
A) 1200K B) 600K C) 400K D) 75K

44. Which among the following is/ are correct regarding the viscosity of gases?
A) Viscosity of a gas is proportional to the square root of the absolute temperature
B) Viscosity of a gas is independent of pressure
C) Viscosity of a gas is inversely proportional to the square of its molecular diameter
D) All the above

45. The free energy change during the isothermal reversible expansion of 10 moles of an ideal gas from a volume of 10L to 100L at 300K is ($R = 8.3\ JK^{-1}mol^{-1}$)
A) 573.4 kJ B) -573.4 kJ C) 57.34 kJ D) -57.34 kJ

46. The condition for equilibrium is
A) $(\partial G)_{P,V} = 0$ B) $(\partial G)_{S,V} = 0$
C) $(\partial G)_{P,T} = 0$ D) $(\partial G)_{T,V} = 0$

47. According to the second law of thermodynamics, which of the following quantity represents the change in a state function?

A) q_{rev} B) T/q_{rev} C) q_{rev}/T D) w_{rev}

48. According to molecular partition function, Helmholtz free energy (A) is given by

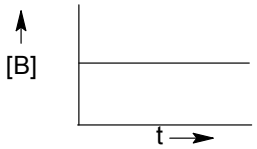
A) $kT^2\left(\frac{\partial lnQ}{\partial T}\right)_{V,N}$ B) $kT\left(\frac{\partial lnQ}{\partial V}\right)_{T,N}$

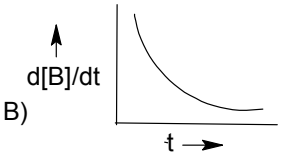
C) A(0) - kTlnQ D) A(0)+kTlnQ

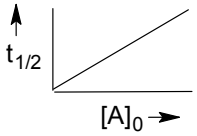
49. For the reaction 2A + B →C + 2D which is first order in A and also first order in B, the overall rate is given by

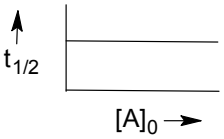
A) $k[A]^2[B]$ B) $k[A][B]^2$ C) $k[A]^2$ D) $k[A][B]$

50. Which graph represents correctly for the zero order reaction A(g) ⟶ B(g)

A) 

B) 

C) 

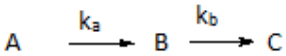
D) 

51. The expression for the rate constant according to the Absolute reaction rate theory is

A) $k=\frac{kT}{h}e^{\Delta S^*/R}e^{\Delta H^*/RT}$ B) $k=\frac{kT}{h}e^{\Delta S^*/R}e^{-\Delta H^*/RT}$

C) $k=\frac{kT}{h}e^{-\Delta S^*/R}e^{\Delta H^*/RT}$ D) $k=\frac{kT}{h}e^{\Delta S^*/R}e^{-E^*/RT}$

52. For a consecutive elementary first order reaction



Under steady state approximation the concentration of the product [C] is given by

A) $(1-e^{-k_a t})[A]_0$ B) $(1-e^{-k_b t})[A]_0$

C) $(1+e^{-k_a t})[A]_0$ D) $(1+e^{-k_b t})[A]_0$

53. The mean ionic activity of 'm' molal solution of $Ca_3(PO_4)_2$ is given by ($\gamma_\pm$ is the mean ionic activity coefficient)

A) $a_\pm = 108m\gamma_\pm$ B) $a_\pm = 12m\gamma_\pm$

C) $a_\pm = \sqrt[5]{108}\ m\gamma_\pm$ D) $a_\pm = \sqrt[5]{108m\gamma_\pm}$

54. $\Lambda^0_{NH4Cl} = 130\Omega^{-1}$ cm^2 mol^{-1}, $\Lambda^0_{KOH} = 220\Omega^{-1}$ cm^2 mol^{-1}, $\Lambda^0_{KCl} = 110\Omega^{-1}$ cm^2 mol^{-1} If Λ_m of NH_4OH at a given concentration is 12.0 Ω^{-1} cm^2 mol^{-1}, what is its degree of dissociation?

A) 2% B) 3% C) 20% D) 5%

55. The relationship between temperature coefficient of e.m.f. of a cell and standard entropy change of the cell reaction is given by

A) $\Delta S^\circ = nF\left(\frac{\partial E}{\partial T}\right)_p$ B) $\Delta S^\circ = -nF\left(\frac{\partial E}{\partial T}\right)_p$

C) $\Delta S^\circ = -F\left(\frac{\partial E}{\partial T}\right)_p$ D) $\Delta S^\circ = nFE^\circ - nF\left(\frac{\partial E}{\partial T}\right)_p$

56. Tafel plot is

A) Plot of current density against electrode potential
B) Plot of current density against over potential
C) Plot of logarithm of current density against over potential
D) Plot of logarithm of current density against electrode potential

57. Match the following

Column I	Column II
(i) Freundlich isotherm	a) $\frac{z}{(1-z)V} = \frac{1}{cV_{mon}} + \frac{(c-1)z}{cV_{mon}}$
(ii) Langmuir isotherm	b) $\theta = c_1 p^{1/c_2}$
(iii) BET isotherm	c) $\theta = \frac{Kp}{1+Kp}$

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

58. ESCA is usually used to study

A) Reactions occurring at the bulk of the material
B) Surface state of heterogeneous catalysts
C) Electronic structure of molecules
D) Homogeneous catalysis

59. The colour of lyophobic colloids is due to

A) Electronic transition in colloidal particles
B) Vibrational transition in colloidal particles
C) Scattering of light by colloidal particles
D) Electronic & vibrational transition

60. Oxidation of propene to acrolein by bismuth molybdate is best explained by

A) Langmuir- Hinshelwood mechanism
B) Eley – Rideal mechanism
C) Mars van Krevelen mechanism
D) None of the above

61. Which of the following is not a linear operator?

A) $\frac{d^2}{dx^2}$ B) $\sqrt{\ }$ C) $\hat{P}_x$ D) $\hat{H}$

62. The probability that a particle to be found in between 0 and a/2 in a one dimensional box of length 'a' is

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{3}{4}$

63. The angular momentum of an electron in the f-orbital is

A) $\sqrt{2}\frac{h}{2\pi}$ B) $\sqrt{6}\frac{h}{2\pi}$ C) $\sqrt{3}\frac{h}{2\pi}$ D) $\sqrt{12}\frac{h}{2\pi}$

64. The ground state term symbol of Mn^{2+} is

A) ^3F B) ^2D C) ^2S D) ^6S

65. According to the Born-Oppenheimer approximation, which of the following relative motion may be neglected?

A) Electron to nucleus B) Electron to electron
C) Nucleus to nucleus D) All of the above

66. For hydrogen molecule in the excited state $\sigma_g^1\sigma_u^1$, the spin part of the triplet state with $m_s = 0$ is proportional to

A) $\alpha(1)\beta(2)$ B) $\alpha(1)\beta(2) + \beta(1)\alpha(2)$

C) $\alpha(1)\alpha(2)$ D) $\alpha(1)\beta(2) - \beta(1)\alpha(2)$

67. The term symbol of a molecule with the electronic configuration

$(1\sigma_g)^2(1\sigma_u)^2(2\sigma_g)^2(2\sigma_u)^2(1\pi_u)^2(1\pi_u)^2(3\sigma_g)^1$ is

A) $^1\sum_g^+$ B) $^3\sum_g^+$ C) $^2\sum_g^-$ D) $^2\sum_g^+$

68. According to Huckel MO treatment the four π-MO energies of butadiene are given by $\alpha \pm 1.62\beta$ and $\alpha \pm 0.62\beta$. The delocalization energy of butadiene is

A) 0.62β B) 0.48β C) 1.62β D) 1.48β

69. The point group of eclipsed ethane is

A) D_{3h} B) C_{3v} C) D_{3d} D) D_3

70. A point group has the following sets of elements E, $2C_5$, $2C_5^2$, $5C_2$ σ_h, $2S_5$, $2S_5^2$, $5\sigma_v$. The order and the number of irreducible representations of the group are respectively

A) 8, 8 B) 20, 20 C) 20, 8 D) 10, 8

71. $C_6^3 \times \sigma_h$ is equivalent to

A) σ_h B) C_3 C) σ_v D) i

72. Which of the following is a well-behaved function? (x lies between plus and minus infinity).

A) $y = \exp(a x^2)$ B) $y = a x + b$
C) $y = a x^2$ D) $y = \exp(-a x^2)$

73. Match the following

I	CH_4	a. Asymmetrical top
II	H_2O	b. Spherical top
III	CO_2	c. Symmetrical top
IV	CH_3Cl	d. Linear
V	C_2H_5OH	

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

74. The fundamental and first overtone of $H^{35}Cl$ occurs at 2885.64 cm^{-1} and 5667.18 cm^{-1} respectively. The fundamental vibrational frequency ($\bar{\nu}$) of the molecule is

A) 2885.64 cm^{-1} B) 2937.69 cm^{-1}
C) 2833.59 cm^{-1} D) 2989.74 cm^{-1}

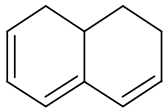
75. A molecule containing a carbonyl group showed the following absorptions in the UV (a) λ_{max} 295 nm with ε_{max}=20 (b) λ_{max} 175 nm with ε_{max}=11000. Which among the following is true?

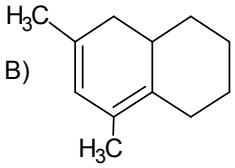
A) (a) $n \rightarrow \pi$ (b) $\sigma \rightarrow \sigma$
B) (a) $n \rightarrow \sigma$ (b) $\sigma \rightarrow \sigma$
C) (a) $n \rightarrow \pi$ (b) $\pi \rightarrow \pi$
D) (a) $n \rightarrow \sigma$ (b) $\pi \rightarrow \sigma$

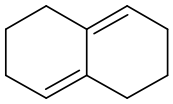
76. Which of the following species show esr spectrum?
(i) CO_2, (ii) N_2^+, (iii) NO, (iv) H_2O, (v) O_2

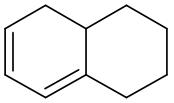
A) (ii),(iii) & (v) only B) (i), (ii) & (iv) only
C) (i), (ii), (iii) & (iv) only D) All of these

77. A conjugated polyene showed a λ_{max} 272 nm in the UV region. The possible structure of the compound is

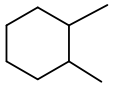
A) 

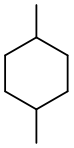
B) 

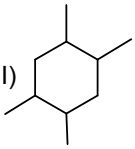
C) 

D) 

78. The numbers of proton decoupled ^{13}CNMR signals shown by the following compounds are respectively

I) 

II) 

III) 

A) 4, 4, 2 B) 4, 3, 3 C) 3, 4, 3 D) 8, 8, 10

79. The order of C=O stretching frequency in aldehyde, acyl chloride and amide is
A) Amide > acyl chloride > aldehyde
B) Acyl chloride > aldehyde > Amide
C) Amide > aldehyde > acyl chloride
D) Acyl chloride > Amide > aldehyde

80. If Mossbauer spectrum of $Fe(CO)_5$ is recorded in the presence of a magnetic field , the original spectrum of two lines changes into one with
A) three lines B) four lines
C) five lines D) six lines

81. The indicators that can be used to detect the equivalence points in the following two titrations (i) a strong acid and a weak base and (ii) a weak acid and a weak base are, respectively,
A) (i) Methyl orange and (ii) no suitable indicator
B) (i) no suitable indicator and (ii) Methyl orange
C) (i) Phenolphthalein and (ii) Methyl orange
D) (i) Diphenylamine and (ii) Ferroin

82. To compare the precisions of data recorded in two different occasions we make use of-----

A) Student t-test B) Paired t-test
C) Chi-square-test D) F-test

83. Pipettes, burettes and volumetric flasks may hold or deliver volumes slightly different from those indicated by their graduations. This may lead to

A) Instrumental error B) Method error
C) Personal error D) Random error

84. Which among the following is/ are the reason for co-precipitation?

(i) Occlusion (ii) Inclusion (iii) Adsorption

A) (i) only B) (ii) & (iii) only
C) (i) & (iii) only D) (i), (ii) & (iii)

85. The chromatographic method by which separation is effected by the difference in distribution of the substances in two different immiscible solvents is called

A) Column chromatography B) Partition chromatography
C) Thin layer chromatography D) Gel permeation chromatography

86. In a TLC if the compounds A and B have moved a distance of 5.5cm and 7cm respectively from the sample spot, the solvent front moved a distance of 10cm, then the R_f values of A and B are respectively

A) 1.8 & 1.4 B) 1.4 & 1.8
C) 0.55 & 0.7 D) 0.7 & 0.55

87. Which among the following is not a carrier gas in GC?

A) H_2 B) CO C) He D) N_2

88. Separation of Lanthanides is most effected by

A) HPLC
B) Electrophoresis
C) Gel permeation Chromatography
D) Ion-exchange chromatography

89. When a monochromatic beam of light of wavelength 540nm is passed through sample solution in cell 1cm thick the transmittance is 20%. The molar extinction coefficient of the substance is 2000 L $mol^{-1}cm^{-1}$. The concentration of the solution is (log2 = 0.3010)

A) 3.5×10^{-3} mol L^{-1} B) 5×10^{-3} mol L^{-1}
C) 7×10^{-3} mol L^{-1} D) 2×10^{-3} mol L^{-1}

90. For the quantitative estimation of alkali metals of low concentrations (ppm), which of the following analytical method is most suitable?

A) AAS
B) FES
C) Turbidimetry
D) Photoelectron spectroscopy

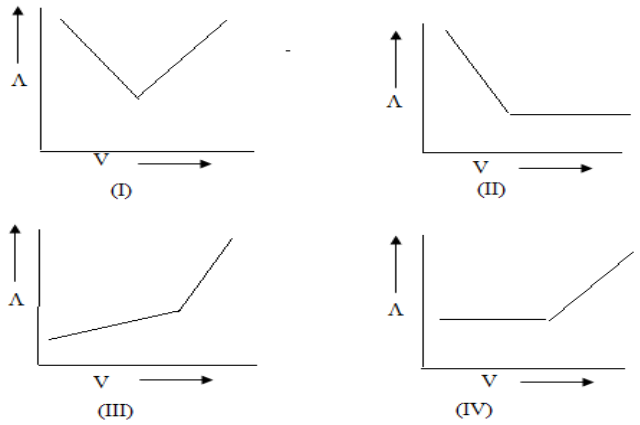
91. Clarity of water can be determined by

A) Turbidimetry B) Nephelometry
C) Flourimetry D) All the above

92. The information about the occupied MO energy levels of molecules can be determined by

A) UV-visible spectroscopy
B) IR spectroscopy
C) Photoelectron spectroscopy
D) Raman spectroscopy

93. Which among the following curves represent the conductometric titration of a weak acid against a strong base



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

94. When hydrogen electrode and normal calomel electrode are immersed in a solution at 25°C a potential of 0.664V is obtained. The pH of the solution is
$(2.303\frac{RT}{F} = 0.059V, E_{calomel} = 0.2802V)$

A) 6.5 B) 5.5 C) 7.5 D) 4.5

95. Coulometric method of analysis is based on

A) Ohms law B) Nernst equation
C) Faraday's law D) Ilkovic equation

96. The working electrode used in polarographic analysis is usually

A) Standard Calomel electrode B) Ag/AgCl electrode
C) Hydrogen electrode D) Dropping mercury electrode

97. Exothermic and endothermic reactions can be easily identified by the thermograms

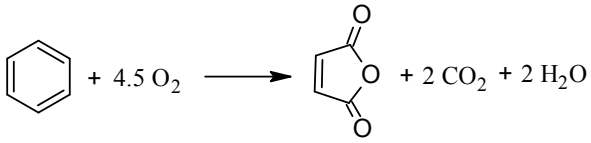
A) TG B) DTG
C) DSC D) Both B & C

98. Of the following, which one is wrong with respect to radiometric titration?
A) Gives sharp and accurate end point.
B) Weight and chemical purity of the reagents have no consideration.
C) Radiochemical purity of the reagent and precipitate have no consideration.
D) Quantities required for the estimation are usually small.

99. The SI unit of radioactivity is
A) becquerel B) curie C) rad D) rem

100. A liquid scintillating counter converts the energy of the nuclear emissions to
A) Heat energy B) Light energy
C) Electrical energy D) Chemical energy

101. Benzene combines with oxygen in presence of V_2O_5 according to the equation



If the desired product is maleic anhydride, the atom economy of the reaction is

A) 44.14% B) 83.78% C) 35.13% D) 52.18%

102. Which among the following is not true with respect to ionic liquids?
A) They are organic salts with melting point lower than 100^{o}C
B) They generally consist of large N- containing cation and a smaller inorganic anion
C) They are regarded as designer solvents
D) They exist in super critical fluid state

103. Which among the following statements is/are true for microwave assisted organic synthesis?
(i) It can be used for reactions involving heterogeneous metal catalysts
(ii) It can be used for reactions in non-polar solvents
(iii) It increases the reaction rate more effectively than the rate of conventional methods
A) (i) & (ii) only B) (ii) & (iii) only
C) (iii) only D) (ii) only

104. Which among the following is a phase transfer catalyst?
A) Benzyltrimethylammonium chloride
B) Pentadecyltributyl phosphonium sulphate
C) Vanadiumpentoxide
D) Invertase

105 Nanomaterials are solid substances with the dimension
A) 0.01 nm to 10 nm B) 10 nm to 1000 nm
C) 1 nm to 100 nm D) 0.1 nm to 1000 nm

106. The colour of nano-metallic particles dispersed in a dielectric medium is mainly due to
A) Scattering of radiation
B) Localised surface Plasmon absorption
C) Electronic transition
D) None of the above

107. The nano- crystals employed for QD colour production in HD LED TV is
A) ZnS B) Si C) CdSe D) AlN

108. Bottom-up fabrication of nanomaterials can be done by
A) Photolithography
B) Electron beam lithography
C) Soft lithography
D) Solution method and vapour phase methods

109. Photochemical smog is formed in
A) Summer during the morning time
B) Summer during the day time
C) Winter during the day time
D) Winter during the morning time

110. Which among the following gases in the atmosphere are the main causes of green house effect?
(i) CO_2 (ii) N_2 (iii) CH_4 (iv) H_2O (v) N_2O

A) (i), (iii), (iv), (v) only B) (i), (ii), (iii), (v) only
C) (i), (iii), (v) only D) All

111. Acid rain is caused by which of the following?
i. NO_2 ii. SO_2 iii. CFC

A) i and iii only B) ii only
C) i only D) i and ii only

112. During the Bhopal tragedy the toxic gas released into the atmosphere was
A) HCN B) Carbaryl
C) Methyl isocyanate D) Methyl mercaptan

113. Which among the following are true for thermoplastics?
I) They have ordered crystalline regions
II) They have amorphous regions
III) They are hard at room temperature

A) (I) & (III) only B) (II) & (III) only
C) (I) & (II) only D) All the three

114. Protective clothing of fire fighters are made by the polymer
A) Nylon 66 B) Kevlar C) Dacron D) Kodel

115. Lexan the transparent polymer used to make bullet proof windows is made by the copolymerisation of
A) Phosgene and bisphenol A
B) Alkyl isocyanate and alcohol
C) Terephthalic acid and ethyleneglycol
D) Formaldehyde and melamine

116. Match the following

Column I	Column II
(a) A strongest adhesive	(i) Polyacetylene
(b) Conducting polymer	(ii) Neoprene
(c) Thermosetting polymer	(iii) Epoxy resin
(d) Synthetic rubber	(iv) Melmac

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

117. Which among the following is not correct in designing an agonist drug?
A) The drug must have the correct binding groups
B) The drug must have these binding groups correctly positioned
C) The drug must be the right size for the binding site
D) The drug must alter the shape of the binding site

118. A drug that is antipyretic as well as analgesic
A) Quinine B) p- acetamidophenol
C) Penicillin D) Chloramphenicol

119. Which among the following is not a sulpha drug?
A) Hydrochlorothiazide B) Sulphamethaxazole
C) Chlorthalidone D) Diazepam

120. Which among the following is a sedative drug?
A) Phenobarbital B) Paracetamol
C) Ibuprofen D) Oxamniquine

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