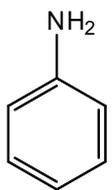
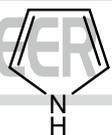
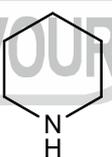
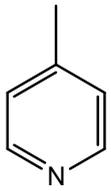




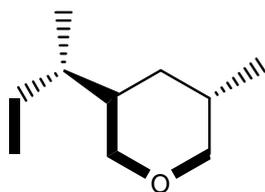
CUET-PG CHEMISTRY
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PART-B CHEMISTRY

26. Which of the following compound is ionic in nature and soluble in water?
- (a) 1-Bromocyclohepta-2,4,6-triene (b) 3-Bromohepta-2,4,6-triene
(c) 3-Bromopenta-1,4-diene (d) 1-Bromocyclopenta-2,4-diene
27. To generate molecular orbitals in molecules consisting of three or more atoms, which of the following is *correct*?
- (a) Group orbitals are first generated by combining atomic orbitals with same symmetry
(b) Group orbitals are first generated by combining atomic orbitals with different symmetry
(c) Group orbitals can be treated as molecular orbitals of the molecule
(d) LCAO method can't be applied
28. A 60 W electric heater was immersed in a gas taken in a constant-volume adiabatic container and it was switched on for 150s. The temperature of the gas increased by 50°C. The heat capacity of the gas is
- (a) 1.8 kJ K⁻¹ (b) 32.37 JK⁻¹ (c) 1.8 JK⁻¹ (d) 32.37 kJ K⁻¹
29. In nonpolar aprotic solvent which of the following will act as strongest base?
- (a)  (b)  (c)  (d) 
30. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**.
Assertion A: For a binary solution the chemical potential of one component of the mixture cannot change independently of the chemical potential of the second component.
Reason R: $n_A d\mu_A + n_B d\mu_B = 0$
In the light of the above statements, choose the *most appropriate* answer from the options given below:
- (a) Both **A** and **R** are correct and **R** is the correct explanation of **A**
(b) Both **A** and **R** are correct but **R** is **NOT** the correct explanation of **A**
(c) **A** is correct but **R** is not correct
(d) **A** is not correct but **R** is correct
31. Van Arkel-De Boer process for purification of metals is based on thermal instability of
- (a) Sulphates (b) Phosphates (c) Iodides (d) Oxides

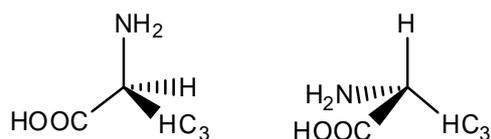


32. Find out the total number of stereoisomers in the following molecule.



- (a) 2 (b) 4 (c) 6 (d) 8

33. What is the relation between the following pair of compounds?



- (a) Enantiomers (b) Homomers (c) Identical (d) Diastereomers

34. For a particle in a square box of side ' l ' and quantum numbers $n_1 = 1$, $n_2 = 2$, the most probable location of finding the particle is

- (a) $x = \frac{l}{2}, y = \frac{l}{4}$ (b) $x = \frac{l}{4}, y = \frac{l}{2}$ (c) $x = \frac{l}{2}, y = \frac{l}{2}$ (d) $x = \frac{l}{4}, y = \frac{l}{4}$

35. The molar volume of an ideal gas at 500 K and 100 bar is $0.416 \text{ dm}^3 \text{ mol}^{-1}$. Under the same conditions the molar volume of carbon dioxide is $0.366 \text{ dm}^3 \text{ mol}^{-1}$. Based on this information which statement is **correct** for carbon dioxide.

- (a) Repulsive forces and attractive forces are equal
 (b) Attractive forces dominate repulsive forces
 (c) Repulsive forces dominate attractive forces
 (d) Carbon dioxide is behaving like an ideal gas

36. The examples of chain silicate and sheet silicate respectively are

- (a) Diopside, Spodumene (b) Kaolinite, Pyrophyllite
 (c) Diopside, Biotite (d) Muscovite, Pyrophyllite

37. Two liquid components 'A' and 'B' are mixed together to form ideal binary solution. Select the **true** options for this solution.

- A. A-B interactions are equal to A-A and B-B interactions.
 B. $\Delta V_{\text{mix}} = 0$.
 C. Both the components follow Duhem Margules's equation.
 D. They have same vapour pressure.

Choose the most appropriate answer from the options given below:

- (a) A, B and C only (b) A, B and D only
 (c) A, C and D only (d) B, C and D only

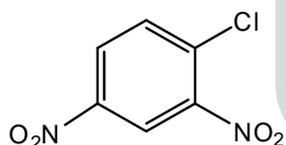
38. Given below are two statements:

Statement I: The radius ratio of $\text{Si}^{4+} : \text{O}^{2-}$ is 0.29 suggesting a coordination number of 4 for silicon in silicates.

Statement II: SiO_4^{4-} ion is a tetrahedral ion in which Si is sp^3 hybridized.

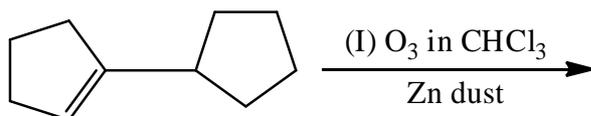
In the light of the above statements, choose the *most appropriate* answer from the options given below:

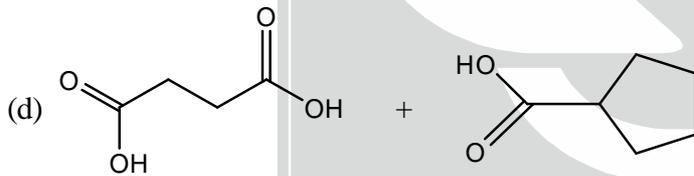
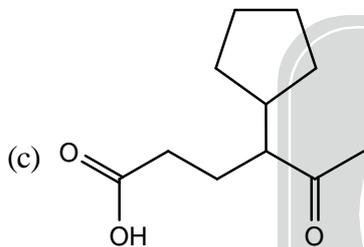
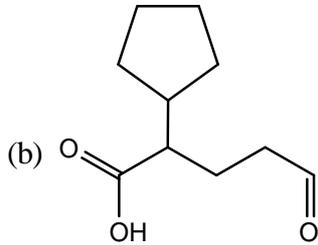
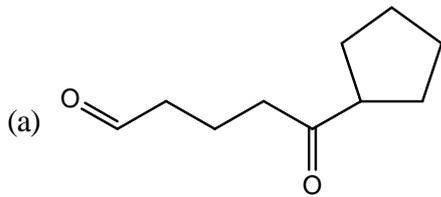
- (a) Both Statement I and Statement II are correct
 (b) Both Statement I and Statement II are incorrect
 (c) Statement I is correct but Statement II is incorrect
 (d) Statement I is incorrect but Statement II is correct
39. In a nucleophilic substitution reaction proceeding via $\text{S}_{\text{N}}2$ mechanism, which among the following will act as good leaving group?
 (a) CN^- (b) N_3^- (c) Cl^- (d) CH_3COO^-
40. In HCl molecule, the molecular orbitals will be formed by combining
 (a) 1s (H), 1s (Cl) (b) 1s (H), 2s (Cl) (c) 1s (H), 3s (Cl) (d) 1s (H), $3p_x$ (Cl)
41. For equimolar solutions of acetic acid, dichloroacetic acid and trichloroacetic acid, the depression in freezing point is maximum for
 (a) dichloroacetic acid (b) acetic acid
 (c) trichloroacetic acid (d) same for all
42. Which of the following anions on reaction with alkyl halide favor elimination over substitution, if effect of solvent is considered negligible?
 (a) Br^- (b) $\text{C}_2\text{H}_5\text{O}^-$ (c) I^- (d) CH_3COO^-
43. Predict the major product in the following reaction.



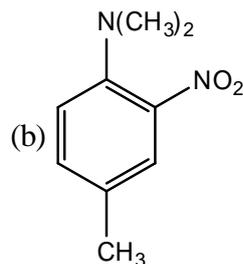
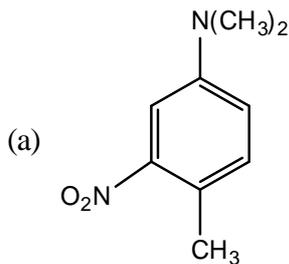
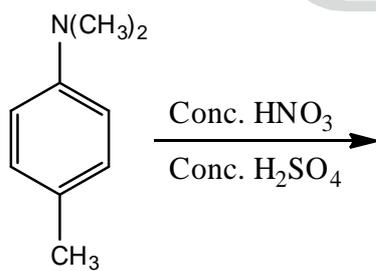
- (a) 2,4-Dinitrophenol (b) 1,3-Dinitrobenzene
 (c) 3,5-Dinitrophenol (d) 2,4,6-Trinitrophenol
44. When two phases are in equilibrium:
 A. Chemical potential of two phases is same.
 B. There is no change in Gibb's free energy.
 C. Temperature of two phases are same.
 D. Pressure of two phases are same.
- Choose the most appropriate answer from the options given below:
 (a) A and D only (b) B and D only (c) A and C only (d) All of above

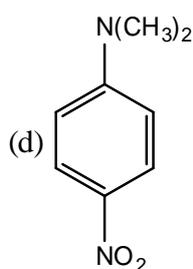
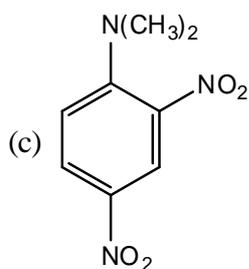
45. 25% of a first order reaction completes in 2.1×10^6 s. How much time is required to complete the reaction?
 (a) 2.1×10^{24} s (b) 8.4×10^6 s (c) 4.2×10^{12} s (d) Infinity
46. Consider the electrode potential diagram for Cl.
- $$\text{ClO}_4^- \xrightarrow{+0.36} \text{ClO}_3^- \xrightarrow{+0.50} \text{OCl}^- \xrightarrow{+0.88} \text{Cl}^-$$
- Identify the species capable of disproportionating in aqueous solution.
- (a) ClO_4^- only (b) ClO_3^- and OCl^-
 (c) OCl^- and Cl^- (d) Cl^- only
47. Benzyne bond is formed by the
 (a) $\text{sp}^2\text{-sp}^2$ overlap (b) p-p overlap (c) $\text{sp}^2\text{-p}$ overlap (d) sp-sp overlap
48. The properties used for calculating Pauling's electronegativity and Mullikan electronegativity, respectively are
 (a) Bond energy, IE + EA (b) IE, Bond energy + EA
 (c) IE + EA, Bond energy (d) Bond energy, Bond energy
49. For the reaction
 $2\text{N}_2\text{O}_5 \rightarrow 4\text{NO}_2 + \text{O}_2$
 Rate of the reaction is:
- (a) $\frac{\Delta[\text{N}_2\text{O}_5]}{\Delta t} = \frac{1}{2} \frac{\Delta[\text{NO}_2]}{\Delta t}$ (b) $-\frac{\Delta[\text{N}_2\text{O}_5]}{\Delta t} = \frac{1}{2} \frac{\Delta[\text{NO}_2]}{\Delta t}$
 (c) $\frac{\Delta[\text{O}_2]}{\Delta t} = \frac{\Delta[\text{NO}_2]}{\Delta t}$ (d) $-\frac{\Delta[\text{O}_2]}{\Delta t} = \frac{\Delta[\text{NO}_2]}{\Delta t}$
50. Given below are two statements:
- Statement I:** To form interstitial alloys, the radius ratio of smaller atom/larger atom should be in the range 0.414–0.732.
- Statement II:** Two different metals having metallic radii differing only by 10% but similar crystal structures can form a good alloy.
- In the light of the above statements, choose the *most appropriate* answer from the options given below:
- (a) Both Statement I and Statement II are correct
 (b) Both Statement I and Statement II are incorrect
 (c) Statement I is correct but Statement II is incorrect
 (d) Statement I is incorrect but Statement II is correct
51. Deduce the structure of the product in the following reaction



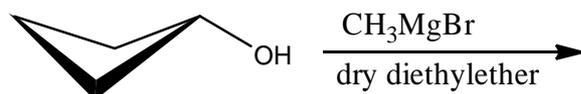


52. Identify the major product in the following reaction.





53. Identify the major product in the following reaction.



54. Select the option which is **correct** about photochemical reaction:

- A. Temperature has very little effect on rate of reaction.
- B. The presence of light is the primary requirement.
- C. ΔG may be positive or negative for spontaneous photochemical reaction.
- D. Photochemical reaction always involves emission of light radiation.

Choose the **correct** answer from the options given below:

- (a) A and B only
- (b) A, B and D only
- (c) A, B and C only
- (d) All of above

55. The galvanic cell with the cell reaction



is **correctly** represented as

- (a) $\text{Mg}^{2+} (0.65 \text{ M}) | \text{Mg} || \text{Ag}^+ (0.001 \text{ M}) | \text{Ag}$
- (b) $\text{Mg} | \text{Mg}^{2+} (0.65 \text{ M}) || \text{Ag} | \text{Ag}^+ (0.001 \text{ M})$
- (c) $\text{Mg}^{2+} (0.65 \text{ M}) | \text{Mg} || \text{Ag} | \text{Ag}^+ (0.001 \text{ M})$
- (d) $\text{Mg} | \text{Mg}^{2+} (0.65 \text{ M}) || \text{Ag}^+ (0.001 \text{ M}) | \text{Ag}$

56. Which of the following orders are **correct** for noble gases?

- A. Solubility in water $\text{He} < \text{Ne} < \text{Ar} < \text{Kr} < \text{Xe}$
- B. Boiling points $\text{He} < \text{Ne} < \text{Ar} < \text{Kr} < \text{Xe}$
- C. Chemical reactivity $\text{He} > \text{Ne} > \text{Ar} > \text{Kr} > \text{Xe}$
- D. Enthalpy of vaporisation $\text{He} > \text{Ne} > \text{Ar} > \text{Kr} > \text{Xe}$

Choose the **correct** answer from the options given below:

- (a) A and B only
- (b) B and C only
- (c) B and D only
- (d) A and D only

57. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**

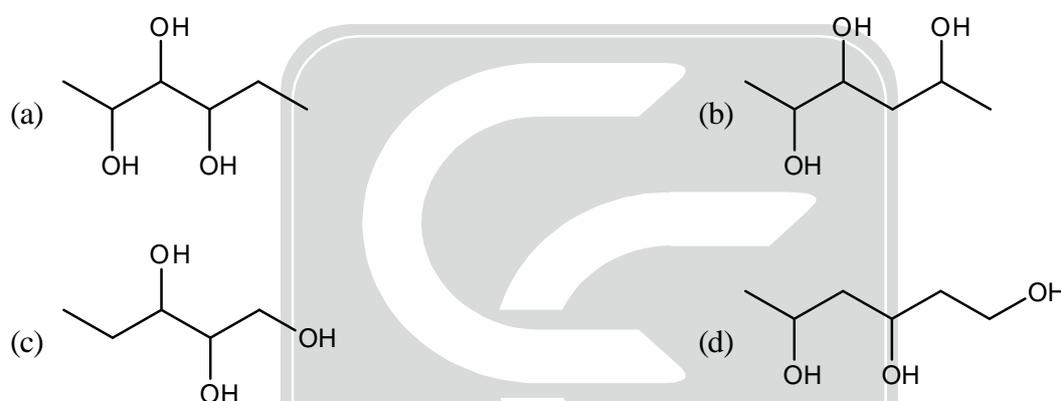
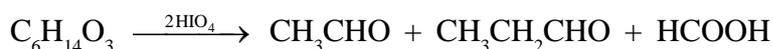
Assertion A: The moving boundary method yields more accurate data on transference number than does the Hittorf method.

Reason R: In moving boundary method, indicator electrolyte has same anion as principal electrolyte and is placed at the bottom due to its higher density.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

- (a) Both A and R are correct and R is the correct explanation of A
 (b) Both A and R are correct but R is NOT the correct explanation of A
 (c) A is correct but R is not correct
 (d) A is not correct but R is correct

58. Deduce the structure of the corresponding alcohol which shows the following reaction



59. The **correct** combination of enzyme and metal ion at the active site is

- (a) Hemoglobin (Fe^{2+}), Carboxypeptidase (Zn^{2+}), Carbonic anhydrase (Cu^{2+})
 (b) Hemoglobin (Fe^{3+}), Carboxypeptidase (Cu^{2+}), Carbonic anhydrase (Zn^{2+})
 (c) Hemoglobin (Fe^{2+}), Carboxypeptidase (Zn^{2+}), Carbonic anhydrase (Zn^{2+})
 (d) Hemoglobin (Fe^{3+}), Carboxypeptidase (Zn^{2+}), Carbonic anhydrase (Zn^{2+})

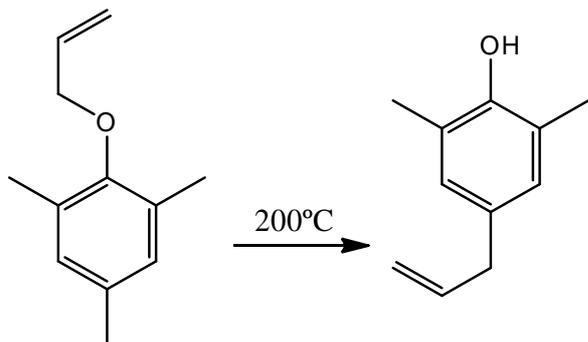
60. Identify the infrared active molecules from the following

- A. N_2 B. NO C. CO D. CO_2

Choose the **correct** answer from the options given below:

- (a) A, B and C only (b) B, C and D only (c) B and C only (d) B and D only

61. Identify the class of the following reaction.



- (a) Aromatic Nucleophilic Substitution
(b) Aromatic Electrophilic Substitution
(c) Nucleophilic Elimination addition reaction
(d) Pericyclic reaction

62. Kronecker delta is defined by

- (a) $\delta_{nk} = 2, n = k$ and $\delta_{nk} = 2, n \neq k$
(b) $\delta_{nk} = 3, n = k$ and $\delta_{nk} = 3, n \neq k$
(c) $\delta_{nk} = 1, n = k$ and $\delta_{nk} = 0, n \neq k$
(d) $\delta_{nk} = 0, n = k$ and $\delta_{nk} = 1, n \neq k$

63. Number of C-O stretching frequency bands observed for $M(CO)_6$; $M(CO)_3L_3$ (fac-isomer), $M(CO)_3L_3$ (mer-isomer), respectively are:

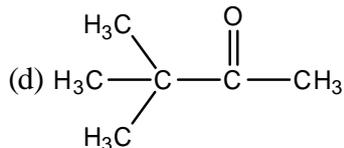
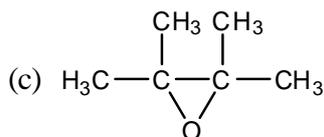
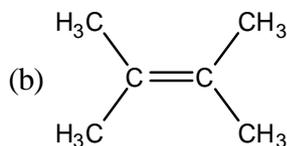
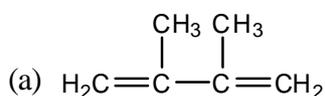
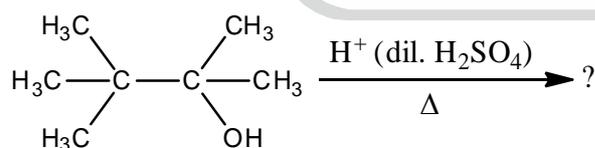
- (a) 3,2,1
(b) 1,3,2
(c) 1,2,3
(d) 1,3,3

64. The following reaction undergoes via _____ and is known as _____ reaction.



- (a) Carbene, Reimer-Tiemann
(b) Carbocation, Kolbe
(c) Carbene, Kolbe
(d) Carbocation, Reimer-Tiemann

65. Choose the *correct* product formed in the following reaction.



66. Given below are two statements:

Statement I: For $\text{Na}^+ | \text{K}^+$ pump, the active ion transport involve three Na^+ expelled out for two K^+ ions intake across the cell membrane.

Statement II: Binding of K^+ induces phosphorylation of ADP to ATP.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

- (a) Both Statement I and Statement II are correct
 (b) Both Statement I and Statement II are incorrect
 (c) Statement I is correct but Statement II is incorrect
 (d) Statement I is incorrect but Statement II is correct

67. Which of the following expression holds good for Freundlich adsorption isotherm.

- (a) $\frac{x}{m} = kp^{\frac{1}{n}}$ (b) $\frac{x}{m} = k^n p^{\frac{1}{n}}$ (c) $\frac{x}{m} = kp^2$ (d) $\frac{x}{m} = \left(\frac{k}{p}\right)^{\frac{1}{n}}$

68. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**.

Assertion A: Concentrated HNO_3 is colourless but often turns yellow on keeping.

Reason R: Photo chemical decomposition of HNO_3 gives NO_2 .

In the light of the above statements, choose the **most appropriate** answer from the options given below:

- (a) Both A and R are correct and R is the correct explanation of A
 (b) Both A and R are correct but R is NOT the correct explanation of A
 (c) A is correct but R is not correct
 (d) A is not correct but R is correct

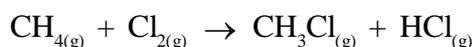
69. Match **List I** with **List II**

	List I		List II
A.	Carbonyl compounds react with ylide to form alkene	I.	Cannizzaro Reaction
B.	Ketone reacts with zinc-mercury amalgam in HCl as reducing agent to form alkane	II.	Clemmensen Reduction
C.	Carbonyl compounds react with basic solution of hydrazine as reducing agent to produce alkane	III.	Wittig Reaction
D.	Formaldehyde react with NaOH to form methanol	IV.	Wolf-Kishner Reduction

Choose the **correct** answer from the options given below:

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

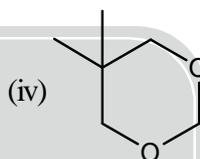
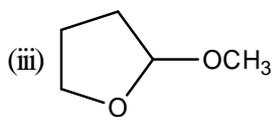
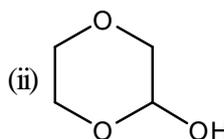
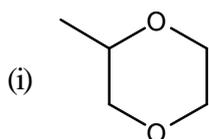
70. The bond enthalpies for C–H, Cl–Cl, C–Cl and H–Cl are 99, 58, 78 and 103 kcal/mol respectively. What will be the ΔH for the reaction.



- (a) –24 kcal (b) –26 kcal (c) –23 kcal (d) –32 kcal

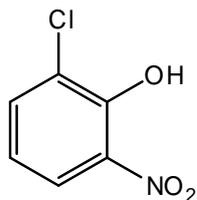


71. Which among the elements of Lanthanoid series often exhibit +4 oxidation state.
 (a) Ytterbium (b) Lanthanum (c) Gadolinium (d) Cerium
72. Which of the following statement is not correct regarding five membered heterocyclic compounds?
 (a) Furan is least aromatic in nature among furan, thiophene and pyrrole.
 (b) Thiophene can have more number of canonical structures using $3d$ -orbitals.
 (c) Pyrrole has maximum double bond character among furan, thiophene and pyrrole.
 (d) Furan, thiophene and pyrrole can be synthesized using Paal-Knorr synthesis.
73. Which of the following are acetals?



- (a) I and II (b) III and IV (c) I and III (d) I and IV
74. A nitrogen containing compound dissolves in 10% aq. sulphuric acid. The Hinsberg test gives a solid product that is not soluble in 10% aq. NaOH. Which one of the following compounds best fits the above facts?
 (a) N, N-Dimethylaniline (b) N-Methylbenzamide (c) N-Methylaniline (d) Benzylamine
75. At 20°C pure water requires 102.2 seconds to flow through the capillary of an Ostwald Viscometer while toluene at 20°C requires 68.9 seconds. Calculate the relative viscosity of the toluene. Densities of water and toluene are 0.998 and 0.866 g cm^{-3} respectively.
 (a) 1.709 poise (b) 0.585 poise (c) 1.287 poise (d) 1.170 poise
76. What is the effective atomic number (EAN) of $[\text{Cd}(\text{NH}_3)_4]^{2+}$
 (a) 48 (b) 46 (c) 54 (d) 56
77. The dissociation constant of bromocresol purple indicator is 3.981×10^{-7} at 0°C . The indicator when added to a buffer solution gave a colour matched with 50% basic colour and rest matched with acidic colour. The pH of buffer is: $[\log 3.98 = 0.5999]$
 (a) 7.40 (b) 3.25 (c) 6.40 (d) 5.40
78. The type of isomerism displayed in following pair of compounds is
 $[\text{Co}(\text{NH}_3)_6] [\text{Cr}(\text{C}_2\text{O}_4)_3]$ and $[\text{Cr}(\text{NH}_3)_6] [\text{Co}(\text{C}_2\text{O}_4)_3]$
 (a) Coordination isomerism (b) Linkage isomerism
 (c) Ionization isomerism (d) Geometric isomerism
79. Which one of the following compounds on reaction with two moles of Grignard reagent followed by acidic hydrolysis does not give tertiary alcohol?
 (a) Ethylacetate (b) Acetyl chloride
 (c) Methyl formate (d) Acetic Anhydride

80. How many signals are shown by the following compound in the NMR spectra?



- (a) 1 (b) 2 (c) 3 (d) 4

81. What will be the final product of the reaction of borax with aqueous hydrochloric acid (HCl)?

- (a) B_2O_3 (b) $NaBO_2$ (c) H_3BO_3 (d) BCl_3

82. The first order diffraction from (110) plane of KCl observed using X-ray of wavelength 150 pm and edge length of unit cell is 305 pm, then glancing angle is equal to

$$[\sin 20.35^\circ = 0.3478$$

$$\sin 38.35^\circ = 0.6205$$

$$\sin 40.35^\circ = 0.6475$$

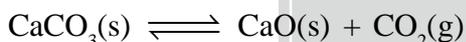
$$\sin 18.35^\circ = 0.3148]$$

- (a) 38.35° (b) 20.35° (c) 40.35° (d) 18.35°

83. What will be the splitting pattern of NMR signals of 1, 2-Dibromoethane in increasing order of δ values?

- (a) Triplet followed by triplet (b) Doublet followed by doublet
(c) Triplet followed by doublet (d) No splitting

84. The decomposition of $CaCO_3$ in a closed vessel is represented by the equation



Calculate the number of phases, components and degree of freedom

- (a) $p = 2; C = 3; F = 3$ (b) $p = 3; C = 2; F = 1$
(c) $p = 2; C = 2; F = 2$ (d) $p = 3; C = 3; F = 2$

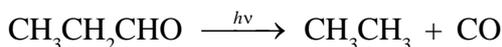
85. Which of the following form square planar complexes

- A. $[AuCl_4]^-$ B. $[RhCl(PPh_3)_3]$ C. $[NiBr_4]^{2-}$ D. $[FeCl_4]^{2-}$

Choose the *correct* option:

- (a) A and B only (b) C and D only (c) A and C only (d) B and D only

86. Calculate the number of moles of carbon mono oxide in the following reaction.



If the light irradiated has $\lambda = 3020\text{\AA}$, the quantum yield of reaction 0.54 and the light energy absorbed is 15000 erg in a given time.

- (a) 3.26×10^{-9} mol (b) 2.04×10^{-9} mol
(c) 1.04×10^{-9} mol (d) 2.56×10^{-9} mol

87. Given below are two statements:

Statement I: The conversion of diamond to graphite at room temperature and pressure is spontaneous ($\Delta G^\circ = -2.90 \text{ kJ mol}^{-1}$)

Statement II: The electrical conductivity of graphite perpendicular to the plane is low, whereas parallel to the plane is very high.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

- (a) Both Statement I and Statement II are correct
 (b) Both Statement I and Statement II are incorrect
 (c) Statement I is correct but Statement II is incorrect
 (d) Statement I is incorrect but Statement II is correct

88. Which of the following compound is not an alkaloid.

- (a) Nicotine (b) Paracetamol (c) Reserpine (d) Cocaine

89. A liquid having molar mass of 50 g mol^{-1} boils at 80°C . If the latent heat of vapourization is 500 cal g^{-1} , the molar entropy of vapourization is

- (a) $70.8 \text{ cal K}^{-1} \text{ mol}^{-1}$ (b) $312 \text{ cal K}^{-1} \text{ mol}^{-1}$
 (c) $1.42 \text{ cal K}^{-1} \text{ mol}^{-1}$ (d) $25.3 \text{ cal K}^{-1} \text{ mol}^{-1}$

90. Oxidation state of Sulphur in dithionite and dithionate ions are respectively

- (a) +3 and +4 (b) +4 and +3 (c) +3 and +5 (d) +5 and +3

91. Match List I with List II

	List I		List II
A.	$\nabla^2\psi + \frac{8\pi^2m}{h^2}(E - V)\psi = 0$	I.	Planck
B.	$E = h\nu$	II.	Heisenberg
C.	$\Delta x \cdot \Delta p \geq \frac{h}{4\pi}$	III.	Schrodinger
D.	$\lambda = \frac{h}{p}$	IV.	de Broglie

Choose the **correct** answer from the options given below:

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

92. Determine the Miller indices for a plane when the intercepts along the axes are $2a$, $3b$ and $2c$

- (a) (3, 2, 2) (b) (1, 1, 1) (c) (2, 3, 2) (d) (3, 2, 3)

93. Using Slater's rule, the shielding constant and effective nuclear charge for the outermost electron of Mg are respectively.

- (a) 9.10 and 2.90 (b) 9.15 and 2.85 (c) 8.15 and 3.85 (d) 9.10 and 3.90



94. The energy required for various electronic transitions follow the order
- (a) $\sigma \rightarrow \sigma^* > n - \sigma^* > \pi - \pi^* > n \rightarrow \pi^*$ (b) $\sigma \rightarrow \sigma^* > n \rightarrow \pi^* > n - \sigma^* > n - \pi^*$
 (c) $\pi - \pi^* > n \rightarrow \pi^* > \sigma \rightarrow \sigma^* > n - \sigma^*$ (d) $n \rightarrow \pi^* > \sigma \rightarrow \sigma^* > n - \sigma^* > \pi - \pi^*$
95. Which among the following is *wrong* statement?
- (a) Haemoglobin consists of a tetramer of myoglobin like subunits with four iron sites
 (b) All four Fe sites present in haemoglobin bind with oxygen during oxygen transport
 (c) Myoglobin contains no Fe atom in it
 (d) Haemoglobin is an oxygen transport protein and myoglobin is an oxygen storage protein
96. Identify the *correct* statements applicable to rotational spectroscopy.
- A. It lies in the microwave region
 B. The molecules must have permanent dipole moment
 C. The selection rule is $\Delta J = \pm 2$
 D. Only one transition is observed at room temperature.
- Choose the *correct* answer from the options given below:
- (a) A, B and C only (b) A and D only
 (c) A and B only (d) B, C and D only
97. Treatment of 1-Methylcyclohexene with an ether solution of diborane (B_2H_6), followed by reaction with alkaline H_2O_2 produces which of the following product?
- (a) 1-Methylcyclohexanol (b) *cis*-1-Methylcyclohexane-1,2-diol
 (c) *cis*-2-Methylcyclohexanol (d) *trans*-1-Methylcyclohexane-1,2-diol
98. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**
- Assertion A:** cyanide and phosphorus trifluoride ligands stabilize metals in low oxidation states.
Reason R: Cyanide and phosphorus trifluoride ligands are excellent π -acceptor ligands.
- In the light of the above statements, choose the *most appropriate* answer from the options given below:
- (a) Both A and R are correct and R is the correct explanation of A
 (b) Both A and R are correct but R is NOT the correct explanation of A
 (c) A is correct but R is not correct
 (d) A is not correct but R is correct
99. Which of the following complexes are diamagnetic complexes?
- (a) $[Fe(bipy)_3]^{3+}$ (b) $[Fe(phen)_3]^{2+}$ (c) $[NiF_6]^{4-}$ (d) $[CoF_6]^{3-}$
100. The *correct* statements for second law of thermodynamics is/are
- A. Heat does not flow spontaneously from a cool body to a hotter body
 B. The entropy of perfectly crystalline substance is zero at 0 K.
 C. No process is possible in which the sole result is the absorption of heat from a reservoir and its complete conversion to work.
 D. For a spontaneous change $\Delta S_{total} > 0$
- Choose the *most appropriate* answer from the options given below:
- (a) A, B and C only (b) A, B and D only
 (c) A and B only (d) A, C and D only