

PG/INTEGRATED PG ENTRANCE EXAMINATION, APRIL 2023

APPLIED CHEMISTRY/CHEMISTRY (NANO SCIENCE)

Time : Two Hours

Maximum : 400 Marks

*Each questions carries 4 marks.**1 mark will be deducted for each wrong answer.*

1. Born Lande equation is used to calculate _____.
[A] Lattice energy. [B] Electron affinity.
[C] Electronegativity. [D] Bond length.
2. AlCl_3 is in solid-state has a _____ structure.
[A] Body cantered. [B] Face cantered.
[C] Cubic close-packed. [D] Hexagonal.
3. Among the four oxychloro acids the highest acid strength is for :
[A] HClO_4 . [B] HClO_2 .
[C] HClO_3 . [D] HOCl .
4. Emission of which one of the following leaves both atomic number and mass number unchanged ?
[A] Neutron. [B] Beta particle.
[C] Positron. [D] Gamma radiation.
5. Which element has the most stable isotope ?
[A] Cobalt. [B] Barium.
[C] Aluminium. [D] Lead.
6. The Born-Oppenheimer Approximation is the assumption that the electronic motion and the _____ in molecules can be separated :
[A] Nuclear motion. [B] Vibrational motion.
[C] Thermal motion. [D] Translational motion.

Turn over

7. According to the _____, Electrons in a molecule occupy atomic orbitals rather than molecular orbitals.
- [A] Metallic theory. [B] Band theory.
[C] Valence bond theory. [D] Molecular orbital theory.
8. The shape of sp^2 hybridized molecule is _____.
- [A] Tetrahedral. [B] Planar.
[C] Hexagonal. [D] Linear.
9. The _____ is defined as the average rate at which two reactants collide in the given system.
- [A] Collision index. [B] Collision number.
[C] Collision speed. [D] Collision frequency.
10. The enthalpy change in a reaction does not depend upon the _____.
- [A] Initial and final enthalpy of the reaction.
[B] Different intermediate steps in the reaction.
[C] State of reactions and products.
[D] Nature of the reactants and products.
11. Carnot cycle consists of _____.
- [A] Two constant volume and two reversible adiabatic processes.
[B] One constant volume, one constant pressure and two reversible adiabatic processes.
[C] Two constant pressure and two reversible adiabatic processes.
[D] Two isothermal and two reversible adiabatic processes.
12. The enthalpy of dry saturated steam _____ with the increase in pressure.
- [A] Become zero. [B] Remains constant.
[C] Decreases. [D] Increases.
13. When 1kg of water at 373 K is converted into steam how much amount of heat required ?
- [A] 2260 KJ. [B] 22600 KJ.
[C] 226 KJ. [D] 22.6 KJ.

14. The _____ law of thermodynamics states that the entropy of a system approaches a constant value as the temperature approaches absolute zero.
- [A] Zeroth. [B] Third.
[C] First. [D] Second.
15. Ferric alum is :
- [A] $KAl(SO_4)_2 \cdot 12H_2O$. [B] $NH_4Fe(SO_4)_2 \cdot 12H_2O$.
[C] $NH_4Al(SO_4)_2 \cdot 12H_2O$. [D] $NaFe(SO_4)_2 \cdot 12H_2O$.
16. Which of the following is soluble in yellow ammonium sulphide ?
- [A] CuS . [B] CdS .
[C] PbS . [D] SnS .
17. In a qualitative inorganic analysis of basic radicals, HCl is preferred to HNO_3 , for preparing a solution of given substance. This is because _____.
- [A] Nitric acid is difficult to handle.
[B] Nitrates are not decomposed to sulphides.
[C] Hydrochloric acid is not an oxidizing agent.
[D] Chlorides are easily converted to sulphides.
18. _____ extract is used for the determination of water insoluble anions in inorganic analysis.
- [A] Na_2CO_3 . [B] K_2CO_3 .
[C] $MgCO_3$. [D] $CaCO_3$.
19. Which of the following metals cannot be obtained by reduction of its metal oxide by aluminium ?
- [A] Cr . [B] Mn .
[C] Mg . [D] Fe .
20. Bronze is _____.
- [A] 50 % copper and 50 % tin. [B] 88 % copper and 12 % tin.
[C] 50 % copper and 50 % zinc. [D] 50 % copper, 25 % tin and 25 % zinc.

Turn over

21. The structure of IF_5 , is _____.
- [A] T-shaped. [B] Pyramidal.
[C] Square pyramidal. [D] Pentagonal bipyramidal.
22. Which of the following halogen does not exhibit positive oxidation states in its compounds?
- [A] Fluorine. [B] Chlorine.
[C] Iodine. [D] Bromine.
23. Which among the following noble gases does not form clathrates?
- [A] Xenon. [B] Krypton.
[C] Argon. [D] Helium.
24. On increasing temperature, the viscosity of polysiloxanes _____.
- [A] Decreases. [B] Remains constant.
[C] Increases. [D] First increase and then decrease.
25. The Bhopal gas tragedy was occurred during _____.
- [A] 2-3 December 1985. [B] 2-3 November 1984.
[C] 2-3 November 1985. [D] 2-3 December 1984.
26. The result of the ozone hole is _____.
- [A] Global warming. [B] UV radiation.
[C] Acid rain [D] Greenhouse effect
27. COD/BOD ratio of fresh water is _____.
- [A] 1. [B] 0 - 1.
[C] 0. [D] Above 1.
28. The main cause of the permanent hardness of water is :
- [A] Magnesium carbonate. [B] Magnesium sulphate.
[C] Calcium sulphate. [D] Magnesium chloride.

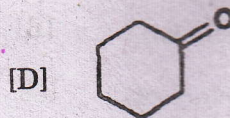
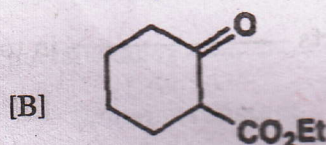
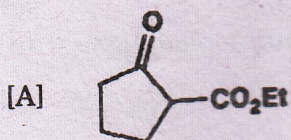
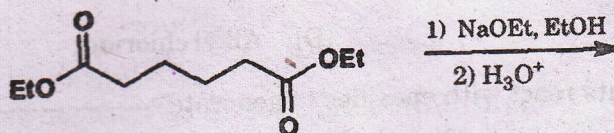
29. The Chernobyl disaster was a _____ that occurred in Ukraine :
- [A] Volcanic eruption. [B] Earthquake.
[C] Tsunami disaster. [D] Nuclear accident.
30. In Zeisel's method, the ester is first converted in to _____.
- [A] Alcohol. [B] Carboxylic acid.
[C] Alkyl iodide. [D] Alkyl chloride.
31. Organolithium reagents react with epoxides to generate _____.
- [A] Esters. [B] Ethers.
[C] Alcohols. [D] Ketons.
32. Wittig reaction converts _____ in to an alkene.
- [A] A ketone. [B] An alkane.
[C] An amine. [D] An alkyne.
33. The colour of potassium dichromate does not change on addition of _____.
- [A] 2-methylpropan-1-ol. [B] 2-methylpropan-2-ol.
[C] Butan-2-ol. [D] Butan-1-ol.
34. The catalyst used in Meerwein-Ponndorf-Verley reduction is _____.
- [A] Aluminium triisopropoxide. [B] Anhydrous aluminium chloride.
[C] Triphenyl phosphine. [D] Sodium ethoxide.
35. Fehling's solution B consists of _____ and an alkali.
- [A] Chevreul's salt. [B] Mohr's Salt.
[C] Bobbitt's salt. [D] Rochelle salt.
36. The named organic reaction where acetone is converted in to propane using zinc amalgam is called _____.
- [A] MPV reduction. [B] Wolff Kishner Reduction.
[C] Birch reduction [D] Clemmensen reduction.

Turn over

37. The product obtained in the Benzoin Condensation is _____.

- [A] α -hydroxy ester. [B] α -diketone.
[C] α -hydroxy ketone. [D] α -hydroxy acid.

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



39. Furan is commercially prepared by heating _____ with copper at very high temperature.

- [A] 1-butene. [B] 1, 3-butadiene.
[C] n-butane. [D] 2-butene.

40. When the rate of the reaction is equal to the rate constant, the order of the reaction is _____.

- [A] Zero order. [B] First order.
[C] Second order. [D] Third order.

41. A reaction passes through multiple pathways resulting in branched products is called :

- [A] Consecutive reaction. [B] Chain reaction.
[C] Opposing reaction. [D] Parallel reaction.

42. Collision theory, theory used to predict the _____ of chemical reactions, particularly for gases.
- [A] Product. [B] Yield.
[C] Rates. [D] Number of isomers.
43. The correct expression among the following is :
- [A] $\Delta G^\circ = RT \ln K$. [B] $\Delta G^\circ = -RT \ln K$.
[C] $\Delta G^\circ = RT \ln K$. [D] $\Delta G^\circ = -RT \ln K$.
44. Which among the following is not a characteristic of chemisorption ?
- [A] It is a multi-layer phenomenon. [B] It is reversible.
[C] Its heat of absorption is high. [D] It is specific.
45. Which theory best suits for heterogeneous catalysis ?
- [A] Absorption. [B] Paratoid.
[C] Intermediate. [D] Nucleate.
46. Where does inhibitor binds on enzyme in mixed inhibition ?
- [A] At active site. [B] Allosteric site.
[C] Does not bind on enzyme. [D] Binds on substrate.
47. Pattinson's process is a method for removing _____ from lead :
- [A] Iron. [B] Gold.
[C] Copper. [D] Silver.
48. The spontaneous loss of water by a hydrated salt is called _____.
- [A] Efflorescence. [B] Crystallization.
[C] Deliquesce. [D] Sublimation.
49. _____ gives a generalisation which governs the distribution of a solute between two non-miscible solvents.
- [A] Planck's distribution law. [B] Maxwell distribution law.
[C] Nernst's distribution law. [D] Boltzmann distribution law.

Turn over

50. The _____ effect states that the increase in the conductivity of an electrolyte solution when the applied voltage has a very high frequency.
- [A] Debye- Huckel. [B] Wein.
[C] Debye-Falkenhagen. [D] Onsager.
51. Ruhemann's purple is obtained in _____ test.
- [A] Biuret. [B] Edmann.
[C] Xanthoprotein. [D] Ninhydrin.
52. If carbohydrate is present, a _____ colour ring is formed in Molisch's test.
- [A] Purple. [B] Blue.
[C] Yellow. [D] Green.
53. Warfarin is an example of a _____.
- [A] Fungicide. [B] Herbicide.
[C] Insecticides. [D] Rodenticide.
54. Polyvinyl chloride is mainly prepared by _____ polymerization :
- [A] Suspension. [B] Precipitation.
[C] Solution. [D] Emulsion.
55. The reaction of hexamethylene diamine with adipic acid produces _____.
- [A] Terylene. [B] Nylon 66.
[C] Rayon. [D] Nylon 6.
56. Wolff-Kishner reduction of acetophenone produces _____.
- [A] Toluene. [B] Benzene.
[C] Styrene. [D] Ethyl benzene.
57. Corey-House Synthesis uses _____ and _____ catalysts.
- [A] Li-Cul. [B] Lil-Cu.
[C] Li-Kl. [D] Li-Col.

58. By the use of Kolbe electrolysis process, an aqueous solution of _____ acetate is used to produce ethane.
- [A] Calcium. [B] Potassium.
[C] Sodium. [D] Magnesium.
59. Anti-Markovnikov addition is best observed in presence of _____.
- [A] Organometallic compounds. [B] Strong bases.
[C] Peroxides. [D] Strong acids.
60. Baeyer's reagent is an _____ solution of cold KMNO_4 .
- [A] Acidic. [B] Ammoniacal.
[C] Alcoholic. [D] Alkaline.
61. In E1 reaction a _____ is formed :
- [A] Carbanion. [B] Carbocation.
[C] Carbene. [D] Carbon free radical.
62. Aromaticity of the following compounds are in the order of _____.
- [A] Pyridine > Pyrrole > Furan > Thiophene.
[B] Pyridine > Thiophene > Pyrrole > Furan.
[C] Pyridine > Pyrrole > Thiophene > Furan.
[D] Pyridine > Furan > Pyrrole > Thiophene.
63. The catalyst used in Birch reduction is _____.
- [A] Na in ethanol. [B] Li in liquid ammonia.
[C] Na in liquid ammonia. [D] Li in ethanol.
64. The sum of mole fraction of compounds of a solution is always _____.
- [A] Less than one but not zero. [B] Zero.
[C] More than one. [D] One.
65. Which of the following is a self-indicating indicator ?
- [A] Potassium hexacyanoferrate. [B] Potassium permanganate.
[C] Diphenyl amine. [D] Methylene blue.

Turn over

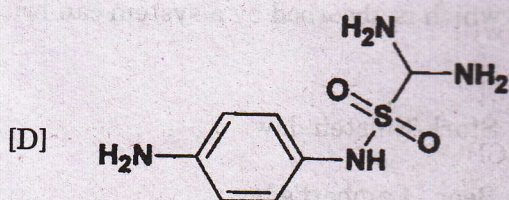
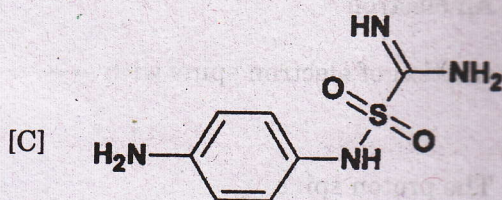
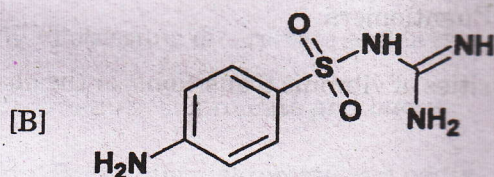
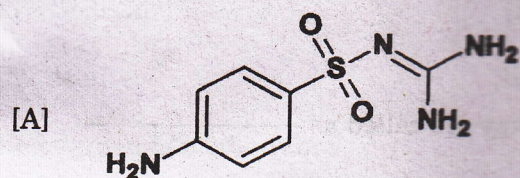
66. Methyl orange is _____.
[A] Pink in acidic medium, yellow in basic medium.
[B] Yellow in acidic medium, pink in basic medium.
[C] Pink in acidic medium, colourless in basic medium.
[D] Colourless in acidic medium, pink in basic medium.
67. Sludge bulking can be controlled by _____.
[A] Aeration. [B] Coagulation.
[C] Denitrification. [D] Chlorination.
68. How many hydrogen spectra are there ?
[A] Six. [B] Four.
[C] Seven. [D] Three.
69. The flame colour of Cesium is _____.
[A] Orange-red. [B] Red-violet.
[C] Blue-violet. [D] Blue-green.
70. According to _____ concept, an acid as anything that accepts negative species.
[A] Usanovich. [B] Lux-Flood.
[C] Lewis. [D] Bronsted-Lowry.
71. The _____ is the divergence of the gradient of a function :
[A] Hermitian operator.
[B] Laplace operator.
[C] Eigen operator.
[D] Hamiltonian.
72. The _____ states that the trial energy can be only greater or equal to the true energy.
[A] Feynmann theorem. [B] Virial, theorem.
[C] Comparison theorem. [D] Variational theorem.

73. The _____ of a pure substance at a given temperature is the sum of all the entropy it would acquire on warming from absolute zero to the particular temperature :
- [A] Residual entropy. [B] Shannon entropy.
[C] Absolute entropy. [D] Thermal entropy.
74. Which one is the correct expression ?
- [A] $K_p = K_c (RT)^{\Delta n}$. [B] $K_c = K_x (RT)^{\Delta n}$.
[C] $K_p = K_x (RT)^{\Delta n}$. [D] $K_c = K_p (RT)^{\Delta n}$.
75. Arrange the order of acidity :
- [A] Chloroacetic Acid > Acetic Acid > **Formic Acid** > Benzoic Acid.
[B] Chloroacetic Acid > Formic Acid > **Acetic Acid** > Benzoic Acid.
[C] Chloroacetic Acid > Benzoic Acid > **Formic Acid** > Acetic Acid.
[D] Chloroacetic Acid > Formic Acid > **Benzoic Acid** > Acetic Acid.
76. Dispersion forces depend on _____ of the compound.
- [A] Molecular weight. [B] Dipole moment.
[C] Density. [D] Co-ordination number.
77. Arrange the stability of the following carbanions :
- [A] Chloromethyl > Ethyl > Benzyl > **Isopropyl**.
[B] Chloromethyl > Benzyl > Ethyl > **Isopropyl**.
[C] Chloromethyl > Benzyl > Isopropyl > **Ethyl**.
[D] Chloromethyl > Isopropyl > Ethyl > **Benzyl**.
78. A _____ is a basic principle, generalization, regularity or rule that holds true universally under particular conditions.
- [A] Assumption. [B] Scientific law.
[C] Hypothesis. [D] Theory.

Turn over

79. _____ is defined as the "total moles of a solute contained in a kilogram of a solvent."
[A] Mole fraction. [B] Normality.
[C] Molality. [D] Molarity.
80. _____ are used to wash the affected area when bromine burning occurs :
[A] Water and soap. [B] Water and dilute acid.
[C] Water and dilute alkali. [D] Water and hydrogen peroxide.
81. The modern periodic table was proposed by _____.
[A] Linus Pauling. [B] Dmitri Mendeleev.
[C] Niels Bohr. [D] Henry Moseley.
82. According to _____ a covalent bond is formed by a compound with a small cation, and a large anion :
[A] Fajans' rule. [B] Slater rule.
[C] Bayer's rule. [D] Mosley's rule.
83. How Does an Organic Material Decompose in the Buried Solid Waste ?
[A] By the soil particles.
[B] By the flow of water.
[C] By the action of oxidation.
[D] By the action of micro-organisms.
84. The Houben-Hoesch reaction used to prepare _____.
[A] Aryl acids. [B] Aryl aldehydes.
[C] Aryl ketones. [D] Aryl amines.
85. Kolbe Schmitt reaction converts phenol to _____.
[A] 2-hydroxy benzoic acid. [B] 3-hydroxy benzoic acid.
[C] 2-hydroxy phenol. [D] 4-hydroxy benzoic acid.
86. In Reimer Tiemann - Reaction, phenol is treated with _____.
[A] CCl_4 . [B] CHCl_3 .
[C] CH_2Cl_2 . [D] CH_3Cl .

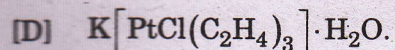
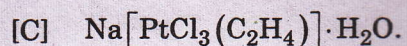
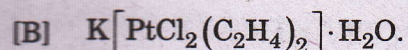
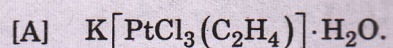
87. Kolbe electrolysis process for the generation of ethane involves a _____ mechanism.
- [A] Free radical. [B] Benzyne.
[C] Carbocation. [D] Carbanion.
88. Perking reaction of benzaldehyde with acetic anhydride in acetic acid produces _____.
- [A] Salicylic acid. [B] 4-ethyl benzoic acid.
[C] Benzoic acid. [D] Cinnamic acid.
89. _____ can be prepared from benzophenone and hydrogen azide using Schmidt reaction.
- [A] Benzanilide. [B] Acetanilide.
[C] Aniline. [D] Benzamide.
90. The structure of Sulfaguanidine :



Turn over

91. Diastereomers are compounds with same molecular formula and sequence of bonded elements but are _____.
- [A] Non-superimposable mirror images.
 - [B] Non-superimposable mirror images.
 - [C] Superimposable non-mirror images.
 - [D] Non-superimposable non-mirror images.
92. In the Fischer projection, threo isomers have two :
- [A] Similar groups are on the opposite side.
 - [B] Similar groups are on the same side.
 - [C] Larger groups are on the opposite side.
 - [D] Larger groups are on the same side.
93. The isomers which are connected in different way are called as _____.
- [A] Constitutional isomers.
 - [B] Geometrical isomers.
 - [C] Optical isomers.
 - [D] Enantiomers.
94. The Franck-Condon Principle describes the intensities of vibronic transitions, or the absorption or emission of _____.
- [A] A proton.
 - [B] A photon.
 - [C] A free radical.
 - [D] An electron.
95. The hyperfine splitting of ESR caused by the interaction of electron spins with _____ in the sample.
- [A] The neutrons.
 - [B] The proton spins.
 - [C] Other electron spins.
 - [D] The magnetic nuclei.
96. The _____ states that only that light which is absorbed by a system can bring about a photochemical change
- [A] Jablonski law.
 - [B] Stark-Einstein law.
 - [C] Grotthuss-Draper law.
 - [D] Beer - Lambert's law.

97. Zeise's salt is :



98. The _____ of solids describes the quantum state that an electron takes inside a metal solid.

[A] Valance bond theory.

[B] Band theory.

[C] Molecular orbital theory.

[D] Free electron theory.

99. Which is the metal found in Chlorophyll ?

[A] Sodium.

[B] Potassium.

[C] Iron.

[D] Magnesium.

100. Guignets green is made from :

[A] Sodium dichromate and boric acid.

[B] Potassium dichromate and boric acid.

[C] Sodium dichromate and borax .

[D] Potassium dichromate and borax.

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(Pages : 16)

Name.....

Reg. No.....

P.G. ENTRANCE EXAMINATION, APRIL 2024

CHEMISTRY/CHEMISTRY (NANOSCIENCE)

Time : Two Hours

Maximum : 400 Marks

Each questions carries 4 marks.

1 mark will be deduced for each wrong answer.

1. The inert pair effect is the reluctance of _____ electrons for participating in bonding.
(A) s. (B) p.
(C) d. (D) f.
2. Born Haber cycle cannot be used to measure _____.
(A) Electronegativity. (B) Lattice energy.
(C) Electron affinity. (D) Ionization energy.
3. Among the four oxychloro acids the weakest acid is _____.
(A) HClO_4 . (B) HClO_3 .
(C) HClO_2 . (D) HOCl .
4. Which of the following atomic particles have the least mass ?
(A) Proton. (B) Electron.
(C) Deuteron. (D) Neutron.
5. Which of the following methods is used to determine the age of organic matter in the archaeology field ?
(A) Neutron activation analysis.
(B) Radiotherapy.
(C) Radiocarbon dating.
(D) Tracer technique.

Turn over

6. Bohr radius is _____ the electron rest mass.
- (A) Inversely proportional to the square of.
 - (B) Directly proportional to the square of.
 - (C) Inversely proportional to.
 - (D) Directly proportional to.
7. According to the _____, two atomic orbitals overlap resulting in the formation of molecular orbitals :
- (A) Metallic theory.
 - (B) Band theory.
 - (C) Valence bond theory.
 - (D) Molecular orbital theory.
8. The shape of sp^3 hybridized molecule is _____.
- (A) Tetrahedral.
 - (B) Hexagonal.
 - (C) Linear.
 - (D) Planar.
9. The ratio of a gas's molar volume to that of an ideal gas at constant temperature and pressure is known as the _____.
- (A) Isothermal constant.
 - (B) Compressibility factor.
 - (C) Isobar constant.
 - (D) Critical constant.
10. Line joining places of equal temperature are called _____.
- (A) Isobars.
 - (B) Isohyets.
 - (C) Isotherms.
 - (D) Isochores.
11. The specific volume of water when heated from 0°C _____.
- (A) Increases steadily.
 - (B) First increases then decreases.
 - (C) Decreases steadily.
 - (D) First decreases then increases.
12. Change in enthalpy of a system is the heat supplied for _____.
- (A) Constant pressure.
 - (B) Constant entropy.
 - (C) Constant temperature.
 - (D) Constant volume.

13. At very high pressure, as compared to a real gas, An ideal gas occupies _____.
(A) Less volume. (B) More volume.
(C) Same volume. (D) Infinite volume.
14. A perfect gas at 27°C is heated at constant pressure till its volume is double. The final temperature is _____ $^{\circ}\text{C}$.
(A) 54. (B) 327.
(C) 108. (D) 654.
15. The _____ law of thermodynamics states that if two bodies are each in thermal equilibrium with some third body, then they are also in equilibrium with each other.
(A) Zeroth. (B) First.
(C) Second. (D) Third.
- 16 Potash alum is :
(A) $\text{NH}_4\text{Al}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$. (B) $\text{NH}_4\text{Fe}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$.
(C) $\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$. (D) $\text{NaFe}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$.
17. The formula of the complex formed in the brown ring test for nitrate is _____.
(A) FeSO_4NO . (B) $[\text{Fe}(\text{H}_2\text{O})_5\text{NO}]^{3+}$.
(C) $[\text{Fe}(\text{H}_2\text{O})_5\text{NO}]^{+}$. (D) $[\text{Fe}(\text{H}_2\text{O})_5\text{NO}]^{2+}$.
18. An aqueous solution of a substance gives a white precipitate with dil. HCl, which dissolves on heating. When H_2S is passed through the hot acidic solution, a black precipitate is obtained. The substance is an ion of :
(A) Hg. (B) Cu.
(C) Ag. (D) Pb.

Turn over

19. In _____ soluble compounds in a solution are eliminated during the course of precipitation.
- (A) Post - precipitation. (B) Direct precipitation.
(C) Co-precipitation. (D) Homogeneous precipitation.
20. For which of the followings, froth flotation method is used for concentration ?
- (A) Zinc blend. (B) Haematite.
(C) Magnetite. (D) Camallite.
21. Brass is _____.
- (A) 50 % copper and 50 % zinc. (B) 66 % copper and 34 % zinc.
(C) 88 % copper and 12 % tin. (D) 66 % zinc and 34 % copper.
22. In the structure of ClF_3 , the number of lone pairs of electrons on central atom 'Cl' is _____.
- (A) 1. (B) 2.
(C) 3. (D) 4.
23. The element which cannot form oxyacid is _____.
- (A) Chlorine. (B) Bromine.
(C) Fluorine. (D) Iodine.
24. Which of the following noble gases do not occur in the elemental state in the atmosphere ?
- (A) Helium. (B) Neon.
(C) Argon. (D) Radon.
25. The catalyst used in the preparation of poly siloxanes is _____.
- (A) Grignard reagent. (B) Lewis acid.
(C) Cumene hydroperoxide. (D) Benzoyl peroxide.
26. The Great Smog of London was occurred during _____.
- (A) 5 - 9 November 1953. (B) 5 - 9 December 1952.
(C) 5 - 9 December 1953. (D) 5 - 9 November 1952.

27. The major ingredient of photochemical smog is _____.
(A) Nitrogen oxides. (B) Sulphur oxides.
(C) Fluorocarbons. (D) Carbon oxides
28. High COD to BOD ratio of an organic pollutant represents _____.
(A) Presence of free oxygen for aerobic decomposition.
(B) Presence of toxic materials in the pollutant.
(C) High degradability of the pollutant.
(D) Low degradability of the pollutant.
29. The main causes of temporary hardness of water are due to the presence of _____.
(A) Magnesium chloride. (B) Calcium sulphate.
(C) Magnesium carbonate. (D) Magnesium sulphate.
30. Minamata disaster was caused by _____.
(A) Methyl mercury. (B) Mercury.
(C) Phenyl mercury. (D) Mercuric chloride.
31. In Claisen rearrangement ether is converted in to _____.
(A) An amine. (B) An alcohol.
(C) A ketone. (D) An ester.
32. Reaction of an epoxide with Grignard reagent generates _____.
(A) Aldehydes. (B) Primary alcohols.
(C) Secondary alcohols. (D) Ketones.
33. Wittig reaction converts a ketone in to an _____.
(A) Alkane. (B) Alkene.
(C) Alkyne. (D) Alcohol.
34. Oxidation of isopropyl alcohol with CrO_3 produces _____.
(A) Acetic acid. (B) Propylene glycol.
(C) Acetaldehyde. (D) Acetone.

Turn over

35. The catalyst used in Oppenauer Oxidation is _____.
(A) Aluminium triisopropoxide.
(B) Triphenyl phosphine.
(C) Anhydrous aluminium chloride.
(D) Sodium ethoxide.
36. _____ is an alkaline solution of ammoniacal silver nitrate.
(A) Borche's reagent. (B) Schiff reagent.
(C) Fehling's solution. (D) Tollens' reagent.
37. The named organic reaction where in acetone is converted in to propane using hydrazine is called _____.
(A) Birch reduction. (B) MPV reduction.
(C) Wolff Kishner Reduction. (D) Clemmensen reduction.
38. The product obtained in the Aldol Condensation is _____.
(A) β -hydroxy ketone. (B) β -diketone.
(C) β -hydroxy ester. (D) β -hydroxy acid.
39. Which of the following is the least abundant aldol adduct formed from an equimolar mixture of ethanal and propanone in aqueous NaOH solution ?
- (A)
$$\begin{array}{c} \text{OH} \\ | \\ \text{CH}_3\text{CHCH}_2\text{CHO} \end{array}$$
 (B)
$$\begin{array}{c} \text{OH} \\ | \\ \text{CH}_3\text{CHCH}_2\text{COCH}_3 \end{array}$$
- (C)
$$\begin{array}{c} \text{OH} \\ | \\ \text{CH}_3\text{CCH}_2\text{CHO} \\ | \\ \text{CH}_3 \end{array}$$
 (D)
$$\begin{array}{c} \text{OH} \\ | \\ \text{CH}_3\text{CCH}_2\text{COCH}_3 \\ | \\ \text{CH}_3 \end{array}$$
40. Chichibabin synthesis is used for the preparation of _____.
(A) Quinoline. (B) Pyridine.
(C) Furan. (D) Indole.

41. In the reaction $2A + B \rightarrow A_2B$, if the concentration of A is doubled and that of B is halved, then the rate of the reaction will _____.
- (A) Increase 2 times. (B) Increase 4 times.
(C) Decrease 2 times. (D) Remain the same.
42. A reaction passes through an intermediate before attaining the final product is called _____.
- (A) Parallel reaction. (B) Chain reaction.
(C) Consecutive reaction. (D) Opposing reaction.
43. The relationship between rate constant and _____ can be deduced from the Arrhenius equation.
- (A) Temperature. (B) Enthalpy.
(C) Pressure. (D) Free energy.
44. The Lindemann mechanism explains _____ that take place in gas phase.
- (A) Unilayer absorption. (B) Bilayer absorption.
(C) Bimolecular reactions. (D) Unimolecular reactions.
45. Which of the following isotherm is applicable to physical adsorption ?
- (A) Langmuir. (B) Freundlich.
(C) BET. (D) Kisluk.
46. Which theory best suits for homogeneous catalysis ?
- (A) Absorption. (B) Nucleate.
(C) Intermediate. (D) Paratoid.
47. The molecule which acts directly on an enzyme to lower its catalytic rate is _____.
- (A) Repressor. (B) Inhibitor.
(C) Modulator. (D) Regulator.

Turn over

48. The interdependence of the pressure and temperature along the phase equilibrium curve of a pure substance is shown by _____.
- (A) Clausius-Clapeyron equation.
 - (B) Gibbs Helmholtz equation.
 - (C) Gibbs Duhem equation.
 - (D) Arrhenius equation.
49. The process by which a substance absorbs moisture from the atmosphere until it dissolves in the absorbed water and forms a solution :
- (A) Crystallization.
 - (B) Sublimation.
 - (C) Efflorescence.
 - (D) Deliquescence.
50. Nernst's distribution law gives a generalisation which governs the distribution of a solute between _____.
- (A) Two miscible solvents.
 - (B) Two non-miscible solvents.
 - (C) Two organic solvents.
 - (D) A non-miscible solvent and a miscible solvent.
51. A _____ is a reagent that is extremely pure, stable, has no water of hydration and has a high molecular weight.
- (A) Primary standard.
 - (B) Titrant.
 - (C) Secondary standard.
 - (D) Tertiary standard.
52. According to _____ an ionic bond is formed by a compound with a large cation, and a small anion.
- (A) Bayer's rule.
 - (B) Mosley's rule.
 - (C) Slater rule.
 - (D) Fajans' rule.
53. Copious amount of _____ is used to wash the affected area for phenol burning.
- (A) Water.
 - (B) Dilute Na_2CO_3 solution.
 - (C) Soap and water.
 - (D) Dilute NaHCO_3 solution.

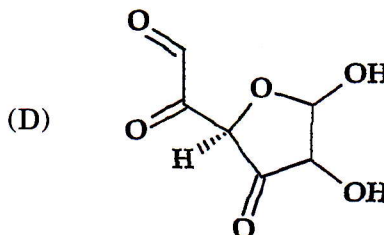
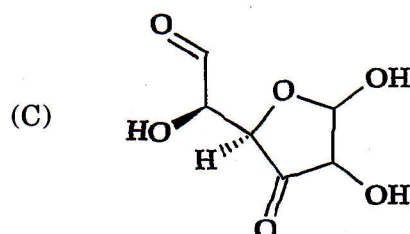
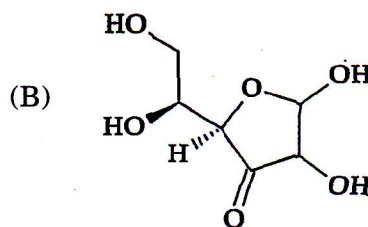
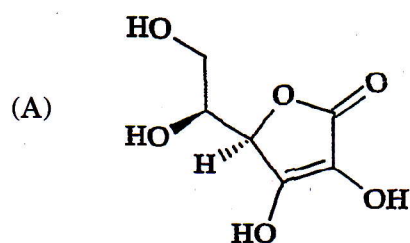
54. A _____ is a critical account of what has been published on a topic by accredited researchers.

- (A) Bibliography. (B) Manuscript.
(C) Review. (D) Patent.

55. A supposition or a system of ideas intended to explain something is called _____.

- (A) Assumption. (B) Hypothesis.
(C) Law. (D) Theory.

56. The structure of Vitamin C is :



57. If carbohydrate is present Benedict's test gives a colour change from _____.

- (A) Blue to red. (B) Green to blue.
(C) Blue to green. (D) Green to red.

58. The main component of talcum powder is _____.

- (A) Magnesium sulphate. (B) Magnesium silicate.
(C) Barium sulphate. (D) Barium silicate.

Turn over

59. The reaction of a diisocyanate with a diol yields _____.
(A) Polyurea. (B) Polycarbomate.
(C) Polyester. (D) Polyurethane.
60. Peroxides are used in _____ polymerization reactions.
(A) Condensation. (B) Addition.
(C) Free radical. (D) Anionic.
61. The flame colour of Rubidium is _____.
(A) Red-Violet. (B) Orange-red.
(C) Blue-violet. (D) Blue-green.
62. According to the _____ Concept, substance must have an oxide ion in order to explain its acidity or basicity.
(A) Lewis. (B) Bronsted-Lowry.
(C) Lux-Flood. (D) Arrhenius.
63. How many postulates are there in Bohr atomic model ?
(A) Three. (B) Four.
(C) Two. (D) Five.
64. The _____ states that no two electrons in the same atom can have identical values for all four of their quantum numbers.
(A) Hund's rule. (B) De Broglie's principle.
(C) Aufbau principle. (D) Pauli's exclusion principle.
65. The _____ is the difference in entropy between a non-equilibrium state and crystal state of a substance close to absolute zero.
(A) Shannon entropy. (B) Thermal entropy.
(C) Absolute entropy. (D) Residual entropy.
66. Which one is the correct expression ?
(A) $\Delta G^\circ = -RT \ln K$. (B) $\Delta G^\circ = RT \log K$.
(C) $\Delta G^\circ = RT \ln K$. (D) $\Delta G^\circ = -RT \log K$.

67. According to _____ quantum theory, Different atoms and molecules can emit or absorb energy in discrete quantities only.
- (A) De Broglie's. (B) Planck's.
(C) Einstein's. (D) Bohr's.
68. Arrange the order of basicity :
- (A) Ammonia > p-anisidine > p-nitroaniline > aniline.
(B) Ammonia > p-nitroaniline > aniline > p-anisidine.
(C) Ammonia > aniline > p-anisidine > p-nitroaniline.
(D) Ammonia > p-anisidine > aniline > p-nitroaniline.
69. Arrange the stability of the following carbocations :
- (A) Benzyl > Ethyl > Methyl > Chloromethyl
(B) Chloromethyl > Benzyl > Ethyl > Methyl
(C) Benzyl > Methyl > Chloromethyl > Ethyl
(D) Benzyl > Ethyl > Chloromethyl > Methyl
70. The boiling point of 2-aminophenol is higher than that of 3-aminophenol is due to _____.
- (A) Inductive effect.
(B) Intermolecular hydrogen bonding.
(C) Intramolecular hydrogen bonding.
(D) Van der Walls force.
71. Which of the following alkane can exhibit optical activity ?
- (A) 3-Methylpentane. (B) 3-Methylhexane.
(C) Isopentane. (D) Neopentane.

Turn over

72. Enantiomers are a pair of molecules that are _____.
- (A) Mirror images of one another but cannot be superimposed one upon the other.
 - (B) Not mirror images of one another but cannot be superimposed one upon the other.
 - (C) Mirror images of one another and superimposed one upon the other.
 - (D) Not mirror images of one another and superimposed one upon the other.
73. The order of stability of cyclohexane conformations is :
- (A) Chair > twist boat > half chair > boat.
 - (B) Chair > boat > half chair > twist boat.
 - (C) Chair > half chair > twist boat > boat.
 - (D) Chair > twist boat > boat > half chair.
74. Clemmenson's reduction of benzaldehyde produces :
- (A) Toluene.
 - (B) Benzene.
 - (C) Benzyl alcohol.
 - (D) Benzoic acid.
75. Wurtz's reaction uses _____ metal in _____ solvent.
- (A) Magnesium - ether.
 - (B) Potassium - ethanol.
 - (C) Sodium - ether.
 - (D) Lithium - ammonia.
76. The stable compound obtained in the dehydrohalogenation of 2-bromobutane is 2-butene. This is in accordance with _____.
- (A) Hoffmann rule.
 - (B) Saytzeff rule.
 - (C) Markovnikov's rule.
 - (D) Anti-Markovnikov's rule.
77. Lindlar's catalyst is _____.
- (A) Rh deposited on CaCO_3 .
 - (B) Pt deposited on CaCO_3 .
 - (C) Pd deposited on CaCO_3 .
 - (D) Rb deposited on CaCO_3 .
78. Retention of configuration occurs in _____ reaction.
- (A) $\text{S}_{\text{N}}\text{i}$.
 - (B) $\text{S}_{\text{N}}1$.
 - (C) $\text{S}_{\text{N}}\text{Ar}$.
 - (D) $\text{S}_{\text{N}}2$.

79. Aromaticity is due to _____.
(A) Delocalization of electrons present in the π - π orbitals.
(B) Presence of conjugated double bonds.
(C) Presence of planar structure.
(D) Presence of double bonds.
80. Friedel - Crafts alkylation is catalysed by _____.
(A) Aluminum carbonate.
(B) Aluminum chloride
(C) Anhydrous aluminum carbonate.
(D) Anhydrous aluminum chloride.
81. Birch reduction of benzene gives _____.
(A) 1, 3-cyclohexadiene. (B) 1,4-cyclohexadiene.
(C) Cyclohexene. (D) Cyclohexane.
82. The migrating aptitude of groups in pinacole - pinacolone rearrangement is _____.
(A) Aryl > cyclohexyl > benzyl > methyl.
(B) Methyl > cyclohexyl > benzyl > aryl
(C) Cyclohexyl > benzyl > aryl > methyl.
(D) Benzyl > cyclohexyl > aryl > methyl
83. The process for extracting solid natural resources from waste materials that previously have been disposed of by burying them in the ground is known as _____.
(A) Excavation. (B) Landfill mining.
(C) Unearthing. (D) Landfill leachates.
84. When basic solution is titrated against HCl in the burette with Methyl orange indicator, the endpoint is the color change from _____.
(A) Yellow to Orange. (B) Orange to Yellow.
(C) Yellow to Violet. (D) Violet to orange.

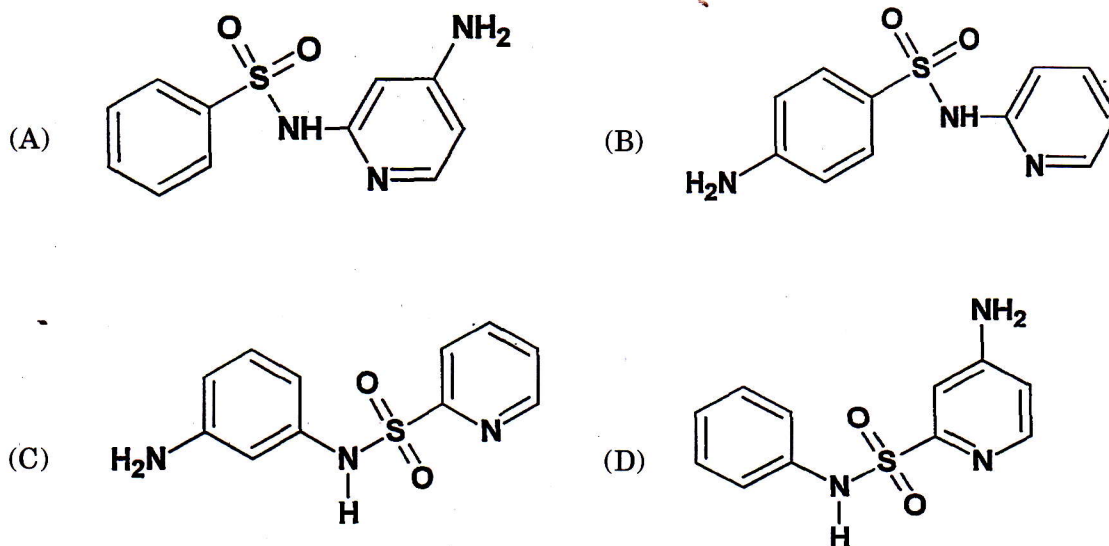
Turn over

85. In EDTA method, the purpose of adding buffer is———.
- (A) To maintain the pH of 8-10 range.
 - (B) To maintain the concentration of the reagent.
 - (C) To maintain the pH of 4-6 range.
 - (D) To maintain the pH of 6-8 range.
86. The amount of NaOH used in the titration of 100 ml 0.1 N HCl is ——.
- (A) 4.0 g.
 - (B) 0.4 g.
 - (C) 0.04 g.
 - (D) 2.0 g.
87. The Victor Meyer test is used to distinguish between ——.
- (A) Primary and secondary proteins.
 - (B) Mono and di carboxylic acids.
 - (C) Primary, secondary, and tertiary amines.
 - (D) Primary, secondary and tertiary alcohols.
88. On addition of NaCl the ionization of NaOH ——.
- (A) Decreases.
 - (B) Ceases.
 - (C) Remain the same.
 - (D) Increases.
89. Reimer Tiemann Reaction is used to convert phenol to ——.
- (A) 4-hydroxy toluene.
 - (B) 2-hydroxy benzaldehyde.
 - (C) 3-hydroxy benzaldehyde.
 - (D) 2-hydroxy benzoic acid.
90. The Mutual exclusion principle states that no normal modes can be **both Infrared** and —— active in a molecule that possesses a centre of symmetry.
- (A) Raman.
 - (B) NMR.
 - (C) ESR.
 - (D) UV.
91. Knoevenagel condensation of acetaldehyde with malonic acid in pyridine produces ——.
- (A) Crotonic acid.
 - (B) Lactic acid.
 - (C) Tartaric acid.
 - (D) Succinic acid.

92. According to _____ metals exhibit two types of valency (i) primary valency ; and (ii) secondary valency

- (A) Sidgwick's concept. (B) EAN rule.
(C) Jahn-Teller Theorem. (D) Werner's theory.

93. The structure of Sulfapyridine is :



94. In Hell Volhard Zelinsky reaction, the bromination of carboxylic acid takes place at _____ position.

- (A) γ (gama). (B) δ (delta).
(C) α (alpha). (D) β (beta).

95. The _____ describes the magnetic interactions between neighboring, non-equivalent NMR-active nuclei.

- (A) Nuclear Overseer Effect. (B) Spin-spin coupling.
(C) j.j - coupling. (D) Chemical shift.

96. The _____ states that for each photon of light absorbed by a chemical system, only one molecule is activated for subsequent reaction.

- (A) Grothus-Draper law. (B) Beer - Lambert's law.
(C) Jablonski law. (D) Stark-Einstein law.

Turn over

97. The _____ states that the electrons are moving freely and randomly moving in the entire volume of the metal like gas atoms in the gas container.
- (A) Free electron theory. (B) Valance bond theory.
(C) Molecular orbital theory. (D) Band theory.
98. Urea on Hofmann's bromamide reaction produces _____.
- (A) Ammonia. (B) Methyl cyanide.
(C) Hydrazine. (D) Methylamine.
99. Which is the metal found in Myoglobin ?
- (A) Potassium. (B) Sodium.
(C) Magnesium. (D) Iron.
100. In solid waste management, waste utilization is done by _____.
- (A) Reuse, reproduce and recycling.
(B) Recover, reclamation and reproduce.
(C) Recover, recycling and reproduce.
(D) Reuse, reclamation and recycling.