As per I - Scheme

BHARATI VIDYAPEETH INSTITUTE OF TECHNOLOGY

SCIENCE & HUMANITIES DEPT.

Multiple Choice Questions

Program – CE/ME/CM/IF/CH/EJ/EE **Course – Basic Chemistry (22102)**

Unit-1 Chemical Bonding & Catalysis

1. Which combination of atoms can form a polar covalent bond?

a. H & Br b. N & N c. Na & Br d. H & H

2. When an ionic compound is dissolved in water, the ions in solution can best be Described as……

a. hydrated molecules only b. dehydrated ions & molecules

c. hydrated ions only d. both hydrated molecules & hydrated ions

3. Which kinds of bonding can be found in a sample of H2o (l)?

a. hydrogen bond only b. Ionic & nonpolar hydrogen bonds

c. nonpolar covalent bonds only d. both polar covalent & hydrogen bonds

4. The bond between two identical non-metal atoms has a pair of electrons…

a. unequally shared between two b. equally shared between them

c. transferred fully from one atom to another d. with identical spins

5. Carbon tetrachloride has no net dipole moment because of……..

a. its planar structure b. its regular tetrahedral structure

c. similar sizes of carbon and chlorine atom

d. similar electron affinities of carbon and chlorine

6. Which type of bonding would be expected between S & Cl?

a. polyionic b. non-polar covalent

c. polar covalent d. ionic

7. Which formula represent a molecular substance?

a. Cao b. Al2O3 c. CO d. Li2O

8. Which bond has the greatest ionic character?

a. H-O b. H-F c. H-N d.H-CL

9. Which molecule is a polar molecule?

a. N2 b. CO2 c. CH4 d. H2O

10. Which of the following covalent bonds has the greatest polarity?

a. C-O b. Na-Br c. S-O d. Na-I

11. Which compound contains no ionic character?

a. CaO b. NH4Cl c. CO d. K2O

12. The forces of attraction that exist between nonpolar molecules are called..

a. electrovalent bond b. covalent bond

c. ionic bond d. van der Waals/dispersion forces

13. Which one of the following is a polar covalent bond?

a. Ca-Cl b. Cl-Cl c. P-Cl d. Si-Si

14. Element which are good catalyst and have ability to change their oxidation number are……

a. transition elements b. Nobel gases

c. alkalis d. all of them

15. In Haber process bonds between ammonia and iron surface weaken and break during…….

a. adsorption b. chemisorption's

c. both (a) & (b) d. desorption's

16. How does a catalyst work?

a. by decreasing the activation energy of a reaction

b. by decreasing the pressure of a chemical reaction

c. by increasing the concentration of reactants in a reaction

d. by increasing the temperature of a chemical reaction

17. Changes in oxidation number of ions which are involved in catalyst is done in…

a. homogeneous catalysis b. heterogeneous catalysis

c. hypergeneous catalyst d. hypogeneous catalyst

18. Which component is affected when a catalyst is added to a chemical reaction?

a. the amount of substrate b. the concentration of reactant

c. the amount of product d. the activation energy

19. Coordination number in simple cubic crystal structure:

a. 1 b. 2 c. 3 d. 4

20. Electron sea exists in……

a. polar bond b. ionic bond

c. covalent bond d. metallic bond

21. Which of the following is not a strong bond?

a. Van der Waals bond b. covalent bond

c. metallic bond d. ionic bond

22. In crystal lattice ions are arranged in …….

a. two dimensions b. four dimensions

c. three dimensions d. single dimensions

23. Crystal lattice is also known as……

a. lattice triangle b. space lattice

c. lattice line d. lattice arrangement

24. Metals can be hammered into different shapes and drawn into wires hence they are…..

a. soft b. malleable c. strong d. weaker

25. The three dimensional graph of lattice points which sets the pattern for the whole lattice is called……

a. space lattice b. simple lattice c. crystal lattice d. unit cell

26. In a metallic crystal :

a. the valence electrons constitute a sea of mobile electrons

b. the valence electrons are localized in between the kernels

c. the valence electrons remain within the field of influence of their own kernels

d. none of the above

27. If the pressure on a NaCl structure is increased, then its coordination number will……

a. increase b. decrease c. either (a) or (b) d. remain the same

28. The valence electrons of representative elements are…..

a. in s orbitals only b. located closest to the nucleus

c. located in d orbitals d. located in the innermost occupied shell

29. Which of the following bonds would be best categorized as covalent?

I. H-S II. Al-S III. N-F

a. I only b. II only c. III only d. I & III e. I,II & III

30. Which of the following species below would be considered molecular in nature?

a. C (diamond) b. C (graphite) c. Fe d. $AlCl_3$ e. PCl_3

31. Which of the following BEST explains the relatively low melting point of covalent molecular substances?

a. covalent molecular materials rely on weak electrostatic forces holding the ions together.

b. the "sea" of electrons between the atoms creates relatively weak bonding.

c. the intermolecular forces between the molecules are weak compared to ionic or covalent bonds.

d. the metals involved create uneven bonding with the non-metals.

e. the similar electronegativity of the atoms causes repulsions between the molecules.

32. Of the molecule below, only ……is nonpolar.

a. CO_2 b. H_2O c. NH_3 d. HCl e. $TeCl_2$

33. Of the following molecules only ……..is polar.

a. CCl_4 b. BCl_3 c. NCl_3 d. $BeCl_2$ e. Cl_2

34. Which of the following properties does not belong to a covalent substance?

a. Liquid with a low boiling point.

b. Insoluble in water and does not conduct electricity.

c. Soft solid and a very poor conductor of electricity.

d. High melting point and a brittle solid

35. What is the reason for ionic compound having high melting and boiling point?

a. The bonds between the atoms are strong.

b. A small amount of energy is needed to break the bonds between the ions.

c. Ionic compounds consist of a giant crystalline structure.

d. The bonds between the ions are strong.

36. Which of the following statements is correct?

a. In an electrolytic cell oxidation takes place at a positive anode.

b. In an electrolytic cell oxidation take place at a negative anode.

c. In an electrochemical cell reduction take place at a positive anode.

d. In an electrolytic cell oxidation takes place at a positive anode.

e. In an electrochemical cell reduction takes place at a negative anode.

37. When an ionic compound is dissolved in water, the ions in solution can best be described as…….

a. hydrated ions only b. dehydrated ions and molecules

c. both hydrated molecules and hydrated ions d. hydrated molecules only

38. Which compound contains no ionic character?

a. CaO b. CO c. NH4Cl d. K2O

39. Which one of the following describes the major intermolecular force in I2 (s) ?

a. covalent bond b. ionic bond c. hydrogen bond

d. dispersion forces e. dipole-dipole forces

40. What is the coordination no. of body centered cube?

a. 4 b. 6 c. 8 d. 12

41. Which of the following is a covalent crystal?

a. dry ice b. rock salt c. ice d. quartz

42. The no. of tetrahedral voids in the unit cell of face centered cubic lattice of similar atoms is……..

a. 4 b. 6 c. 8 d. 10

43. Point which shows position of atoms in a crystal are called…….

a. lattice point b. lattice lines c. lattice circles d. lattice arrangement

44. In crystal lattice ions are arranged in…….

a. Two dimensions b. four dimensions

c. Three dimensions d. single dimensions

45. Crystal lattice is actually……

a. array of points b. lines of points c. sum of points d. triangles of points

46.Usual habit of crystals of ice is……

a. cubic b. monoclinic c. hexagonal d. rhombic

47. Energy which is released when 1 mole of ionic crystal is formed is……

a. lattice energy b. heat energy c. molar energy d. none

48. very high boiling and melting points are of……..

a. covalent compound b. ionic compounds

c. metallic compound d. diatic bonds

49. Which of the following is an example of homogeneous catalysis?

a. enzyme catalysis b. Haber's process

c. hardening of animal and vegetable oils

d. cracking of heavy oils for synthesis of gasoline

50. Select the incorrect statement form the following options.

a. intermediate compound formation theory fails to explain the action of promoters

b. intermediate compound formation theory fails to explain the functions of catalyst in homogeneous reactions.

c. intermediate compound formation theory fails to explain the action of catalytic poisons

d. intermediate compound formation theory fails to explain the function of catalyst in heterogeneous reactions.

51. Which of the following statement is incorrect about the adsorption theory?

a. the catalyst is more efficient in finely divided state

b. action of promoters is not explained

c. enhanced activity of a rough surfaced catalyst is explained

d. specific action of catalyst is explained

52. Which of the following process is used for the preparation of sulphuric acid?

a. Ostwald's process b. Bergius process

c. Deacon's process d. Chamber process

53. Select the catalyst which is used for manufacture of ethanol from glucose.

a. maltase b. Pt/V2O c. Zymase d. Fe2O3

54 Name of the catalyst which is used for manufacture of glucose from cane sugar

a.maltase b. Zymase c. CuCl2 d. CuCl

55. The adsorption theory is applicable to……

a. homogeneous catalysis b. heterogeneous catalysis

c. catalysis d. none of the above

56.Name the metal which increases the activity of iron metal when added in small amount.

a. Cu b. Mo c. Al d. Mn

57. The strength of the metallic bond increases with:

a. increase in number of valence electrons

b. decrease in number of valence electrons

c. the decrease in size of atom

d. increase in size of atom

58. Water accumulates in cells of animals and plants due to presence of:

a. covalent bond b. coordinate bond

c. hydrogen bond d. electrovalent bond

59. Polar refers to……

a. even-sized electronegativity's in a bond

b. bonds that have an uneven distribution of charge

c. bonds that have an even distribution of charge

d. the formation of uneven size ions

60. Which of the following contain a covalent bond?

a. Li2O b. NO3 c. Mg3N2 d. NaCl

61. Which substance has a polar covalent bond between its atoms?

a. NH3 b. NaCl c. K3N d. Ca3N2

62. Which one among the following does not have the hydrogen bond?

a. Water b. phenol c. liquid NH3 d. liquid HCl

63. The no. of lone electron pairs in the N2 molecule is…….

a. 1 b. 2 c. 4 d.3

64.Which substance represents a molecule that can combine with a proton (H1+)?

a.NH3 b. Na1+ c. HCl d. H3O1+

65. What type of chemical bond holds the atoms together within a water molecule?

a. nonpolar covalent bond b. ionic bond

c. polar covalent bond d. hydrogen bond

66. Classify the O-H bond in CH3OH as ionic, polar covalent or nonpolar covalent.

a. nonpolar covalent b. none of this c. polar covalent d. ionic

67. Which pair of elements would be most likely to form an ionic compound?

a. Cl & I b. Al & K c. C & S d. Cl & Mg

68. Which one of the following compound is most likely to be an ionic compound?

a. CCl4 b. CO2 c. KF d. CS2

69. Process in which catalyst has a different phase to a reaction mixture, this process is known as,…..

a. homogeneous catalysis b. heterogeneous catalysis

c. hypergeneous catalyst d. hypogeneous catalyst

70. Which statement best describes how a catalyst can speed up a chemical reaction?

a. the catalyst binds to enzymes to release substrates.

b. the catalyst makes lower energy pathway available.

c. the catalyst increases the concentration of products.

d. the catalyst increases the concentration of reactants.

71. Repeatable entity of a crystal structure is known as……

a. crystal b. lattice c. unit cell d. miller indices

72. The atomic diameter of an BCC crystal is…..

a. a b. a/2 c. a/(4/ $\sqrt{3}$) d. a/(4/ $\sqrt{2}$)

73. Atomic packing factor is……..

a. distance between two adjacent atoms.

b. projected area fraction of atoms on a plane.

c. volume fraction of atoms on a plane.

d. none.

74. How many nearest neighbors are there for an atom in a hexagonal close-packed crystal structure?

a. 6 b. 12 c. 18 d. 24

75. Points which hows position of atoms in a crystal are called…….

a. lattice points b. lattice lines c. lattice circles d. lattice arrangement.

76. The energy released when an electron is added to an atom is the gaseous state is called……

a. electro positivity b. ionization potential

c. electron affinity d. electronegativity

77. Giant ionic structures is also name given to…….

a. ionic lattice b. crystal lattice c. metallic lattice d. covalent lattice.

78. Compound with identical crystal structure and analogous chemical formula are called……..

a. isomers b. isotones c. allotropes d. isomorphs.

79. NaCl is an example of……

a. ionic solid b. covalent solid c. metallic solid d. molecular solid.

80. Statement I : Crystalline solid are anisotropic

Statement II : Crystalline solids are not as closely packed as amorphous solids.

a. statement I is true; statement II is true; statement II is a correct explanation for statement I.

b. statement I is true; statement II is true; statement II is not a correct explanation for statement I.

c. statement I is true; statement II is false.

d. statement I is false; statement II is true.

81. Which is classified as nonpolar covalent?

a. the H-I bond in HI b. the H-S bond in H_2S

c. the P-Cl bond in PCl_3 d. the N-Cl bond in NCl_3

e. the N-H bond in NH_3

82. Which of the following bonds would be best categorized as covalent?

a. Strong covalent bonds between atoms with similar electronegativity.

b. Covalently bound atoms arranged in small individual molecules.

d. Positively charged ions covalently bound with many mobile electrons.

e. none of these.

83. The substance below BEST characterized as having a high melting point and able to conduct electricity in the liquid state only would be:

a. CH_4 b. V_2O_5 c. CO d. HF e. C (diamond)

84. Of the molecules below, only ……..is polar.

a. CCl_4 b. CH_4 c. SeF_4 d. $SiCl_4$ e. CO_2

85. Which of the following would contain both covalent and ionic bonding?

a. CaO b. NH_3 c. C (diamond) d. $Ca(NO_3)_2$ e. CO_2

86. Why can ionic substance conduct electricity when in solution or molten, but not when they are in the solid state.

a. When in solution or molten, the protons are free to move, but not free to move in the solid state.

b. When in solution or molten, the atoms are free to move, but not free to move in the solid state.

c. When in solution or molten, the ions are free to move but not free to move in the solid state.

d. Electrons cannot travel through solids.

87. Which of the following pairs of element will combine to produce a covalent bond?

a. sodium & chlorine b. lithium & bromine

c. magnesium & oxygen d. hydrogen & chlorine.

88. Which of the following pairs of atoms would form a non-polar covalent bond?

a. C & O b. N & O c. Cl & Cl d. Na & Cl e. Ne & Ne

89. The bond between two identical non-metal atoms has a pair of electrons;

a. unequally shared between the two.

b. transferred fully from one atom to another.

c. with identical spins.

d. equally shared between them.

90. Ions of ionic crystals become free when it is in……..

a. solid state b. compound state c. molten state. d. none.

91. Crystal lattice is also known as…….

a. lattice triangle b. space lattice c. lattice line d. lattice array.

92. The radius ratio in CsCl is 0.93. the expected lattice structure is :

a. octahedral b. square planer c. tetrahedral d. body centred cubic

93. The no. of atoms per unit cell of bcc structure is……

a. 1 b. 2 c. 4 d. 6

94. Usual property of ionic crystals is that they are…….

a. stable b. unstable c. gaseous form d. compound forming.

95. Lattice energy is decreased when size of anion is…….

a. decreased b. increased c. remain same d. no change.

96. Which of the following is not a category of catalysis?

a. homogeneous b. heterogeneous c. artificial d. enzymatic.

97. Which of the following process is used for the preparation of chlorine gas?

a. Deacon’s process b. Bergius process

c. Ostwald’s process d. Haber’s process

98. The factor which determines the activity of a heterogeneous catalyst is…….

a. total surface are only.

b. the no. of active sites per unit amount of catalyst only.

c. method of preparation, prior treatment only.

d. total surface area, no. of active sites and method of preparation.

99. Select the incorrect statement about the adsorption theory from the following option.

a. the surface of the solid catalyst possess some isolated active Centre's having residual affinity.

b. due to these Centre's , the molecules of the gaseous reactants get adsorbed in unimolecular thick layer.

c. the adsorbed reactants get activated and then react.

d. the energy required for activation is more than that required for uncatalysed reaction.

100. What is the role of Mo in following reaction?

$$N2+3H2 \Rightarrow 2NH3$$

a. catalytic inhibitor b. catalytic promoter

c. catalyst d. Auto catalyst

Unit-II Corrosion and Electrochemistry

1. Standard hydrogen electrode has an arbitrarily fixed potential……

a. 0.00 volt b. 1.00 volt c. 0.10 volt d. none of these

2. When aqueous solution of NaCl is electrolyzed……

a. Cl2 is evolved at the cathode b. H2 is evolved at cathode

c. Na is deposited at the cathode d. Na appears at the anode

3. Electrolysis is the process in which a chemical reaction takes place at the expense of……

a. chemical energy b. electrical energy c. heat energy d. none of these

4. During electrolysis of $CuSO_4$ (aq) using Cu electrodes, when the current is passed through an electrolytic solution. Which of the following process will occur?

A.anions move towards anode and cations move towards cathode.

b. cations and anions both move towards cathode.

c. cations and anions both move towards anode.

d. no movement of the ions occur.

5. An electrochemical cell is based upon……

a. acid-base reaction b. redox reaction

c. nuclear reaction d. none of the above.

6. During a redox reaction, an oxidizing agent…..

a. gain electrons b. is oxidized c. loses electrons d. is hydrolyzed.

7. Which one of the following will be good conductor of electricity?

a. pure distilled water b. molten NaCl c. dilute sol of glucose d. chloroform

8. In the electrolysis the process of oxidation occurs at…..

a. anode b. cathode c. both cathode and anode d. in electrolytic solution.

9. In the reduction process the oxidation no. of the element……

a. increases b. decreases c. does not change d. none of the above.

10. During the electrolysis of H_2SO_4 (aq) O_2 is evolved at……

a. cathode b. anode c. both a & b d. none of these.

11. The e.m.f. produced by a voltage cell is……..

a. electrode potential b. reduction potential c. cell potential d. oxidation potential.

12. Metallic conductors conduct electricity…….

a. with chemical change b. without any chemical change

c. both a & b d. none of these

13. The process of producing the chemical change in an electrolytic cell is called…..

a. electrolyte b. electrolysis c. electrodes d. conductors.

14. An apparatus in which chemical energy in converted to electrical energy is called…..

a. electrolytic cell b. galvanic cell c. fuel cell d. down cell.

15. Electric current passes through both molten and solution form of NaCl because of…..

a. ionic bonding b. Na+ & Cl- ions c. ions of water d. both a & b

16. Substances through which electric current cannot pass are called…..

a. insulators b. conductors c. anode d. cathode.

17. Sodium metal is obtained by the electrolysis of fused NaCl in a cell is called….

a. Nelson's cell b. Down's cell c. Daniell cell d. Voltaic cell

18. A system containing of electrodes that dips into an electrolyte in which a chemical reaction either uses or generates an electric current id called…..

a. voltaic cell b. electrochemical cell c. voltaic or galvanic cell d. fuel cell

19. In lead accumulator the electrolyte H_2SO_4 solution is…….

a. 30 % b. 60 % c. 80% d. 90 %

20. During electrolysis of $CuSO_4$ (aq) using Cu electrodes Cu is deposited at…….

a. anode b. cathode c. both a & b d. none of these

21. Several blocks of magnesium are fixed to the bottom of a ship to…….

a. prevent action of water and salt b. keep away the sharks

c. prevent puncturing by under-sea rocks d. make the ship lighter.

22. Electrolyte used for tin plating is

a. sulphide ore b. stannous sulphate c. hydrogen sulphate d. sodium chloride

23. An electrolytic cell uses electrical energy to drive….

a. chemical reaction b. physical reaction c. no reaction d. none of above

24. Faraday's constant is defined as…….

a. charge carried by 1 electron b. charge carried by one mole of electrons

c. charge required to deposit one mole of a substance d. charge carried by two mole of e-

25. One ampere of current is passed for 9650 seconds through molten $AlCl_3$. What is the weight in grams of Al deposited at cathode? (Atomic weigh – 27)

a. 0.9 b. 9.0 c. 0.09 d. 90.0

26. One Faraday of the electricity is passed separately through one litre of one molar aqueous solution of (i) $AgNO_3$ (ii) $SnCl_4$ and (iii) $CuSO_4$. The no. of moles of Ag, Sn and Cu deposited at cathode are respectively…….

a. 1.0, 0.25, 0.5 b. 1.0, 0.5, 1.0 c. 0.5, 1.0, 0.25 d. 0.25, 0.5, 1.0

27. Which among the following metals is employed to provide cathodic protection to iron?

a. Zinc b. Nickel c. Tin d. Lead

28. During a cathodic protection, the sacrificial anode……

a. accepts electrons from the protected metal.

b. reacts spontaneously with the protected metal.

c. oxidizes more readily than the protected metal.

d. causes the protected metal to become an anode.

29. Iron corrodes faster in

a. hard water b. soft water c. demineralized water d. distilled water.

30. A piece of Au does not react spontaneously with 1.0 M HCl. Which of the following statement is true?

a. Au is a weaker reducing agent than H_2

b. Au is a stronger reducing agent than H_2

c. Au is a weaker oxidizing agent than H^+

d. Au is a stronger oxidizing agent than H

31. Which of the following metals protects itself by forming a passive layer of its own oxide?

a. Pt b. Au c. Fe d. Al

32. During galvanic corrosion, the noblest metal acts as ….

a. anode b. cathode c. both a & b d. corroding metal.

33. Cathodic protection corrosion control is most suitable for ……

a. bimetallic couple b. buried iron pipelines c. window grills.

d. metallic articles completely immersed in water.

34. Anodized coatings are generally produced on……..

a. non-ferrous metal b. ferrous metal c. alloy d. non-metal

35. Waterline corrosion in steel tank is an example of ……

a. stress corrosion b. differential aeration corrosion

c. pitting corrosion d. differential metal corrosion

36. Ships sailing in ocean suffer from……

a. stress corrosion b. grain-boundary corrosion

c. pitting corrosion d. waterline corrosion

37. Galvanizing is a process of…….

a. coating tin on zinc b. coating iron on zinc c. coating zinc on iron d. none of above

38. Caustic embrittlement in boilers is an example of ……

a. pitting corrosion b. differential aeration corrosion

c. stress corrosion d. grain-boundary corrosion

39. In which of the following metals is the specific volume of oxide is more than that of the metal?

a. Cr b. Al c. W d. all of the above

40. Chromate coating are…….

a. non-porous b. more resistant than phosphate coatings

c. amorphous d. all of the above.

41. Which of the following metals are more corrosion resistant than expected from their position in the electrochemical series?

a. Mg b. CO c. Al d. Fe

42. In anodized Aluminium, the corrosion protection is due to…..

a. passive oxide coating b. phosphate coating c. chromate coating d. organic coating.

43. Differential metal corrosion is an example of …….

a. galvanic corrosion b. crevice corrosion c. stress corrosion d. water line corrosion.

44. During corrosion, evolution of hydrogen occurs in……

a. acidic medium b. basic medium c. neutral medium d. all are correct.

45. Pitting corrosion can be explained on the basis of …….

a. differential aeration b. size of anode and cathode

c. localized corrosion d. all of the above

46. Anodic protection can be applied to…..

a. all the metals b. more electropositive metals c. less electropositive metals

d. metals which undergo active-passive transition.

47. The flux used in galvanizing is…….

a. NH4Cl b. BaCl2 c. NaCl d. palm oil

48. The main objective of metal finishing is to modify…….

a. chemical properties of material b. surface properties of materials

c. physical properties of materials d. electrical properties of materials

49. Polarization of electrodes is reduced by ……..

a. increasing the ionic concentration b. increasing the electrode surface area

c. decreasing the ionic concentration d. both b & c

50. The process of electroplating involves...

a. Electrolysis b. discharge of metal ions at cathode.

c. redox reaction d. all of the above.

51. During electrolysis of KNO3, H2 is Evolved at

a. anode b. cathode

c. both (a) &(b) d. None of these.

52. During Electrolysis of fused NaCl, Which of the following reaction occurs at anode?

a. acid-base reaction. b. Redox Reaction

C. Nuclear reaction d. None of the above.

53. Which of the following represents the same net reaction as the electrolysis of aqueous H2SO4?

a. Electrolysis of water b. electrolysis of molten NaCl

c. Electrolysis of aqueous HCl d. electrolysis of aqueous NaCl.

54. In a salt bridge KCl is used because

a. it is an electrolyte b. K+ & Cl- transfers easily

c. Agar- Agar forms a good jelly with it. d. KCl is also present in the calomel electrode.

55. A oxidizing agent is a substance which brings about

a. electron donation d. oxidation

c. Reduction d. hydrolysis.

56.In an oxidation process the oxidation number of the element

a. Increases b. Decreases c. Does not change d. None of above.

57. Which of the following is the definition of oxidation?

a. gain of electrons b. loss of electrons

c. addition of H2 d. Removal of O2.

58. Which element acts as a reducing agent in the reaction?

$Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$?

a.Zn b. H c. S d.O

59. When the current is passed through an electrolytic solution, which of the following process will occur?

a. Anions move towards anode & cations move towards cathode

b. Cations & anions both move towards anode

c. Cations & anions both move towards anode.

d. No movement of the ions occurs.

60. A cell which produces electric current by redox reaction is called

a. Standard cell b. voltaic cell

c. reversible cell d. concentration cell.

61. Which of the following conduct electricity due to the migration of electrons only?

a. Copper metal b. NaCl Molten

c. NaCl d. NaCl Solution.

62. Substances through which electric current can pass are called

a. Insulators. B. Conductors c. Cathode d. Anode.

63. Metallic conduction is due to the

a. Movement of electrons b. Movement of ions

c. Both (a) & (b) d. None of these.

64. The flow of electrons are called

a. Electrolyte b. Electric Current c. Cathode d. Anode.

65.A substances which in molten state or in solution form allows electric current to pass through it is called.

a. Electrolyte b. insulator c. conductor d. None of these.

66. The process in which ionic compound when fused of dissolved in water split up into charged particles is called

a.Electrolysis b. Hydration c. ionization d. Conduction.

67. The reaction in a galvanic cell is

a. Spontaneous b. Non –Spontaneous c. Fuel Cell d. Down Cell.

68. Aqueous copper sulphate solution is electrolyzed using platinum electrodes. The electrode reaction occurring at cathode is

a. $Cu^{2+}(aq) + 2e^- \rightarrow Cu(S)$

b. $Cu(s) \rightarrow Cu^{2+}(aq) + 2e^-$

c. $2H_2O(l) \rightarrow O_2(g) + 4H^+(aq) + 4e^-$

d. $O_2(g) + 4H^+(aq) + 4e^- \rightarrow 2H_2O(l)$

69. Conductivity of 0.01M Nacl solution is 0.00147ohm-1cm-1 what happens to this conductivity if extra 100ml of H2o will be added to the above solution?

a. Increases b. Decreases

c. Remains Unchanged d. First increases & then decreases.

70. The Electrochemical equivalent of a metal is ‘X’gram coulomb -1

a. x b. x* 96500 c. x/ 96500 d.1.6 8 10-9 *x

71. One Faraday of electricity is passed through molten Al2O3 aqueous solution of CuSO4 and molted NaCl taken three different electrolytic cells connected in series. The mole Ration of Al, Cu,& Na deposited at the respective cathode is

a. 2: 3: 6 b.. 6: 2 :3

c. 6 :3 :2 d. 1: 2 :3

72. Li occupies higher position in the electrochemical series of metals as compare to Cu since

a. the standard reduction potential of Li+/Li is lower than that of Cu 2+/Cu

b. the standard reduction potential of Cu2+/Cu is lower than that of Li+/Li

c. The standard oxidation potential of Li/Li+ is lower than that of Cu/Cu2+

d. Li is smaller in size as compared to Cu.

73. Consider the following electrochemical cell

Fig.

In this operating electrochemical cell

a. Electrons flow toward the Cu & the Cu2+ ions Migrate toward the Zn.

b. Electrons flow towards the Cu & the Zn2+ ions migrate the Cu.

c. Electrons flow towards the Zn & the Cu2+ ions migrate the Zn.

d. Electrons flow towards the Zn & the Zn 2+ migrate towards the Cu.

74. During a cathodic protection, the sacrificial anode--------

a. accepts electrons from the protected metal

b. Reacts spontaneously with the protected Metal.

c. Oxidizes more readily than the protected metal.

d. causes the protected metal to became an anode.

75. Consider the following diagram of a piece of iron, cathodically protected by magnesium

Diagram:-

What is happening during this process?

a. Iron acts as the anode & water is oxidized.

b. Iron acts as the cathode & oxygen is reduced

c. Magnesium acts as the anode & iron is oxidized.

d. Magnesium acts as the cathode & iron is reduce.

76. What occurs when a piece of Zn is placed in 1.0 M Cu(NO3)2?

a. [Cu2+] decreases b. [Zn 2+] decreases

c. [NO3-] increases d. No change occurs

77. Pin holes on Zinc – Coated iron articles are less corrosive to iron than pn holes on tin coated iron articles due to ---

a. High ratio of anodic to cathodic areas.

b. Low reduction potential of tin.

c. Low ratio of anodic to cathodic areas.

d. High rate of corrosion.

78. At low hydrogen overvoltage rate of corrosion of Metals---

a. Decreases b. Increases

c. Increases initially & then decreases d . Remains the same.

79. Which corrosion control Technique is most suitable in case of buried iron pipelines?

a. Anodic Metal coating b. Anodic Protection

c. Cathodic Protection d. Corrosion Inhibitors.

80. Atmospheric corrosion is caused by

a. Humidity in air b.Frequency of rainfall

c. presence of gases like SO2- d. Presence of O2 in air.

81. Which of the following is an example for anodic coating?

a. Tinning b. Galvanizing c. Painting d. Chromizing.

82. Which Part(s) of corrosion cell undergoes corrosion.

a. Anodic part b. cathodic part c. Both (a) & (b) d. None of the above.

83. Presence of copper impurity in Zinc causes

a. Waterline Corrosion b. Galvanic Corrosion c. pitting Corrosion d. Crevice Corrosion.

84. Electrochemical Corrosion is essentially due to

a. Formation of anodic & cathodic areas

b. electrical contact between anode & cathode for conduction of electrons

c. Electrolyte, Usually provided by the presence of Moisture

d. all of the above.

85. On the basis of physical nature & behavior, the corrosion products may be

a. Soluble b. Insoluble & fixed to the metal c. Discontinuous & not fixed d. all of the above.

86. Phosphate coatings can be produced by chemical reaction of a base Metal with aqueous solution of

a. Chromic acid & chromite b. Phosphoric acid & Phosphate

c. chromate coating d. organic coating.

87. Which of the following factor accounts for higher corrosion rate

a. large anodic area & small cathodic area

b. small anodic & large cathodic area

c. High Temperature

d. High humidity.

88. Sacrificial anode method of protecting a metal is an example of

a. anodic protection b. cathodic protection

c. Metal coating d. organic coating.

89. Anodized coatings have good Resistance to corrosion because

a. They are thicker than neutral oxide films.

b. They are thinner than neutral oxide films.

c. both (a) & (b)

d. None of the above.

90. Polarization of anode results in

a. Increase in the rate of corrosion.

b. Decrease in the rate of corrosion.

c. Increase in the rate of cathodic reaction.

d. Increase in the rate of anodic reaction.

91. At high hydrogen overvoltage, the rate of corrosion---

a. Increases d. Decreases

c. Increases initially & then decreases

d. Remains the same.

92. Electrolytes decomposes at a specific potential due to

a. Development of electrolytic cell b. development of galvanic cell

c. development of electrical double layer

d. None of the above.

93. The electrode with lowest hydrogen overvoltage is

a.Zn. b.Ni c.Hg d.Pt.

94. For an electrolytic mixture containing Zn2+,Cu2+,Ag2+,Au2+ the ion which is discharged first is ---

A.Zn2+ b. Cu2+ c. Ag + d.Au3+

95. In electroplating the article to be placed is subjected to pickling. This is to

a. Remove Grease b. Increase the rate of plating c. Remove oxide Scale d. Get a bright deposit.

96. Electrodes plating can be used for plating of

a. Metals b. Semiconductors c. Insulators d. all of the above.

98. Conductors & Insulators can be plated by

a. Electroplating b. Electroless plating c. Electro polishing d. None of the above.

99. During plating, Favorable condition having brighter & smooth deposits is –

a.Low temperature b. low metal on concentration

c. Both (a) & (b) d. None of the above.

100. When the metal structure to be placed is irregular, the process employed is

a. Electroplating b. Electro less plating c. electro polishing d. none of the above.

101. The practical decomposition potential is greater than the theoretical decomposition potential because of

a. ionization b. dissociation c. polarization of electrodes d. none of the above.

102. Formation of rust on iron is an example of

a. oxidation b. liquid metal corrosion

c. electrochemical corrosion d. chemical corrosion.

103. Which of the following is not true for dry corrosion?

a. It takes place in dry conditions.

b. It takes place in heterogeneous metal surfaces only.

c. It takes place uniformly.

d. It takes place by direct chemical attack on metal.

104. The corrosion of buried pipelines in passing from one soil type of another is caused by

a. Differential aeration b. stress c. Erosion d. Presence of microbes.

105. Welding is a better joining technique than using mechanical fasteners because it prevents.

a. Stress corrosion. Pitting corrosion

c. Galvanic corrosion d. crevice corrosion.

106. During rusting of iron

a. corrosion occurs at cathode.

b. Corrosion product is deposited at anode.

c. Corrosion occurs at anode & rust is deposited at cathode.

d. Corrosion occurs at anode & rust is deposited at anode.

107. The protection of ship hull from marine corrosion by using magnesium sheets of blocks is an example of

a. Cathodic protection b. Impressed voltage protection

c. Sacrificial cathodic protection d. Sacrificial anodic protection.

108. Which of the following types of corrosion does not occur due to formation of oxygen concentration cell?

a. Crevice corrosion b. Waterline corrosion

c. Erosion Corrosion d. Soil corrosion.

109. Wire mesh corrodes faster at the joints due to

a. Galvanic corrosion b. Stress corrosion

c. Crevice corrosion d. pitting corrosion.

110. Which of the following cannot be used for sacrificial anodic protection of steel?

a. Pb. b.Mg c. Al d. Zn

111. Which of the following is not a chemical conversion coating?

a. Chemical oxide coating b. Ceramic coating c. Phosphate coating d. Chromate coating.

112. The process of coating iron & steel with powdered Zinc & Zinc oxide is called

a. Sherardizing b. Metal cladding c. Colorizing d. Chromizing.

113. Zinc can be electrodeposited from acidic solutions, even though the standard electrode potential of zinc is less than that of hydrogen because of

a. Polarization b. Decomposition c. Hydrogen Over voltage d. None of the above.

114. Which of the following factors does not affect the polarisaton of electrodes?

a. stirring b. Nature of electrode.

c. Concentration & conductivity of electrolyte d. None of the above.

115. Which of the following is not a component of electroless plating bath?

a. Reducing agent b. conducting solution c. Metal salt d. Complexing agent.

116. Which of the following factors does not influence throwing power of electroplating bath?

a. Current density b. Conductance of solution

c. complexing agent d. competing electrode reactions.

117. In electro deposition of copper from CuCN, NaCN is added to the electrolyte bath.

a. as brightener b. as structure Modifier

c. to reduce metal ion concentration d. To enhance electrolyte concentration.

Answer Key

1. a	2. b	3. b	4. a	5. b	6. a	7. b	8. a	9. b	10. b
11. a	12. b	13. b	14. a	15. b	16. b	17. d	18. b	19. a	20. b
21. a	22. b	23. a	24. b	25. a	26. a	27. a	28. c	29. a	30. a
31. d	32. b	33. c	34. a	35. b	36. d	37. c	38. c	39. d	40. d
41. c	42. a	43. a	44. a	45. d	46. d	47. a	48. b	49. d	50. d
51. b	52. b	53. a	54. b	55. b	56. a	57. b	58. b	59. a	60. b
61. a	62. b	63. a	64. b	65. a	66. c	67. b	68. a	69. b	70. c
71. a	72. a	73. b	74. c	75. b	76. a	77. a	78. b	79. c	80. d
81. b	82. a	83. b	84. d	85. d	86. b	87. b	88. b	89. a	90. b
91. b	92. b	93. d	94. d	95. c	96. d		98. d	99. b	100. b
101. c	102. c	103. b	104. a	105. d	106. c	107. d	108. c	109. b	110. a
111. b	112. a	113. c	114. d	115. b	116. a	117. c			

Unit-III Paint, Varnishes, Insulators, Polymers, Adhesives & lubricants

1. Which of the Following is not the constituent of Paint?

a. Pigment b. Thinner c. Anti skinning Agent d. Alcohol.

2. Which of the pigment gives white colour to the paint?

a. Chromium Oxide b. Ferric Oxide c. Zinc Oxide d. Brown Umber.

3. The function of pigment is?

a. Reduces the fluidity of the paint b. Provides opacity to the paint

c. Improve the drying quality of paint d. Prevent gelling skinning of the paint film.

4. The constituents which Increases the random arrangement of pigment particles in paint are

a. Thinners b. Pigments c. Fillers/Extenders d. Thinner

5. The constituents which reduces the fluidity of paint is

a. Antiskining agent b. Driers c. Fillers/Extenders d.Thinners.

6. An example of bad thermal insulator is

a. Potassium b. Paper c. cork d. wool.

7. Handles of saucepans & other cooking utensils are made up of

a. Thermal conductors b. thermal Insulators c. Shares of heat d. Insulators of electricity.

8. An example of conductor of heat is

a. Paper b. Cloth c. Air d. Aluminium

9. The insulation ability thermal insulator with the presence of moisture would

a. Increase b. Decrease c. Remain affected d. None of the above.

10. Glass wool is a good insulator because it has –

a. Free electrons b. atoms colliding frequency c. porous body d. low density

11. Thermal conductivity of glass wool varies from sample to sample because of variation in

a. Composition b. density c. porosity d. all of the above.

12. Which plastic materials contain strong cross linking in their molecular structure?

a. Thermoplastic materials b. Thermosetting materials

c. Both (a) & (b) d.None of the above

13. Which of the following is an example of thermoplastic material?

a. Epoxy Resins b. Nylon 66 c. Teflon d. Bakelite

14. The polymer cannot be recycled

a. Thermoplastic b. Thermosets c. elastomers d. all polymers.

15. Name polymer among the polymers which do not soften on heating

A.Bakelite b. Polythene c. Polystyrene d.PVC.

16. Name the polymer that occur naturally

a. Starch & Nylon b. Starch & cellulose

c. Proteins & Nylon d. Proteins & PVC.

17. Which is used in the formation of epoxy resin.

a. Phenol b. Bisphenol c. Formaldehyde d. Ethylene.

18. Polyvinyl chloride is prepared from the monomer

a. Ethyl chloride b. Formaldehyde c. Vinyl chloride d. Ethylene's.

19. The example of linear polymer is

a. Polystyrene b. Nylon-66 c. Epoxy Resin d. Bakelite

20. The monomer of vinyl chloride contain

a. Single bond b. double bond c. triple bond d. None of the above.

21. Epoxy resin is prepared from

a. Epicholroydrin & bisphenol b. Epichlorohydrin & phenol

c. Bisphenol & phenol d. Epichlorohydrin & Formaldehyde.

22. Thermosetting synthetic adhesive is

a. Starch b. Phenol formaldehyde Resin c. Asphalt d. Shellac Resin.

23. In adhesive bonding, which one of the following is the term used for parts that are joined

a. adhered b. adherent c. adhesive d. infinitum.

24. The polymer which can be used as synthetic adhesive is

a. Neoprene b. Buna-S c. Epoxy Resin d. Polystyrene.

25. The purpose of lubrication is

a. To reduce friction b. To reduce wear.

C. To reduce corrosion d. all of the above.

26. Which one is not a example of solid lubricant?

a. Graphite lubricant b. Molybdenum Disulphite

c. Polytetrafluoroehylene d.Multigrade.

27. Apart from reducing friction & wear, the secondary purpose of lubricant is

a. Heat dissipation b. reducing corrosion c. Both (a) & (b) d. None of these.

28. For rocket & submarine the lubricant use is

a. Animal oil b. Vegetable oil c. mineral oil d. synthetic oil.

29. The type of lubricant used for cutting tools is

a. Solid lubricant b. Liquid lubricant c. Semisolid lubricant d. all of the above.

30. Solid lubricant is used for

a. cutting tool b. steam turbine c. sewing machine d. Gun parts.

31oilliness is the property of lubricant

a. absorb on the surface b. adsorb on the surface

c. Mixed with the surface d. none of the above.

32. Which of the following is not true for lubricants?

a. A good lubricant should High mechanical stability.

b. A good lubricant should have low volatility

c. A good lubricant should form stable emulsion with water.

d. A good lubricant should have high viscosity index.

33. The temperature at which oil ceases to flow from a on a machinery part is called

a.Flash point b. cloud point c. pour point d. fire point

34. The example of solid lubricant is

a. Grease b. Vaseline c. castor oil d. Talc

35. Repeatable unit of polymers

a. Isomer b. Copolymer c. Homopolymer d. monomer

36. Turpentine oil in paints is used as a

a. Pigment b. film forming pigment c. thinner d. drier.

37. Lubrication is necessary to protect wear & tear caused due to

a. electrostatic force b. gravitational force c. frictional force d. Magnetic force

38. Select the incorrect statement from the following options;

a. Lubricant keep out dirt b. Lubricant acts as a seal

c. Lubricant Transmit fluid power d. Lubricant enhances corrosion.

39. The viscosity of petroleum oil for hydraulic lifts is

a. High b. Low c. Moderate d. Very high.

40. On increasing the lubrication, the efficiency of the machine

a. Increases b. Decreases c. Remain Same d. Does not get affected.

41. Which of the following statement is incorrect about the team?

a. It has high density of the order 2.1 to 2.3 gm/cm3

b. It has excellent electrical insulation properties.

c.It has coefficient of friction

d. It is dense & chemically inert.

42. Select the incorrect statement from the following option

a. Thermosets have 3-dimensional, cross linked network structure.

b. Thermosets cannot be remoulded, reused or reclaimed.

c. Thermosets are hard, strong & brittle.

d. Thermosets are soluble in suitable solvent.

43. Which of the following is not an example of thermosets?

a. Epoxy b. Teflon c. Vulcanized Rubber d. Bakelite.

44. Which of the following statement is incorrect about the Teflon?

A.It has density of the order 2.1 to 2.3 gm/cm3

b. It has excellent electrical insulation properties

c. It has high coefficient of friction

d. It is chemically inert.

45. Select the incorrect statement from the following option

a. Condensation polymerization requires two reactive functional groups to be present at both end of the monomer.

b. No by- product is formed in condensation polymerization.

c. In condensation polymerization, growth of chain occurs at minimum of the two active centers.

d. In condensation Polymerization, Polymer MW rises steadily throughout the reaction.

46. Which of the following act as initiator in free – Radical polymerization?

a. Grignard Reagent b. Lewis Acid c. Benzoyl Peroxide d. Potassium Amide.

47. Which of the following is a conducting polymer?

a. Polyaniline b. Polyacetylene c. Polypyrrole d. All of the above.

48. The monomer Tetrafluroehylene can be used for the preparation of

a. PMMA b. Polyurethane c. Teflon d. Polyethylene.

49. A lubricant should possess High

a. Volatility b. Acidity c. Oiliness d. None of these.

50. A lubricant is used primarily to prevent

a. Corrosion of metals b. Oxidation of Metals

C.Wearing out of rubbing metallic Surface d. Reduction of Metals.

51. A suitable lubricant for watches

a. Grease b. Graphite c. Hazel Nut oil d.Palm Oil.

52.A good lubricant should have

a. Low viscosity –Index b. High viscosity –Index

c. Low fire point d. High Volatility

53. Capacity of oil to stick on the surface of machine parts under condition of heavy load is called

a. Volatility b. Oilliness c. acid Value d. Flash point.

54. In case of liquid lubricant, Generally

a. Flash point is higher than the fire point

b. Fire point is higher than the flash point

c. Fire point is lower than the flash point

d. Flash & fire point are identical.

55. When the resistance to movement of sliding/moving parts is only due to internal resistance between the lubricant itself, and lubricant is called

a. Fluid film b. Boundary c. Thin Film d. Extreme pressure.

56. Grease are not used to lubricate

a. Rail axel boxes b. Gears c. Bearing working d. Delicate Instruments

57. Machines operating under high temperature & load are best lubricated by—

a. Minerals b. Solid lubricants c. Grease d. Animal oil.

58. Single most important property of lubricant oil is

a. Its fire point b. cloud point c. oiliness d. Viscosity Index

59. Viscosity of oil is measured by using

a. Redwood Viscometer. B.Ostwalds Viscometer

C.Saybolt Viscometer d. All of the above.

60. The temperature at which lubricating oil will give off sufficient vapours to form combustible mixture with air is known as

a. Flash point b. Fire point c. pour point d. combustion point.

61. The temperature at which lubricating oil will give off sufficient vapours to form combustible mixture with air is known as

a. Flash point b. fire point c. pour point d. combustion point.

62. Which temperature for lubricating oil will be lowest?

a. Flash point b. Fire point c. Pour point d. Boiling point

63. The function of piston ring in internal combustion engine is

a. to prevent lubrication oil from entering the combustion space.

b. To prevent the leakage of combustion chamber products past piston.

c. To transfer heat from piston to cylinder walls.

d. all of the above.

64. Which engine has the highest air fuel ratio?

a. Petrol engine b. Gas engine c. Diesel Engine d. Gas turbine.

65. Thermoplastic materials are those Materials which

a. are flexible and can withstand considerable wear under suitable conditions.

b. are formed into shapes under heat & pressure & results in a permanently hard product.

c. do not become hard with the application of heat & pressure & no chemical change occurs.

D.are used as a friction lining for clutches & brakes.

66. Example of inorganic thermal insulator is

a.Mineral wood b. wool c. rubber d. none of the above.

67. Example of organic thermal Insulator is

a. Glass wool b. asbestos c. Polyurethane foam d. calcium silicate.

68. Which is the example of natural adhesive?

a. Asphalt b. Polyvinyl Acetate c. Epoxy Resin d. None of the above.

69. Polymer that softens on heating & stiffens on cooling is called

a. Thermoset b. Thermoplastic c. Elastomer d. Rubber.

70. Which of the following may not be used as criteria for classification of polymers?

a. Number of monomers b. Structure /Shape

c. Thermal behavior d. None of the above.

71. Polymer with low degree of polymerization is known as

a. High polymer b. oligomer c. Macromolecule d. Copolymer.

72. The compound that can be used as initiator addition polymerization is

a. Potassium dichromate b. Potassium sulphate c. benzoyl peroxide d. Any of the above.

73. Formation of polymers from unsaturated monomers

a. Exothermic process b. Endothermic Process

c. Depends on the compound used d. cannot be predicted.

74. The species responsible for propagation of polymerization reaction of ethylene using benzoyl peroxide as initiator is.

a.cation b. anion c. free radical d. any of the above.

75. An example of chain – growth polymer is

a. Nylon -66 b. Bakelite c. Terylene d. Teflon.

76. An example of step growth polymer is

A Teflon b.PVC c. Polybutadiene d. Bakelite.

77. Which of the following polymers is formed by condensation polymerization?

a. Polyethylene terephthalate b. Polyethylene c. Polystyrene d. Polypropylene.

78. Increase in viscosity of the medium is a major disadvantage in –

a. Bulk polymerization b. solution polymerization

c. suspension polymerization d. Emulsion polymerization.

79. Which one of the following is a Homopolymer?

a. Buna-S b. Styrene Acrylonitrile

c. Polyvinyl chloride d. Buna-N

80. Which of the following has the largest molecular mass?

a. Monomer b. Dimer c. Oligomer D. Polymer.

81. Chemical resistance of a polymer decreases with

a. Increase in cystallinity b. Increase in cross Linking

c. increase in molecular mass d. none of the above.

82. Additives are added to increase the flexibility of a polymer are called

A. Stabilizers b. Accelerators c. Plasticizers d. Fillers.

83. Additives are added to polymer/resins to

a. Improve mechanical properties b. Impart colour

c. Impart stability to weathering d. all of the above.

84. The polymer likely to be attacked easily by acids & alkali

a. polypropylene b. Polystyrene c. Polyvinyl chloride d. Polyester.

85. Which of the following polymers are hard?

a. linear b. Branched c. Cross-linked d. Thermoplastic.

86 The polymer used for making gasket & filters in chemical industry is

a. Polytetrafluroethylene b. Polymethylmethacrylic acid.

c. Polyethylene d. Polystyrene.

87. Polymer used in making laser disks & rear lights in cars is

a. Polytetrafluroethylene b. Polymethylmethacrylate.

c. Polyethylene d. Polystyrene

88. Phenol formaldehyde is commercially called as

a. PVC b. Bakelite c. Elastomer d. Nylon.

89. Epoxy Resins are obtained from

a. Bisphenol A & Formaldehyde

b. Phenol & formaldehyde

c. Bisphenol-A & Epichlorohydrin

d. Bisphenol A & alkyl di-isocyanate.

90. Low density polythene is obtained by using

a. anionic catalyst b. Free radical indicator

c. Ziegler-Natta catalyst d. Cationic Catalyst.

91. Phenol Formaldehyde is an example of

a. Thermoplastic polymers b. Thermoplastic polymers

c. Thermite polymers d. Thermosetting polymers.

92. Which one of the following is thermosetting polymer?

a. PVC b. Polystyrene c. Polyethylene d. Epoxy Resin.

93. The example of thermosetting polymer is

a. PMMA b. PVA. C. Teflon D. Urea formaldehyde.

94. Which of the following is used as monomers in polymerization?

a. NH3 b. CH3CH2COOH c. HOCH2CH2OH d.All of the above.

Answer Key

1. d	2. c	3. b	4. c	5. d	6. a	7. b	8. d	9. b	10. c
11. d	12. b	13. c	14. b	15. a	16. b	17. b	18. c	19. a	20. b
21. a	22. b	23. b	24. c	25. d	26. c	27. c	28. d	29. b	30. b
31. b	32. c	33. c	34. d	35. d	36. c	37. c	38. d	39. b	40. a
41. c	42. d	43. b	44. c	45. b	46. c	47. d	48. c	49. c	50.c
51. c	52. b	53. b	54. b	55. a	56. d	57. b	58. d	59. d	60. a
61. a	62. b	63. d	64. d	65. c	66. a	67. c	68. c	69. b	70. d
71. b	72. c	73. a	74. c	75. d	76. d	77. a	78. a	79. c	80. d
81. d	82. c	83. d	84. a	85. c	86. a	87. b	88. b	89. c	90. b
91. d	92. d	93. d	94. c						