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Arts, Commerce and Science college Bodwad Dist-Jalgaon

Question Bank

Class- S.Y.B.Sc **Sem- IV**

Subject- Chemistry. **Paper name- Physical and inorganic chemistry**

1. An electrolyte is a substance which :

a) **conducts electricity**

b) decomposes on heating

c) is acidic in nature

d) when dissolved in water, dissociates into ions

2. Conductivity of aqueous solution of an electrolyte depends on:

a) molecular mass of the electrolyte

b) boiling point of solvent

c) **degree of ionisation**

d) volume of the solvent

3. Strong electrolytes are those which :

a) dissolve readily in water

b) conducts electricity

c) dissociate into ions even at high concentration

d) **dissociate into ions at high dilution**

4. The electrochemical cell stops working after some time because :

a) electrode potential of both the electrodes becomes zero

b) **electrode potential of both the electrodes becomes equal**

c) one of the elctrodes is eaten away

d) the cell reaction gets reversed

5. In electrolysis oxidation takes place at :

a) both the electrodes b) cathode c) **anode** d) in the solution

6. A solution of Cu(II) sulphate is reacted with KC1 and KI. In which case will the Cu2+ be reduced to Cu+ :

a) In both the cases

b) When reacted with KC1

c) **When reacted with KI**

d) In both the cases but in presence of H+

7. Which is not true for a standard hydrogen electrode ?

a) The hydrogen ion concentration is 1 M

b) Temperature is 25oC

c) Pressure of hydrogen is 1 atmosphere

d) **It contains a metallic conductor which does not absorb hydrogen**

8. The half-cell reaction is the one that :

a) **takes place at one electrode**

b) consumes half a unit of electricity

c) involves half a mole of electrolyte

d) goes half way to completion

9. In an electrochemical cell, anode and cathode are :

a) positively and negatively charged ions

b) positively and negatively charged electrodes

c) **negatively and positively charged electrodes**

d) negatively and negatively charged ions

10. More electronegative elements have :

a) negative reduction potential

b) tendency to lose electrons

c) positive reduction potential

d) **positive oxidation potential**

11. The strong oxidising agent has :

a**) high value of reduction potential**

b) high value of oxidation potential

c) low value of reduction potential

d) high tendency to lose electrons

12. The passage of electricity in the Daniell cell when Zn and Cu electrodes are connected is from :

a) Cu to Zn in the cell

b) Cu to Zn outside the cell

c) Zn to Cu outside the cell

d) Zn to Cu in the cell

13. When a lead storage battery is charged :

a) PbO_2 dissolves

b) the lead electrode becomes coated with lead sulphate

c) **sulphate acid is regenerated**

d) the amount of acid decreases

14. An example of a simple fuel cell is :

a) l**ead storage battery** b) $H_2 - O_2$ cell c) Daniell cell d) Lechlanche cell

15. The number of coulombs required for the deposition of 107.87 g of silver is :

a) 48250 b) 10000 c) **96500** d) 19300

16. In the electrochemical reaction,

2Fe3+ + Zn -> Zn2+ + 2Fe2+ increasing the concentration of Fe2+ :

a) **increases the cell emf** b) increases the current flow

c) decreases the cell emf d) alters the pH of the solution

17. In a galvanic cell, the electrons flow from :

a) anode to cathode through the solution

b) **cathode to anode through the solution**

c) anode to cathode through the external circuit

d) cathode to anode through the external circuit

18. The highest electrical conductivity of the following aqueous solutions is of :

a) 0.1 M acetic acid b) 0.1 M chloroacetic acid

c) 0.1 M fluoroacetic acid d) **0.1 M difluoroacetic acid**

19. Chlorine electrode is example of...

A. **Gas electrode**

B. Metal - metal ions electrode

C. Redox ion electrode

D. Standard electrode

20. Which one of the following thermodynamic quantities is a state function?

(a) Gibbs free energy

(b) enthalpy

(c) entropy

(d) internal energy

(e**) all of the above**

21. Which of the following is not correct ?

a) Gibbs energy is an extensive property

b) Electrode potential or cell potential is an intensive property

c) **Electrical work = - Δ G**

d) If half reaction is multiplied by a numerical factor, the corresponding Eo

value is also multiplied by the same factor.

22.Which one of the following thermodynamic quantities is not a state function?

(a) Gibbs free energy

(b) enthalpy

(c) entropy

(d) internal energy

(e) **work**

23.Which statement is incorrect?

(a) At constant pressure, H = E + PV

(b) The thermodynamic symbol for entropy is S.

(c) Gibbs free energy is a state function.

(d) **For an endothermic process, H is negative.**

(e) If the work done by the system is greater than the heat absorbed by the system, E is negative.

24.The term RT ln Ka is equal to

(a) – ΔG

(b) **– ΔGo**

(c) – ΔG/T

(d) – ΔGo/T

25.For a spontaneous process, the change in Gibbs function is equal to the

(a) the heat content of the system

(b) entropy change of the system

(c) work of expansion

(d) **useful work**

26.The term “thermodynamics” comes from Greek words “therme” and “dynamis” which means _____.

A. Heat power

B. **Heat transfer**

C. Heat energy

D. Heat motion

27.. A spontaneous process

a. is reversible.

b. is irreversible.

c. may be reversible or irreversible depending on whether equilibrium is maintained throughout the process.

d. may be reversible or irreversible depending on the value of ΔS.

28.Which of the following is not correct?

(i) ΔG is zero for a reversible reaction

(ii) ΔG is positive for a spontaneous reaction

(iii) ΔG is negative for a spontaneous reaction

(iv) ΔG is positive for a non-spontaneous reaction

29.Helmholtz free energy A. is defined as_____?

A. A = H – TS

B**. A = E – TS**

C. A = H + TS

D. None of these

30.What is the relation between Gibbs free energy and the EMF of the cell?

a) **ΔG = -nFEcell**

b) G = -nFEcell

c) ΔG = -nEcell

d) ΔG = -nFcell

31.10. Write 1 Faraday in terms of coulombs.

a) **96500 C**

b) 95600 C

c) 9560 C

d) 9650 C

32.Enthalpy is represented by which of the following symbols?

a) **H**

b) K

c) S

d) U

33.Which of the following statements regarding the Gibbs free energy change for a reaction is false?

a) The Gibbs free energy change is the proportion of the enthalpy change of a reaction that is used to increase the entropy.

b) If the Gibbs free energy change for a reaction is negative, the reaction happens

spontaneously.

c) The Gibbs free energy is represented by the symbol G

d) **A reaction with a negative Gibbs free energy change of reaction is called an non spontaneous reaction.**

33.If the reaction quotient (Q) is less than the equilibrium constant (K), what is true about the Gibbs free energy?

A. It is less than zero

B. We must know the reaction temperature to determine the answer

C. We must know the reaction enthalpy to determine the answer

D. It is greater than zero

E. It is equal to zero

34.The Gibbs free energy is _____.

A. **The energy available to do work in chemical reactions**

B. The energy available to do mechanical work

C. The degree of disorder in a chemical

D. The kinetic energy of a rock

35.gibbs free energy G is defined as.....

A.G = E - TS

B.**G = H - TS**

C.G = H + TS

D.G = E + TS

36.Li Occupies Higher Position in the Electrochemical Series of Metals as Compared to Cu Since.

a) **The standard reduction potential of Li+/Li is lower than that of Cu2+/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.

37. Which of the Following Element Act as Inert Electrode?

a) Cu

b) Ag

c) **Pt**
d) None

38. Stronger the Oxidizing Agent Greater is the……

a) Oxidation potential

b) **Reduction potential**

c) Redox potential

d) EMF of cell

39. In an Electrolytic Cell Current Flows?

a) From cathode to anode in outer circuit

b) **From anode to cathode outside the cell**

c) From cathode to anode inside the cell

d) both b & c

40. In a Galvanic Cell

a) **Chemical energy is converted into electricity.**

b) Chemical energy is converted into heat.

c) Electrical energy is converted into chemical energy.

d) Electrical energy is converted into heat.

41. For the Measurement of Standard Electrode Potential Zn is Dipped in

a) 1M ZnO solution

b) **1M ZnSO4 solution**

c) 1.5M ZnSO4 solution

d) 1.6 MZnSO4 solution

42.. Zn(s)/Zn+2(aq) 1M || Cu+2(aq) 1M/Cu(s) is Representation of Reaction in

a) Daniel cell

b) Downs cell

c) **Voltaic cell**

d) Nelsons cell

43.. H2 Gas in SHE is Filled at temperature of

a) **298K**

b) 300K

c) 30K

d) 310K

44.. Greater Value of Standard Reduction Potential Greater Will be Tendency.

a) To get oxidized

b) To get reduced

c) To accept electrons

d) **Both b and c**

45. Voltaic Cell is a

a) **irreversible cell**

b) reversible cell

c) alkaline cell

d) All of the above.

46.H2 Gas in SHE is Filled at pressure of

A. 2 atm

B**. 1 atm**

C. 4 atm

D. 3 atm

47.dp/dT = L/(T(Vv - Vl)) this is called.....

A. Clapeyorn equation

B. **Clausius clapeyorn equation**

C. Gibbs- Helmholtz equation

D. Vanthoff isotherm

48.to estimate the vapor pressure at another temperature, if the vapor pressure is known at some temperature is done by.....

A. Clapeyorn equation

B. **Clausius clapeyorn equation**

C. Gibbs- Helmholtz equation

D. Vanthoff isotherm

49. dG=−SdT+VdP equation shows.....

A. **Gibbs free energy is function of temperature and pressure**

B. Change in Gibbs free energy at constant pressure

C. Change in Gibbs free energy at constant temperature

D. Gibbs free energy is a work function

50.$\Delta G = \Delta G^{\circ} + RT \ln Q$ in equation Q is.....

A. Temperature coefficient

B**. reaction quotient**

C. Work function

D. Equilibrium constant

51. $\Delta G^{\circ} = RT \ln Ka$ in equation Ka is.....

A. Temperature coefficient

B**.** reaction quotient

C. Work function

D. **Equilibrium constant**

51. The equation for relation between ΔG and Δ A is

A. ΔG= ΔH + PdV

B. **ΔG= ΔA + PdV**

C. ΔA = ΔH + PdV

D. ΔA= ΔG + PdV

52. Physical significance of Helmholtz free energy is given by

A. **Δ A= - Wmax**

B. Δ A= - Wmax + Pdv

C. Δ A= ΔE + TΔS

D. ΔA= ΔH + TΔS

53. Physical significance of Gibbs free energy is given by

A. Δ G= - Wmax

B. **Δ G= - Wmax + Pdv**

C. Δ G= ΔE + TΔS

D. ΔG = ΔH + TΔS

54. The pressure exerted on the surface of liquid at equilibrium is called.....

A. Atmosphere pressure

B. **Vapour pressure**

C. Constant pressure

D. None of the above

55. The loss of electrons is called as

A. Reduction

B. Electronegativity

C. **Oxidation**

D. Potential difference

56. Strong reducing agents has...

A. **Negative reduction potential**

B. Positive reduction potential

C. Negative oxidation potential

D. None of the above

57. Oxidising agent can .....itself

A. **Reduced**

B. Oxidesed

C. Decomposed

D. Ionise

58. Electrodes dipped in its own ion solution is called.....

A. Gas electrode

B. **Metal - metal ions electrode**

C. Redox ion electrode

D. Standard electrode

59. [(dG/T)/ dT]p is called .....

A. **Temperature coefficient**

B. Gibbs equation

C. Clapeyorn equation

D. Pressure coefficient

60. The point at which vapour pressure of a liquid become equal to atmospheric pressure than it is called....

A. Freezing point

B. Melting point

C. **Boiling point**

D. Fusion

61. The energy gap is maximum in

A. Conductors

B. Semiconductors

C. **Insulators**

D. Superconductors

62. Good conductors have many loosely bound

A. Atoms

B. Protons

C. Molecules

D. **Electrons**

63. With the increase in temperature the conductivity of semiconductors

A. Decreases

B. **Increases**

C. Remains constant

D. Initially increases and then decreases

64. For conductors, the free electrons will exist at

a) Valence band

b) Middle of valence and conduction band

c) Will not exist

d) **Conduction band**

65. In intrinsic semiconductors, number of electrons _____ number of holes.
a) **Equal** (b) Greater than (c) Less than (d) Can not define

66. In n-type semiconductors, number of holes _____ number of electrons.

(a) Equal (b) Greater than (c) **Less than** (d) Can not define

67. In p-type semiconductors, number of holes _____ number of electrons.

(a) Equal (b) **Greater than** (c) Less than (d) Twice

68. In Extrinsic semiconductor the conductivity is increases with increasing

A. Temperature

B. **Impurities**

C. Pressure

D. External energy

69. In conductors the Valence band is .....filled

A. Completely

B. Incompletely

C. Partially

D. **Both B and C**

70. Shiny appearance of a metal is called.....

A. Malleability

B. Ductility

C. **Luster**

D. Alloys

71. In p-type semiconductor the conductance is due to flow of.....

A. Electrons

B. **Holes**

C. Neutrons

D. Current

72. For n- type semiconductor we need to add impurity from group ....., in group IV silicon medium.

A. Group III

B. **Group V**

C. Group VI

D. Group II

73. The tendency of metal to form sheet is called .....

A. Ductility

B. **Malleability**

C. Luster

D. Conductivity

74. The compound which contain complex ion.....

A. Single salts

B. Double salts

C. **Coordination compounds**

D. None of these

75. The geometry of complex with cordination number 4 is.....

A. Linear

B. Planner triangular

C. **Square planner or tetrahedral**

D. Octahedral

76. Complexes having heterocyclic rings

A. Double salts

B. Simple salts

C. **Chelates**

D. None of the above

77. The number of ions formed when [Cu(NH3)4]SO4] is dissolved in water is.....

A. 1 **B. 2.** C. 4. D. Zero

78. NH2-CH2-CH2-NH2 is a .....

A. Mondentate lingands

B. Polydentate ligands

C. Tridentate ligand

D. **Bidentate ligand**

79. Doping of impurity having one valence electrons less than the parent atom gives.....

A. Intrinsic semiconductor

B. **P type semiconductor**

C. N type semiconductor

D. None of the above

80. In electrolysis reduction takes place at :

a) both the electrodes b) **cathode** c) anode d) in the solution

81. When electrodes are present in two different oxidation states is called.....

A. Metal metal ion electrode

B. **Redox electrode**

C. Gas electrode

D. None of the above

82. The electrode having potential zero is called....

A. **Standard hydrogen electrode**

B. Calomel electrode

C. Zinc electrode

D. Platinum electrode

83. If the calomel electrode is saturated with KCl at 25°C, the potential is ...

A. **0.241V**

B. 0.268V

C 0.108V

D. None of the above

84. Primary Standard reference electrode is....

A. **Hydrogen electrode**

B. Calomel electrode

C. Platinum electrode

D. Zinc electrode

85. The energy available to do work excluding P-V type of work is called....

A. Helmholtz free energy

B. **Gibbs free energy**

C. Heat energy

D. Mechanical energy

86. $[d(A/T)/ dT]_T$ is equal to....

A. $- E/ T^2$

B. - S

C. P

D. TS

87. $[d(\Delta A/T)/ dT]_T$ is equal to....

A. $-\Delta E/ T^2$

B. - S

C. P

D. TS

88. The change in Helmholtz free energy is given by...

A. A= E- TS

B. $\Delta A= \Delta E - T\Delta S$

C. A= - Wmax

D.- E/ T^2

89. Helmholtz free energy is function of ....

A. Volume and pressure

B. **Volume and temperature**

C. Pressure and temperature

D. None of the above

90. Gibbs free energy is function of ....

A. Volume and pressure

B. Volume and temperature

C. **Pressure and temperature**

D. None of the above

91. equation that relates the reduction potential of an electrochemical reaction to the standard electrode potential is called as...

A. **Nernst equation**

B. Clapeyorn equation

C. Vanthoff isotherm

D. Gibbs- Helmholtz equation

92. diethylenetriamine with three nitrogen donor atoms, is

A. Mondentate lingands

B. Polydentate ligands

C. **Tridentate ligand**

D. Bidentate ligand

93. $M^{I}M^{III}$ [SO4]2·12H2O) is ...

A. Single salts

B. **Double salts**

C. Common salts

D. None of the above

94. The seperation between conduction band and valence band is called...

A. Energy band

B. **Forbidden band**

C. Molecular band

D. None of the above

95. Germanium is a...

A. Conductors

B. Insulator

C. **Semiconductor**

D. Alloy

96. Metal conducts electric current due to flow of....

A. Protons

B. Neutrons

C. **Electrons**

D. None of the above

97. Metals are....

A. Hard and brittle

B. Good conductor of heat and electricity

C. Malleable and ductile

D. **All of the above**

98. Cordination compounds having trigonal planner geometry possess bond angle of...

A. 109.5 o

B. 180 o

C. **120 o**

D. 90 o

99. Cordination compounds having tetrahedral geometry possess bond angle of...

A. **109.5 o**

B. 180 o

C. 120 **o**

D. 90 o

100. Silicon and germanium is considered as...

A. Metals

B. Non metal

C. **Metalloids**

D. None of the above