CHEMISTRY

BOOKS - ACCURATE PUBLICATION

ELECTRO CHEMISTRY

Multiple Choice Quesitons 1 Mark

1. A salt birdge maintains

A. Electrical neutrality

B. Increase resistance

C. Increase concentration of electrolyte

D. Copper reduction

Answer: A

2. Electrode potential is the potential difference that develops on the

    A. Electrodes

    B. Electrolyte

    C. Electrode and its electrolyte

    D. All

Answer: C

3. Standard electrode potential is the electrode potential when the concentration of all line species involves in a half cell?

    A. zero

B. Unity

C. Depens upon No. of electrons

D. Decreases

Answer: B

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4. Which cell was used in Apollo space programme ? What was the product used for ?

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5. Oxidation potential is the .....of reduction potential

A. Equal

B. Inverse

C. Reverse

D. Charge

Answer: C

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6. On an industrial scale, sodium metal is prepared by electrolysis of fused

A. NaOH

B. NaCl

C. NaO

D. NH_3

Answer: B

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7. Oxidation- reduction reaction involves

A. transfer of neutrons

B. transfer of protons

C. transfer of electrons

D. all of the above

Answer: C

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8. Galvanic cells are also named as

A. electrolytic cells

B. battery cells

C. Daniel cells

D. John's cells

Answer: C

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9. The cell potential, $E°$ for an oxidation-reduction reaction was found to equal 1.10V. What can be said about this reaction?

A. at equilibrium

B. endothermic

C. non-spontaneous

D. spontaneous

Answer: D

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10. State whether the statement is true or false- Process of transpiration occurs through roots of the plants.

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11. The Standard Hydrogen Electrode is also known standard electrode potential is assigned a zero potential at all temperatures and it is also called as _____ electrode.

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12. Standard electrode potential is assigned a .....Potential at all temperatures

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13. A substance with higher reduction potential value means that it is

A. both b and c

B. Good reducing agent

C. Good oxidizing agent

D. none

Answer: C

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14. The electrode with higher reduction potential acts as a.....

A. Active metal

B. Anode

C. Cathode

D. Good oxidizing agent

Answer: C

15. The electrode with a lower reduction potential acts as an anode

    A. Lower reduction

    B. Higher reduction

    C. Lower oxidation

    D. Higher oxidation

Answer: A

16. At equilibrium, cell potentail E_{cell} becomes .....

    A. zero

    B. unity

C. Greather than zero

D. lesser than zero

Answer: A

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17. The substances which allow the passage of electricity through them.....

A. conductors

B. semi-conductors

C. Insulators

D. Both a and b

Answer: A

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18. The .....of any object is directly proportional to its length and inversely proportional to its area of cross section

A. Resistivity

B. Resistance

C. both a and b

D. none

Answer: D

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19. The process of taking out silk fibres from the cocoons is called_____.

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20. State whether the statement is true or false- In the process of photosynthesis, the final products formed are sugar and carbon dioxide.

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21. Silk fibres obtained from cocoons are spun to form silk threads is called_____.

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22. The silk obtained from the cocoons of mulberry silk moth is called_____.

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23. Faraday constant is equal to

A. $96587 Cmol^{-1}$

B. $96500 Cmol^{-1}$

C. $95487 Cmol^{-1}$

D. $96487 Cmol^{-1}$

Answer: B

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24. Faraday's first law of electrolysis states that the amount of substance deposited during electrolysis is directly proportional to.......

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25. Faraday's second law of electrolysis states that if same charge is passed through different electrolytes, the mass of substance deposited will be directly proportional to its ......

26. In dry cell the oxidation state of Manganese is reduced to

A. $+3$

B. $+2$

C. zero

D. 4

Answer: A

27. From where does the kosa silk is obtained?

28. A conductivity cell containing electrodes made up of

29. Which type of batteries is used more in cars:

30. The charge required for the reduction of 1 mole of MnO_4^- to MnO_2 is

A. 1F

B. 3F

C. 5F

D. 6F

Answer: B

31. If limiting molar conductivity of Ca^{2+} and Cl^- are 119.0 and 76.3 S $cm^2 mol^{-1}$, then the value of limiting molar conductivity of $CaCl_2$ will be :

A. $195.3 Scm^2 mol^{-1}$

B. $271.6 Scm^2 mol^{-1}$

C. $43.3 Scm^2 mol^{-1}$

D. $314.3 Scm^2 mol^{-1}$

Answer: B

32. The emf of the cell: $Ni / Ni^{2+} (1.0M) / Au^{3+} (1.0M) / Au$

$\left(E^\circ = -0.25V \text{ for } Ni^{2+} / Ni \text{ and } E^\circ = 1.5V \text{ for } Au^{3+} / Au\right)$

is

A. $1.25V$

B. $-1.25V$

C. $1.75V$

D. $2.0V$

Answer: C

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33. State whether the statement is true or false- Formation of manure from leaves is a chemical change.

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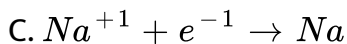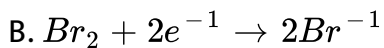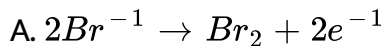**34.** State whether the statement is true or false- The chemical name of baking soda is calcium carbonate.

35. Which of the following statements is False?

A. Oxidation and reduction half-reactions occur at electrodes in electro chemical cells.

B. All electrochemical reactions involve the transfer of electrons

C. Reduction occurs at the cathode

D. All voltaic (galvanic) cells involve the use of electricity to initiate non-spontaneous chemical reactions.

Answer: D

36. The half-reaction that occurs at the anode' during the electrolysis of molten sodium bromide is

A. $2Br^{-1} \rightarrow Br_2 + 2e^{-1}$

B. $Br_2 + 2e^{-1} \rightarrow 2Br^{-1}$

C. $Na^{+1} + e^{-1} \rightarrow Na$

D. $Na \rightarrow Na^{2+} + e^{-1}$

Answer: A

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37. State whether the statement is true or false- Formation of chutney is an reversible change.

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38. How long (in hours) must a current of 5.0 amperes be maintained to electroplate 60g of calcium from molten $CaCl_2$?

  A. 27.2 hours

  B. 8.03 hours

  C. 11.02 hours

  D. 16.08 hours

Answer: D

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39. Which of the following is the strongest oxidizing agent?

  A. Pb^{2+}

  B. I_2

  C. Ag^+

D. Pb

Answer: C

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40. In a galvanic cell, which one of the following statements is not correct?

A. The zinc electrode is the anode

B. Electrons will flow through the external circuit from the zinc electrode to the silver electrode

C. Reduction occurs at the zinc electrode as the cell Sperates

D. The mass of the zinc electrode will decrease as the cell operates

Answer: C

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41. State whether the statement is true or false- Cutting of wood is a chemical change.

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42. State whether the statement is true or false- The process of photosynthesis is an reversible process.

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43. state whether the statement is true or false- Burning of coal is a reversible process.

▶ Watch Video Solution

44. State whether the statement is true or false- Shedding of leaves is a reversible process.

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45. State whether the statement is true or false- Process of respiration is an irreversible change.

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46. State whether the statement is true or false- Cooking of food is a reversible change.

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47. Out of the following which are animal products? Carrot, spinach, butter, ghee, cauliflower, paneer.

48. When does the potential of the electrochemical cell become zero?

A. E_{OX} of anode and E_{red} of cathode become equal

B. E^0_{red} of anode and E^0_{red} of cathode become equal

C. E_{red} of anode and E_{red} of cathode become equal

D. Concentration of both the half cell become same

Answer: C

49. Dear is a _____ because it only feeds on plants.

50. Which of the following cell is different?

    A. Daniel cell

    B. Lead storage cell

    C. Leclanche cell

    D. Electrolytic cell

Answer: D

51. Cell potential of the cell does not depend upon

    A. Temperature

    B. Concentration of the solution of salt bridge

C. Concentration of the solution related with cell reaction

D. Nature of electrodes

Answer: B

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52. What is the specific, more scientifice name for a battery?

A. electrolytic cells

B. Electro chemical cells

C. Primary cells

D. Secondary cells

Answer: B

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53. Balance the chemical equation : KNO3 → KNO2 + O2

54. The branch of chemistry which deals with the relationship between electrical energy and chemical changes taking place in a redox reaction is called.

A. electrolytic cells

B. Electrochemistry

C. Electrolysis

D. None of these

Answer: B

55. On increasing the temperature, metallic conduction goes on

A. Increasing

B. Remain constant

C. Decreasing

D. First increases then decreases

Answer: C

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56. The relation among conductance (G), specific conductance (K) and cell constant (l/A) is :

A. cell Constant = Conductance $\times$ Specific Conductance

B. Conductance = Cell constant $\times$ Specific conductance

C. Specific Conductance = Conductance $\times$ cell Constant

D. Cell Constant = Conductance /Specific Conductance

Answer: C

57. In the operation of a galvanic cell at one of its electrons oxidation takes place. What is the name of this electrode and what is its polarity ?

A. Oxidation takes place at cathode and has -ve polarity

B. Oxidation takes place at anode and has -ve polarity

C. Oxidation takes place at cathode and has +ve polarity

D. Oxidation takes place at anode and has +ve polarity

Answer: B

58. Consider the following reactions:

$$Zn(s) + cu^{2+}(aq) \rightarrow Zn^{2+}(aq) + Cu(s)$$
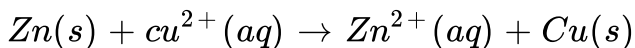
With reference to the above reaction which one of the following is correct statement:

    A. Zn is reduced to Zn^{2+} ions

    B. Zn is oxidized to Zn^{2+} ions

    C. Cu^{2+} ions oxidized to Cu

    D. Zn^{2+} ions are oxidized to Zn

Answer: B

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59. Which of the following solution of KCl will have the maximum value of specific conductance?

A. 1.0N

B. 0.1N

C. $1.0 \times 10^{-2} N$

D. 0.5N

Answer: A

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60. It is possible to determine the potential of single electrode

A. Yes

B. No

C. May be sometime

D. None of these

Answer: B

61. Which allotrope of carbon is used in making electrodes ?

A. Graphite

B. Diamond

C. Fullerenes

D. None of these

Answer: A

62. Choose the correct relation between standard free energy change

and standard cell potential

A. $\Delta G^{\circ} = nFE^{\circ}_{cell}$

B. $\Delta G^\circ = \dfrac{nF}{E_{cell}^\circ}$

C. $\Delta G^\circ = -nFE_{cell}^\circ$

D. $E_{cell}^\circ = -nFG^\circ$

Answer: C

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63. Balance the chemical equation : NH3 + O2 → N2 + H2O

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64. Balance the chemical equation : NaOH + HCl → NaCl + H2O

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65. Balance the chemical equation : Al(OH)3 + H2SO4 → Al2(SO4)3 + H2O

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66. Balance the chemical equation : Zn + HCl → ZnCl2 + H2

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67. Balance the chemical equation : K + H2O → KOH + H2

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68. Balance the chemical equation : Ca(OH)2 + CO2 → CaCO3 + H2O

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69. Balance the chemical equation : HNO_3 + $Ca(OH)_2$ → $Ca(NO_3)_2$ + H_2O

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70. Balance the chemical equation : $Al_2(SO_4)_3$ + $NaOH$ → $Al(OH)_3$ + Na_2SO_4

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71. Balance the following equation : Ca + H_2O → $Ca(OH)_2$ + H_2

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72. Balance the following equation : SO_2 + O_2 → SO_3

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73. Suppose un-insulated copper wires are used for flow of electricity from pole to pole in street. We expect better flow of electricity in

A. winter

B. summer

C. no effect of weather

D. None of these

Answer: A

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74. If a solution has a resistance of 25Ω, its conductance is

A. 0.04 mho

B. $1/25\Omega^{-1}$

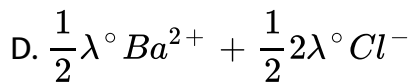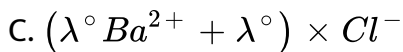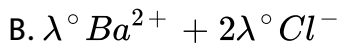C. 1/25 Siemens

D. all of the above

Answer: D

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75. Balance the following equation : CS2 + O2 → CO2 + SO2

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76. Which of the following expression correctly represents the molar conductivity of $BaCl_2$ at infinite dilution given that $\lambda^\circ Ba^{2+}$ and $\lambda^\circ Cl^-$ are the molar conductivity at infinite dilution of respective ions?

A. $2\lambda^\circ Ba^{2+} + \lambda^\circ Cl^-$

B. $\lambda° Ba^{2+} + 2\lambda° Cl^-$

C. $(\lambda° Ba^{2+} + \lambda°) \times Cl^-$

D. $\dfrac{1}{2}\lambda° Ba^{2+} + \dfrac{1}{2}2\lambda° Cl^-$

Answer: B

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77. In the electrolytic cell flow of e^- is from

A. cathode to anode in sol

B. cathode to anode through external supply

C. cathode to anode through internal supply
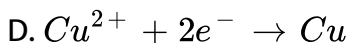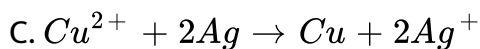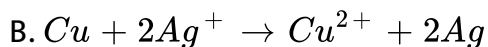
D. anode to cathode through internal

Answer: B

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78. For an electrochemical cell $Cu/Cu^{2+}(XM) \mid \mid Ag^+(Ym)/Ag.$

The cell reaction is

    A. Reaction cannot be predicted

    B. $Cu + 2Ag^+ \rightarrow Cu^{2+} + 2Ag$

    C. $Cu^{2+} + 2Ag \rightarrow Cu + 2Ag^+$

    D. $Cu^{2+} + 2e^- \rightarrow Cu$

Answer: B

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79. Balance the following equation : Al + Fe2O3 → Al2O3 + Fe

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80. Balance the following equation : $P_4 + O_2 \rightarrow P_2O_5$

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81. Balance the following equation : $H_2S + O_2 \rightarrow H_2O + SO_2$

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82. Balance the following equation : $Pb(NO_3)_2 + KI \rightarrow PbI_2 + KNO_3$

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83. Iron pipes are usually coated with zinc to prevent rusting of iron pipes because

A. zinc is less electropositive than iron

B. zinc is more electropositive than iron

C. Iron is oxidized in preference to iron
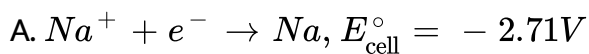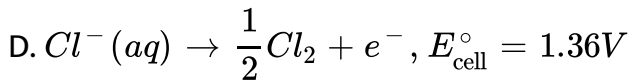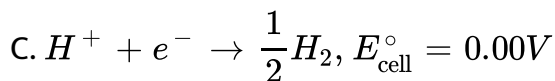
D. None of the above

Answer: B

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84. Balance the following equation : CuSO4 + NaOH → Cu(OH)2 + Na2SO4

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85. In the electrolysis of aq. NaCl solution which half-cell reaction will occurs at anode

A. $Na^+ + e^- \rightarrow Na, E^\circ_{cell} = -2.71V$

B. $2H_2O(l) \rightarrow O_2(g) + 4H^+ + 4e^-$, $E^\circ_{cell} = 1.23V$

C. $H^+ + e^- \rightarrow \dfrac{1}{2}H_2$, $E^\circ_{cell} = 0.00V$

D. $Cl^-(aq) \rightarrow \dfrac{1}{2}Cl_2 + e^-$, $E^\circ_{cell} = 1.36V$

Answer: D

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86. Balance the following equation : C6H12O6 + O2 → CO2 + H2O

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87. What will happen when ammonia reacts with hydrogen chloride ?

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88. Write a reaction when calcium oxide is treated with water.

A.

B.

C.

D.

Answer: C

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89. Write a reaction when ferrous sulphate is heated .

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90. What will happen when carbon dioxide is passed through calcium

hydroxide.

A.

B.

C.

D.

Answer: D

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91. What will happen when lead nitrate is heated .

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92. Write a reaction when electric currrent is passed through

aluminium oxide .

▶ **Watch Video Solution**

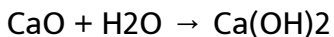**93.** Write a reaction when silver chloride exposed to light.

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94. What type of reactions are represented by following equation :

$CaCO3 \rightarrow CaO + CO2$

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95. What type of reactions are represented by following equation :

$CaO + H2O \rightarrow Ca(OH)2$

> ▶ **Watch Video Solution**

96. Find the charge in coulombs on 1g ion of N^{-3}

A. 2.89×10^5

B. 2.10×10^3

C. 2.69×10^{-5}

D. 2.59×10^{-4}

Answer: A

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97. What type of reactions are represented by following equation :

2FeSO4 → Fe2O3 + SO2 + SO3

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98. Fill in the blanks

The process of deposting a layer of any desired metal on another material, by means of electricity is called............. .

A. Electrolysis

B. Electroplating

C. Carbon plating

D. None of above

Answer: B

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99. What is electroplating?

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100. In a dry cell, the anode is made up of

A. zinc

B. calcium

C. sodium

D. graphite

Answer: A

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101. For one mole of electrolyte which of the following increases with dilution?

A. Conductivity

B. Specific conductance

C. Molar Conductance

D. None of these

Answer: A

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102. Which of the following carboxylic acids has the highest boiling point ?

A. I_2

B. Br_2

C. F_2

D. Cl_2

Answer: C

103. Corrosion can be prevented by

A. Alloying

B. Tinning

C. Galvanizing

D. all of above

Answer: D

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1. what are conductors?

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2. what are insulators?

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3. What are metallic conductors ?

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4. What is a strong electrolyte?

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5. What is weak electrolyte?

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6. What is degree of dissociation of association ?

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7. State and explain Ohm's law?

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8. Write down the units of resistance, resistivity, conductance and conductivity?

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9. Define conductance and conductivity?

▶ Watch Video Solution

10. Define molar conductivity or molar conductance?

▶ Watch Video Solution

11. What is relation between conductivity and molar conductivity ?

▶ Watch Video Solution

12. What is cell constant? Give its units..

▶ Watch Video Solution

13. What are electrochemical cells? Name the two types of electrochemical cells.

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14. In a galvanic cell,

▶ Watch Video Solution

15. What is an electrolytic cell ?

▶ Watch Video Solution

16. What is electromotive force of a cell?

▶ Watch Video Solution

17. What is cell constant? Give its units..

▶ Watch Video Solution

18. What are primary cells ? Give two examples.

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19. What is secondary cells?

20. Define corrosion of metals?

21. What is chemical rust?

22. What are fuel cells ? Discuss $H_2 - O_2$ fuel cell. List some advantages of fuel cells over other cells.

1. Define electrochemical cell and electrolytic cell.

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2. Write down the anode, cathode, uses and reactions of dry cell?

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3. Give the cathode, anode, electrolyte and electrode reactions of mercury cell.

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4. Explain Lead Storage cells?

▶ Watch Video Solution

5. Explain the working of nickel-cadmium storage cell.

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6. What are fuel cells ? Give example.

▶ **Watch Video Solution**

7. What is corrosion?

▶ **Watch Video Solution**

8. Explain the effect of more electropositive metal towards the rusting iron.

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9. Find the charge in coulombs on 1g ion of N^{-3}

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10. What is mean by galvanization?

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11. Why we can't use AC in electrolyte cells?

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12. Explain the variation in molar conductivity of weak electrolyte with concentration.

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13. What is the difference between e.m.f. and potential diffrence?

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14. Explain SHE cell?

▶ Watch Video Solution

15. Describe the construction of standard hydrogen electrode.

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Numbericals Practice

1. Give cell is $[Ni|Ni^{2+}||Cu^{2+}|Cu]$
$\quad\quad\quad\quad\quad$ (0.01m) (0.1m)

$E_{cell} = 0.59V$

Write Nernst equation and find $E^{\circ}_{N_i^{2+}/N_l}$ of cell. (At anode)

$E^{\circ}_{Cu^{2+}/Cu} = 0.39V$

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2. A cell raction is $n(s) \mid Sn^{2+}_{(0.50M)}/H^{+}_{(0.020M)}/H_2(g)$. Calculate E_{cell} of a reaction and also write Nernst equation.

Given: $E^{\circ}(sin^{2+}|Sn) = -0.14V$ and $E^{\circ}(H^{1+}|H) = 0.00V$

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3. Calculate the maximum work that can be obtained from the Daniell cells: $Zn|Zn^{2+}(aq)||Cu^{2+}(aq)|Cu$ Given E^(c-)._((Zn^(2+)|Zn))=-0.76V and E^(c-)._((Cu^(2+)|Cu))=0.34V

4. The resistance of a 0.5 M solution of an electrolyte in a conductivity 'cell was found to be 25 ohm. Calculate the molar conductivity of the solution, if the electrodes in the cell are 1.6 cm apart and have an area of $3 \cdot 2cm^2$.

5. The resistance of a 0.5 M solution of an electrolyte enclosed between two platinum electrodes 1.5 cm apart and having an area of $2 \cdot 0cm^3$ was found to be 30 ohm. Calculate the molar conductivity of the electrolyte.

6. A solution of $CuSO_4$ is electrolysed for 10 minutes with a current of 1.5 amperes. What is the mass of copper deposited at the cathode?

7. Can Chlorine gas be stored in Copper Cylinder ? Given $E^{\circ}_{Cu^+/Cu} = 0.34V$ and $E^{\circ}_{Cl_2/Cl} = 1.36V$

8. State and explain Kohlrausch's law. How would you determine the molar conductance of a weak electrolyte at infinite dilution?

9. Write Nernst equation and calculate the e.m.f. of the following cell at 298 K:

$$Cu(s)\big|Cu^{2+}(0.130M)\big|\big|Ag^{+}(1.0 \times 10^{-4}M)\big|Ag(s)$$
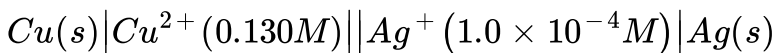
Given that: $E^{\circ}_{Cu^{2+}/Cu} = +0.34V$ and $E^{\circ}_{Ag^{+}/Ag} = +0.80V$

(log 0.130=-1.1139).

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10. Write Nernst equation and calculate e.m.f. of the cell at 298 k.

$$Mg(s)\big|Mg^{2+}(0.001M)\big|\big|Cu^{2+}(0.0001M)\big|Cu(s)$$

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11. Write Nernst equation and calculate the e.m.f of the following cell at 298 K:

$$Zn\big|Zn^{2+}(0.01M)\big|\big|Fe^{2+}(0.005M)\big|Fe$$

Given that:

$$\left(Zn^{2+} / Zn\right) = -0.763V \text{ and } E^\circ_{Fe^{2+} / Fe} = -0.44V \quad \log 2 = 0.3010$$

.

12. Calculate the standard Gibbs energy for the cell :

$$Zn(s) + Zn^{2+}(aq) \mid \left|Cu^{2+}(aq)\right|Cu(s)$$
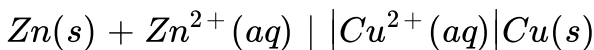
$$E_{(Zn^{2+} / Zn)}^\circ = -0.76V, E^\circ_{(Cu^{2+} / Cu)} = 0.34V, F = 96500C.$$

13. Calculate the standard Gibbs energy for the cell :

$$Zn(s)\left|Zn^{2+}(aq)\right|\left|Sn^{2+}(aq)\right|Sn(s)$$
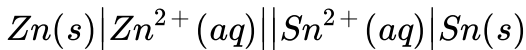
$$E^\circ_{(Zn^{2+} / Zn)} = -0.76V, E^\circ_{(Sn^{2+} / Sn)} = -0.16V, F = 96500C.$$

14. Calculate the standard Gibbs energy for the cell :

$$Zn(s)\big|Zn^{2+}(aq)\big|\big|Cd^{2+}(aq)\big|Cd(s)$$
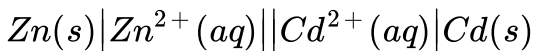
$$E^\circ_{(Zn^{2+}\,/\,Zn)} = -0.76V,\ E^\circ_{(Cd^{2+}\,/\,Cd)} = -0.403V,\ F = 96500C.$$

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15. The λ° values of KNO_3 and $LiNO_3$ are 145.0 and 110.1 S cm^2mol^{-1} respectively. The λ° value of K^+ ion is 73.5S cm^2mol^{-1}. Calculate $\lambda^\circ\left(Li^+\right)$.

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16. Write Nernst equation and calculate the e.m.f of the following cell at 298 K:
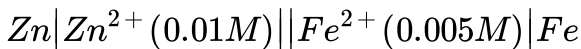
$$Zn\big|Zn^{2+}(0.01M)\big|\big|Fe^{2+}(0.005M)\big|Fe$$

Given that:

$$\left(Zn^{2+} / Zn\right) = -0.763V \text{ and } E^\circ_{Fe^{2+} / Fe} = -0.44V \quad \log 2 = 0.3010$$

.

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17. The λ° values of KCl and KNO_3 are 149.9 and 144.9 S $cm^2 mol^{-1}$ respectively. Also λ° for Cl^- is 71.44 S $cm^2 mol^{-1}$.The λ° value of NO_3^- ion.

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18. The λ° values of NaCl and $NanO_3$ are 126.5 and 121.6S $cm^2 mol^{-1}$ respectively. The λ° value of NO_3^- ion is 76.3 S $cm^2 mol^{-1}$ calculate $\lambda^\circ \left(Cl^-\right)$.

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19. The calculate the e.mf. Of the following cell at 298:

$$Fe|Fe^{2+}(0.1M)||Ag^{2+}(0.1M)|Ag$$
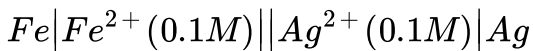
$$E^\circ_{(Fe^{2+}/Fe)} = -0.44V, E^\circ_{(Ag^+/Ag)} = 0.80V.$$

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20. Can we store copper sulphate solution in an iron vessel ?

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21. Write the Nernst equation and calculate e.m.f of following cell at 298K.
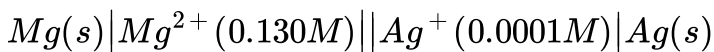
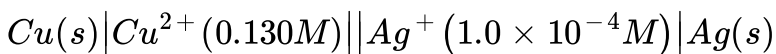$$Mg(s)|Mg^{2+}(0.130M)||Ag^+(0.0001M)|Ag(s) \qquad \text{Given}$$

$$E^\circ_{Mg^{2+}/Mg} = -2.37V, E^\circ_{Ag^+/Ag} = 0.80V. \text{(log 1.3=0.1130)}$$

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22. Is it safe to stir 1M $AgNO_3$ solution with copper spoon.

23. Write Nernst equation and calculate the e.m.f. of the following cell

at 298 K:

$$Cu(s)\big|Cu^{2+}\,(0.130M)\big|\big|Ag^{+}\,(1.0 \times 10^{-4}M)\big|Ag(s)$$

Given that: $E^{\circ}_{Cu^{2+}\,/\,Cu} = +0.34V$ and $E^{\circ}_{Ag^{+}\,/\,Ag} = +0.80V$

(log 0.130=-1.1139).

24. Can you store copper sulphate solutions in a zinc pot?

25. Write Nernst equation and calculate e.m.f. of the cell at 298 k.

$$Mg(s)\big|Mg^{2+}(0.001M)\big|\big|Cu^{2+}(0.0001M)\big|Cu(s)$$

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26. Write Nernst equation and calculate the e.m.f of the following cell at 298 K:

$$Zn\big|Zn^{2+}(0.01M)\big|\big|Fe^{2+}(0.005M)\big|Fe$$

Given that:

$$\left(Zn^{2+}/Zn\right) = -0.763V \text{ and } E^{\circ}_{Fe^{2+}/Fe} = -0.44V \quad \log 2 = 0.3010$$

.
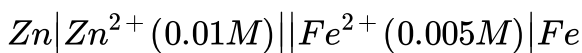
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27. Calculate the e.m.f. of the cell at $25^{\circ}C$

$$Cr\big|Cr^{3+}(0.1M)\big|\big|Fe^{2+}(0.01M)\big|Fe$$
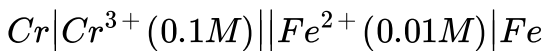
Given $E^{\circ}_{(Cr^{2+}/Cr)} = -0.75V, E^{\circ}_{(Fe^{2+}/Fe)} = -0.44$

28. Calculate the cell e.m.f. and ΔG for the cell reaction at $25°C$ for the cell:
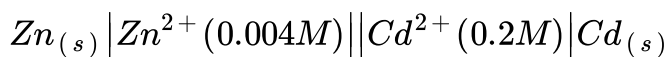
$$Zn_{(s)} \big| Zn^{2+}(0.004M) \big\| Cd^{2+}(0.2M) \big| Cd_{(s)}$$

$E°$ values at $25°C$, $Zn^{2+}/Zn = -0.763V$

$Cd^{+2}/Cd = -0.403V$
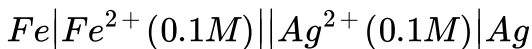
$F = 96,500, R = 8.314 JK^{-1}mole^{-1}.$

29. State whether the statement is true or false- Lion is a herbivorous animal because it feeds only on other animals.

30. The calculate the e.mf. Of the following cell at 298:

$$Fe|Fe^{2+}(0.1M)||Ag^{2+}(0.1M)|Ag$$

$$E^\circ_{(Fe^{2+}/Fe)} = -0.44V, \; E^\circ_{(Ag^+/Ag)} = 0.80V.$$

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31. Write Nernst equation and calculate e.m.f. of the cell at 298 k.

$$Mg(s)|Mg^{2+}(0.001M)||Cu^{2+}(0.0001M)|Cu(s)$$

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32. Write the Nernst equation and calculate the e.m.f. of the following cell at 298K.

$$Sn_{(s)}|Sn^{2+}_{(0.050M)}||H^+(0.020M)|H_2(1atm/Pt)$$
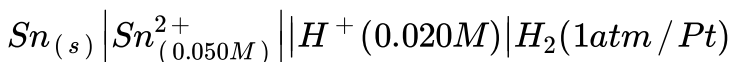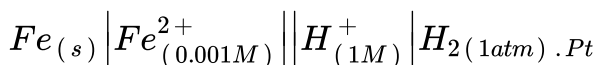
Given $E^\circ_{Sn/Sn^{2+}} = -0.14V$

$$EMF = \left(E^\circ_{H^+/1/2H_2} - E^\circ_{Sn^{2+}/Sn}\right) - \frac{0.0591V}{2}\log\frac{[Sn^{2+}]}{[H^+]^2}.$$
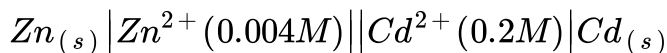
33. Write The Nernst equation and calculate the e.m.f. of the following cell at 298K.

$$Fe_{(s)} \left| Fe^{2+}_{(0.001M)} \right| \left| H^{+}_{(1M)} \right| H_{2(1atm)} . Pt$$

Given $E^{\circ}_{Fe^{2+}/Fe} = -0.44V$

34. Calculate the cell e.m.f. and ΔG for the cell reaction at $25°C$ for the cell:

$$Zn_{(s)} \left| Zn^{2+}(0.004M) \right| \left| Cd^{2+}(0.2M) \right| Cd_{(s)}$$

E° values at $25°C$, $Zn^{2+}/Zn = -0.763V$

$Cd^{+2}/Cd = -0.403V$

$F = 96,500, R = 8.314JK^{-1}mole^{-1}$.

35. Calculate ΔG and E_{cell} for the cell:

$AI/AI^{3+}(0.01M) \mid \mid Fe^{2+}(0.02M)/Fe$ given that

$E^\circ\left(Al^{3+}/Al\right) = -1.66V$ and $E^\circ\left(Fe^{2+}/Fe\right) = -0.44V$

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36. The resistance of 0.5N solution of an electrolyte ina conductivity cell was found to be 25Ω. Calculate the equivalent conductivity of the solution if the electrodes in the cell are 1.6cm apart & having an area of cross section $3.2cm^2$

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37. Write Nernst equation and calculate the e.m.f of the following cell at 298 K:
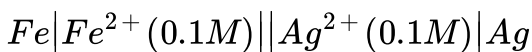
$Zn\left|Zn^{2+}(0.01M)\right|\left|Fe^{2+}(0.005M)\right|Fe$

Given that:

$$\left(Zn^{2+} / Zn\right) = -0.763V \text{ and } E^{\circ}_{Fe^{2+} / Fe} = -0.44V \quad \log 2 = 0.3010$$

.

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38. The calculate the e.mf. Of the following cell at 298:

$$Fe|Fe^{2+}(0.1M)||Ag^{2+}(0.1M)|Ag$$

$$E^{\circ}_{(Fe^{2+} / Fe)} = -0.44V, E^{\circ}_{(Ag^+ / Ag)} = 0.80V.$$

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39. Calculate the e.m.f. of the cell at $25°C$

$$Cr|Cr^{3+}(0.1M)||Fe^{2+}(0.01M)|Fe$$
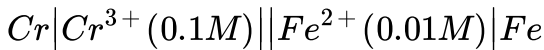
Given $E^{\circ}_{(Cr^{2+} / Cr)} = -0.75V, E^{\circ}_{(Fe^{2+} / Fe)} = -0.44$

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40. Write Nernst equation and find e.m.f of cell $Ni/Ni^{2+}_{(0.01M)}/Cu^{2+}_{(1M)}/Cu.$ Given
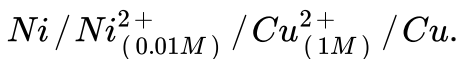
$E^{\circ}_{Cu^{2+}/Cu} = 0.34V, E^{\circ}_{Ni^{2+}/Ni} = -0.22V$

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41. Write Nernst equation and calculate e.m.f. of the cell at 298 k.

$Mg(s)|Mg^{2+}(0.001M)||Cu^{2+}(0.0001M)|Cu(s)$

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42. Write Nernst equation and calculate the e.m.f. of the following cell at 298 K:

$Cu(s)|Cu^{2+}(0.130M)||Ag^{+}(1.0 \times 10^{-4}M)|Ag(s)$
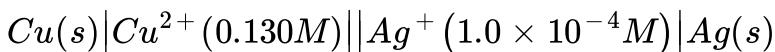
Given that: $E^{\circ}_{Cu^{2+}/Cu} = +0.34V$ and $E^{\circ}_{Ag^{+}/Ag} = +0.80V$

(log 0.130=-1.1139).

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43. Calculate the cell e.m.f for reaction.

$Zn_{(s)} / Zn^{2+}_{(0.0004M)} / Cd^{2+}_{(0.2M)} / Cd_{(s)}$. Given
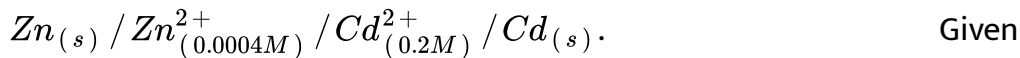
$E°_{Zn^{2+}/Zn} = -0.763V, E°_{Cd^{2+}/Cd} = -0.403V$

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44. Calculate ΔG and E_{cell} for the cell:

$AI / AI^{3+}(0.01M) \mid \mid Fe^{2+}(0.02M) / Fe$ given that

$E°(Al^{3+}/Al) = -1.66V$ and $E°(Fe^{2+}/Fe) = -0.44V$

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