CHEMISTRY

BOOKS - NIKITA CHEMISTRY (HINGLISH)

ELECTROCHEMISTRY

MCQs

1. The effect of temperature increase on conduction as -

A. Metallic conduction increase , electrolytic conduction decrease.

B. Electrolytic conduction increase , metallic conduction decrease.

C. Both metallic and electrolytic conduction decreases .

D. Both metallic and electrolytic conduction decreases .

Answer: B

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2. Which of the following solutions has the highest equivalent conductance?

A. 0.1 M NaCl

B. 0.050 M NaCl

C. 0.005 M NaCl

D. 0.02 M NaCl

Answer: C

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3. The units of equivalent conductivity are

A. Ohm cm

B. Siemens (S)

C. $Ohm^{-1}cm^2$

D. $Ohm^{-1}cm^{-2}$

Answer: C

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4. Which of the following is an insulator ?

A. Graphite

B. Aluminium

C. Diamond

D. Silicon

Answer: C

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5. The equivalent conductance at infinite dilution of a weak acid such as HF

A. can be determined by extrapolation of measurement on dilute solutions of HCl , HBr and HI

B. can be determined by measurement on very dilute HF solutions

C. can best be determined from measurement on dilute solutions of NaF , NaCl and HCl

D. is an underfined quantity .

Answer: C

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6. According of Kohlrausch law, the limiting value of molar conductivity of an electrolyte A_2B is

A. $\lambda^{\circ}(A^{+})+\lambda^{\circ}(B^{-})$

B. $\lambda^{\circ}(A^{+})-\lambda^{\circ}(B^{-})$

C. $2\lambda^{\circ}(A^{+})+\frac{1}{2}\lambda^{\circ}(B^{-})$

D. $2\lambda^{\circ}(A^{+})+\lambda^{\circ}(B^{-})$

Answer: D

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7. The increase in the molar conductivity of acetic acid with dilution is due to

A. decrease in interionic forces

B. increase in degree of ionisation

C. increase in self ionisation of water

D. none of these

Answer: B

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8. Electrolytic conduction differs from metallic conduction in the fact in the case of electrolytic conduction

A. the resistance increases with increasing temperature

B. the reistance decreases with increasing temperature

C. the flow of current does not generate heat

D. the resistance is independent of the length of the conductor .

Answer: B

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9. The units of conductivity of the solution are

A. Ohm cm

B. Siemens (S)

C. S cm

D. S cm^{-1}

Answer: D

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10. The cell constant is the product of resistance and

A. conductance

B. molar conductance

C. specific conductance

D. specific resistance

Answer: C

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11. Solubility of a sparingly soluble salt S , specific conductance K , and the equivalent conductance Λ_0 are related as

A. $S = \frac{1000\Lambda_0}{K}$

B. $S = K\Lambda_0$

C. $S = \frac{K}{1000\Lambda_0}$

D. $S = \frac{1000K}{\Lambda_0}$

Answer: D

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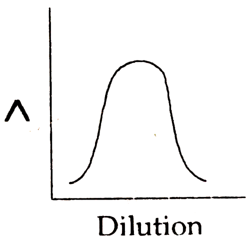
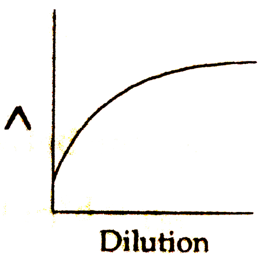
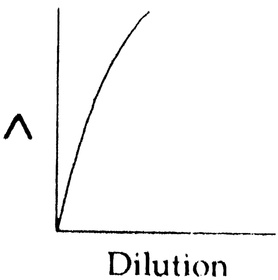
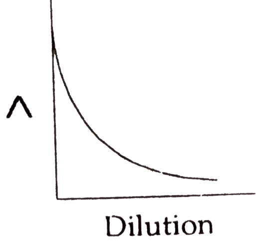
12. Which of the following plots represents correctly variation of equivalent conductance (Λ) with dilution for a strong electrolyte ?

A. 

B. 

C. 

D. 

Answer: B

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13. The increase in the molar conductivity of HCl with dilution is due to

A. increase in the self ionisation of water

B. hydrolysis of HCl

C. decrease in the self ionisation of water

D. decrease in the interionic forces .

Answer: D

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14. The conductance of 0.1 M HCl solution is greater than that of 0.1 M NaCL This is because (

A. HCl is more ionized than NaCl

B. HCl is an acid where as NaCl solution is neutral

C. H^{+} ions have greater mobility than Na^{+} ions

D. Interionic forces in HCl are weaker than those of NaCl.

Answer: C

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15. Which one of the following solution will have highest conductivity .

A. $0.1MCH_3COOH$

B. $0.1MNaCl$

C. $0.1MKNO_3$

D. $0.1MHCl$

Answer: D

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16. $\Omega^{-1}m^{-1}$ is the unit of

A. Molar conductivity

B. Specific conductivity

C. Equivalent conductivity

D. Molar conductivity at infinite dilution .

Answer: B

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17. The incorrect statement is

A. Specific conductivity decreases with dilution

B. Equivalent and molar conductivity increase with dilution

C. Λ_{∞} for a weak electrolyte cannot be found by extrapolation of the graph between Λ and concentration of zero concentration

D. Molar conductivity of a strong electrolyte increase with dilution because ionization increases with dilution .

Answer: D

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18. Which one of the following does not represent cell constant correctly ?

A. It is the ratio of specific conductance to observed conductance

B. It is the ratio of distance between the electrodes to the area of cross-section of the electrode

C. It is the product of specific resistance and observed resistance

D. It is the product of conductivity and observed resistance .

Answer: C

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19. Wrong about molar conductivity is

A. The solution contains Avogadro's number of molecules of the electrolyte

B. It is the product of specific conductivity and volume of solution in cc containing 1 mole of the electrolyte

C. Its units are $ohm^{-1}cm^2mol^{-1}$

D. `Its value for 1 MNaCl solution is same as that of 1 M glucose solution .

Answer: D

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20. A conductivity cell is platinized to

A. to prolong its life

B. to avoid polarisation effect

C. to avoid capacitance of the cell

D. to avoid temperature effect .

Answer: B

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21. Which one of the following statements is wrong ?

A. K^+ has different molar ionic conductivity at infinite dilution in KCl and KBr

B. Λ° for $BaCl_2 = \Lambda^\circ\left(Ba^{2+}\right) + 2\lambda^\circ m\left(Cl^-\right)$

C. Degree of dissociation , $\alpha = \dfrac{\Lambda_c}{\Lambda_0}$

D. Kohlrausch law can be used for finding Λ_0 for weak electrolytes .

Answer: A

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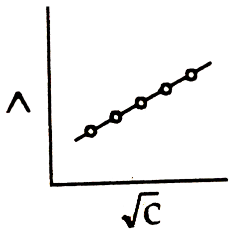
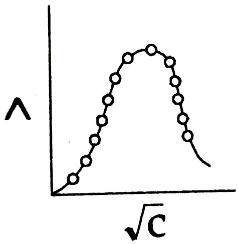
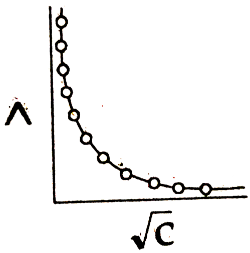
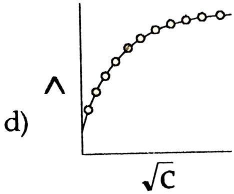
22. The variation of $\wedge_m$ of acetic acid with concentration is correctly represented by

A. 

B. 

C. 

D. 

Answer: C

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23. In terms of SI base units , ohm stands for

A. $\left(kgm^2\right) / (As)$

B. $\left(kgm^2\right) / \left(A^2s^2\right)$

C. $\left(kgm^2\right) / \left(A^2s^2\right)$

D. $\left(kgm^2\right) / \left(A^2s^3\right)$

Answer: D

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24. The degree of ionization increases

A. with increase in concentration of the solution

B. on addition of excess of water to the solution

C. on decreasing the temperature of the solution

D. on stirring the solution vigorousoly.

Answer: B

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25. The equivalent conductance is the conductance of a solution provided the following conditions are statisfied . Which one of the following is wrong ?

A. The solution should contain 1 g equivalent of the electrolyte

B. The distance between the electrodes should be 1 cm

C. The area of the electrodes should be so large that the solution should touch them completely

D. The volume of the solution should be very small.

Answer: D

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26. If x is the conduction of 1 cm^3 of the solution and C is the concentration of the solution . The molar conductivity of the solution is given by

A. $\frac{1000C}{x}$

B. $\frac{1000x}{N}$

C. $\frac{C}{x}$

D. $\frac{x}{C}$

Answer: B

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27. Which one of the following relationship is not correct ?

A. Specific conductance (K) = Observed conductance (C) $\times$ cell constant

B. Eq. conductance $(\Lambda) = \frac{k \times 1000}{\text{Normality}}$

C. Degree of dissociation $|(\alpha)| = \frac{\Lambda_0}{\Lambda_c}$

D. $E^{\circ}_{\text{cell}} = \frac{0.0591}{n} \log K_c$ at 298 K

Answer: C

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28. Which of the following statements is correct ?

A. Oxidation number of oxygen in K_2O is + 1

B. The specific conductance of an electrolyte solution decreases with increase in dilution

C. Sn^{2+} oxidises Fe^{3+}

D. $Zn \mid ZnSO_4$ is reference electrode .

Answer: B

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29. ELECTROCHEMICAL CELL

A. chemical energy to electrical energy

B. electrical energy to chemical energy

C. chemical energy to mechanical energy

D. electrical energy to mechanical energy .

Answer: B

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30. When the same electric current is passed through the solution of different electrolytes in series, the amounts of elements deposited on the electrodes are in the ratio of their

A. densities

B. electrochemical equivalents

C. atomic masses

D. atomic numbers .

Answer: B

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31. In which one of the following one faraday of electricity will liberate 1/2 gram -atom of the metal?

A. $AlCl_3$

B. $FeCl_3$

C. $CuSO_4$

D. $NaCl$.

Answer: C

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32. What is the charge on one mole of electrons ?

A. 6.28×10^{18} coulomb

B. 1.6×10^{-19} coulomb

C. 9.65×10^{4} coulomb

D. None of the above .

Answer: C

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33. On passing C ampere of electricity through an electrolyte solution for l secodns, m gram metal deposits on cathode. The eq. wt. of metal is

A. $E = \dfrac{C \times t}{m \times 96500}$

B. $E = \dfrac{C \times m}{t \times 96500}$

C. $E = \dfrac{96500 \times m}{C \times t}$

D. $E = \dfrac{C \times t \times 96500}{m}$

Answer: C

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34. During electrolysis of a concentrated aqueous solution of NaCl , what is the product at anode ?

A. Na

B. Cl_2

C. O_2

D. H_2.

Answer: B

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35. Which of the following involves electrochemnical phenomenon?

A. Manufacture of aluminium from bauxite

B. Manufacture of caustic soda by Castner- Kellner method

C. Sensory signals sent to the brain through cells

D. All the three above

Answer: D

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36. One faraday of electricicy is passed through aqueous solution of sodium chloride. It produces

A. one mole of oxygen at anode

B. 1 gm of hydrogen at cathode

C. neither hydrogen nor oxygen is produced

D. sodium is deposited at cathode in equivalent proportion.

Answer: B

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37. One coulomb is equal to

A. 96500 Faraday

B. charge on 6.24×10^{18} electrons

C. charge on 1 electron

D. None of the above .

Answer: B

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38. During the electrolysis of fused $NaCl$, which reaction occurs at anode ?

A. Chloride ions are oxidised

B. Chloride ions are reduced

C. Sodium ions are oxidised

D. Sodium ions are reduced .

Answer: A

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39. In electroplating, the article to be electoplated serves as:

A. cathode

B. anode

C. either cathode or anode

D. simply suspended in the electrolytic bath .

Answer: A

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40. On electrolysis of a solution of dilute H_2SO_4 between platinum electrodes , the gas evolved at the anoe is

A. SO_2

B. SO_3

C. O_2

D. H_2.

Answer: C

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41. The unit of electrochemical equivalent is

A. gram/ampere

B. gram/coulomb

C. gram-ampere

D. coulomb/gram

Answer: B

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42. In the electroplating of silver over an article made of iron , the electrolyte generally used is

A. $AgNO_3$

B. $AgCl$

C. Ag_2SO_4

D. $Na[Ag(CN)_2]$

Answer: D

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43. By virtue of Faraday's second law of electrolysis, the electrochemical equivalent of the two metals liberated at the electrodes has the same ratio as that of their

A. atomic masses

B. molecular masses

C. equivalent masses

D. any of the three .

Answer: C

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44. Three faradays of electricity are passed through molten Al_2O_3 aqueous solution of $CuSO_4$ and molten $NaCl$ taken in deffernt electrolytic cells. The amout of Al, Cu and Na deposited at the cathodes will be in the ration of .

A. 1 mol : 2 mol : 3 mol

B. 3 mol : 2 mol : 1 mol

C. 1 mol : 1.5 mol : 3 mol

D. 1.5 mol : 2 mol : 3 mol

Answer: C

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45. The reaction taking place at the anode when a dilute aqueous solution of $CuSO_4$ is electrolysed using inert Pt electrodes.

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

B. $2SO_4^{2-} + 2H_2O \rightarrow 2H_2SO_4 + O_2 + 4e^{-}$

C. $2H_2O \rightarrow O_2 + 4H^{+} + 4e^{-}$

D. $SO_4^{2-} \rightarrow SO_2 + O_2 + 2e^{-}$

Answer: C

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46. Two platinum electrodes were immersed in a solution of $CuSO_4$ and electric current was passed through the solution. After some time, it was found that colour of $CuSO_4$ disappeared with evolution of gas at the electrode. The colourless solution contains.

A. Plantinum sulphate

B. Cuprous sulphate

C. Sulphuric acid

D. Copper hydroxide .

Answer: C

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47. The number of Faradays needed to reduce 4 gm equivalents of Cu^{2+} to Cu metal will be

A. 1

B. 2

C. $1/2$

D. 4

Answer: D

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48. When the electric current is passed through a cell having an electrolyte, the positive ions move towards cathode and negative ions toqards the anode. If the cathode is pulled out of the solution .

A. the positive and negative ions will move towards the anode

B. the positive ions will start moving towards the anode, the negative ions will stop moving

C. the negative ions will continue to move towards the anode , the positive ions will stop moving

D. the positive and negative ions will start moving randomly .

Answer: D

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49. During the electrolysis of aqueous sodium chloride the cathodic reaction is

A. Oxidation of Cl^{-} ion

B. Reduction of Na^{+} ion

C. Reduction of H_2O

D. Oxidation of H_2O

Answer: C

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50. Which one of the following reactions occurs at the anode on electrolysis of aq., solution of $CuCl_2$?

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

B. $2Cl^{-} \rightarrow Cl_2 + 2e^{-}$

C. $2H_2O \rightarrow O_2 + 4H^+ + 4e^-$

D. $4Cl^- + 2H_2O \rightarrow 4HCl + O_2 + 4e^-$

Answer: B

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51. When electrolysis of silver nitrate solution is carried out using silver electrodes, wich of the following reaction occurs at the anode?

A. $Ag \rightarrow Ag^+ + e^-$

B. $Ag^+ + e^- \rightarrow Ag$

C. $2H_2O \rightarrow 4H^+ + O_2 + 4e^-$

D. $4OH^- \rightarrow 2H_2 + O_2 + 4e^-$

Answer: A

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52. If same amount of electricity is passed through aqueous solutions of $AgNO_3$ and $CuSO_4$ and the number of Ag and Cu atoms deposited are'x' and 'y' respectively . Then

A. $x = y$

B. $x < y$

C. $y = 2x$

D. $x = 2y$

Answer: D

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53. The reaction taking place at the anode when a dilute aqueous solution of $CuSO_4$ is electrolysed using inert Pt electrodes.

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

B. $SO_4^{2-} \rightarrow SO_2 + O_2 + 2e^{-}$

C. $2SO_4^{2-} + 2H_2O \rightarrow 2H_2SO_4 + O_2 + 4e^{-}$

D. $2H_2O \rightarrow O_2 + 4H^{+} + O_2 + 4e^{-}$

Answer: A

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54. Electrolysis is the process in which electrical energy is converted to chemical energy. In electrolytic cell, oxidation takes place at anode and reduction at cathode. Electrode process depends on the electrode taken for electrolysis. Amount of substance liberated at an electrode is directly propertional to the amount of charge passed through it. The mass of substance liberated at electrode is calculated using the following relation :

$$m = \frac{\text{ItE}}{96500}$$

Here, E represents the equivalent mass and 96500 C is called the Faraday constant. Faraday (96500 C) is the charge of 1 mole electron, i.e., 6.023×10^{23} electrons, it is used to liberate one gram equivalent of the substance.

The passage of current liberates H_2 at cathode and Cl_2 at anode. The solution is :

A. Copper chloride in water

B. NaCl in water

C. Ferric chloride in water

D. $AuCl_3$ in water .

Answer: B

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55. Electrochemical equivalent of an element is

A. $\frac{\text{Atomic mass} \times \text{Valency}}{96500}$

B. $\frac{\text{Atomic mass} \times 96500}{\text{Valency}}$

C. $\frac{\text{Atomic mass}}{\text{Valency} \times 96500}$

D. $\frac{\text{Valency} \times 96500}{\text{Atomic mass}}$

Answer: C

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56. Of the following that cannot be obtained by electrolysis of the aqueous solution of their states is /are

A. Ag and Mg

B. Ag and Al

C. Mg and Al

D. Cu and Cr.

Answer: C

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57. NaOH is manufctured by the electrolysis of brine solution. The products of reaction are

A. $Cl_2 \text{ and } H_2$

B. $Cl_2 \text{ and } Na - Hg$

C. $Cl_2 \text{ and } Na$

D. $Cl_2 \text{ and } O_2$.

Answer: A

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58. In the electrolysis of an aqueous solution of NaF , the product obtained at the cathode and anode respectively are

A. Na, F_2

B. Na, O_2

C. H_2, O_2

D. H_2, F_2

Answer: C

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59. On electrolysis of a solution of dilute H_2SO_4 between platinum electrodes , the gas evolved at the anoe is

A. SO_2

B. O_2

C. SO_3

D. H_2.

Answer: B

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60. The amount of ion discharged during electrolysis is not directly proprtional to

A. resistance of solution

B. time

C. current strength

D. E.C.E. of the element

Answer: A

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61. When a lead storage battery is discharged:

A. SO_2 is evolved

B. lead is formed

C. lead sulphate is consumed

D. sulphuric acid is consumed

Answer: D

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62. During the electrolysis of fused $PbBr_2$ the reaction that occurs at the cathode is :

A. bromide ions are oxidized

B. bromide ions are reduced

C. lead ions are oxidized

D. lead ions are reduced

Answer: D

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63. Each of the three metals X , Y and Z were put in turn into aqueous solution of the other two .

X + Salt of Y (or Z) = Y (or Z) + Salt of X . Which observation is probably incorrect .

A. Y + salt of X = No action observed

B. Y + Salt of Z = Salt of Y

C. Z + Salt of X = X + Salt of Z

D. Z + Salt of Y = No action observed

Answer: C

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64. Molten sodium chloride conducts electricity due to the presence of:

A. free electrons

B. free molecules

C. free ions

D. atoms of Na and Cl

Answer: C

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65. Faraday's law of electrolysis is not applicable when

A. temperature is increased

B. inert electrodes are used

C. a mixture of electrolytes is used

D. in case of non electrolyte

Answer: D

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66. In the electrolysis of fused salt, the weight of the substance deposited on an electrode will not depend on:

A. temperature of the bath

B. current intensity

C. electrochemical equivalent of ions

D. time for electrolysis

Answer: A

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67. An electric current is passed through following aqueous solutions . Which one shall decompose

A. urea

B. glucose

C. silver nitrate

D. ethyl alcohol

Answer: C

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68. Among Na, Hg, S, Pt and graphite, which can be used as electrodes in electrolystic cells having aqueous solutions?

A. Na and S

B. Na, Hg and Pt

C. Na, Hg and S

D. Hg, Pt and graphite

Answer: D

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69. When the same electric current is passed through the solution of different electrolytes in series, the amounts of elements deposited on the electrodes are in the ratio of their

A. at.no

B. at.mass

C. sp.gravity

D. eq.mass

Answer: D

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70. In electrolysis , oxidation takes place at

A. anode

B. cathode

C. both at the anode as well as cathode

D. the surface of electrolyte solution

Answer: A

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71. Which loses charge at cathode

A. ions

B. cations

C. anions

D. both anions and cations

Answer: B

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72. In the electrolysis of $CuSO_4$, the reaction $Cu^{2+} + 2e^- \rightarrow Cu$, takes place at

A. anode

B. cathode

C. in solution

D. none

Answer: B

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73. 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. none

Answer: A

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74. Electrolytes when dissolved in water dissociate into ions because:

A. they are unstable

B. the water dissolves them

C. the forces of repulsion increases

D. the forces of electrostatic attraction are broken down by water

Answer: D

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75. The metal that cannot be produced on reduction of its oxide by aluminium is :-

A. K

B. Mn

C. Cr

D. Fe

Answer: A

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76. The best conductor of electricity is a 1M solution of

A. CH_3COOH

B. H_2SO_4

C. H_3PO_3

D. Boric acid

Answer: B

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77. If mercury is used as cathode in the electrolysis of NaCl solution, the ions discharged at cathode are

A. H^{+}

B. Na^{+}

C. OH^{-}

D. Cl^{-}

Answer: B

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78. When a copper wire is placed I a solution of $AgNO_3$, the solution acquires blue colour. This due to the formation of .

A. forms a soluble complex with $AgNO_3$

B. is oxidized to Cu^{++}

C. is reduced to Cu^{++}

D. splits up into atomic form and dissolves

Answer: B

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79. When an electric current is passed through an aqueous solution of sodium chloride

A. H_2 is evolved at the anode

B. Oxygen is evolved at the cathode

C. its pH progressively decreases

D. its pH progressively increases

Answer: D

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80. The electric charge required for electrode deposition of one gram-equivalent of a substance is :

A. 1 ampere per second

B. 96,500 coulomb per second

C. 1 ampere for 1 hour

D. charge on 1 mole of electron

Answer: D

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81. Electrolysis of aqueous HCl solution produces

A. H_2 gas at the anode

B. H_2 gas at the cathode

C. Cl_2 gas at the cathode

D. Cl_2 and O_2 gases both at the anode

Answer: A

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82. A solution of sodium chloride in water is electrolysed using inert electrodes . The solution is formed in vessel is

A. $NaOH$

B. H_2O

C. $NaCl$

D. HCl

Answer: A

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83. When an electrolytic solution conducts electricity , current is carried out by

A. electrons

B. cations and anions

C. neutral atoms

D. none

Answer: B

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84. In the electrolysis of which solution OH^- ions are discharged in preference to Cl^- ions?

A. dilute NaCl

B. very dilute NaCl

C. fused NaCl

D. solid NaCl

Answer: B

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85. Pure water does not conduct electricity because it :

A. neutral liquid

B. low boiling b.pt.liquid

C. almost non-ionised

D. none

Answer: C

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86. An aqueous solution of an electrolyte

A. conducts electricity without any chemical change

B. conducts electricity with chemical decomposition

C. is an insulator

D. all are correct

Answer: B

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87. Water is a non-electrolyte but conducts electricity on dissovling a small amount of

A. O_2

B. Sugar

C. Acetone

D. NaCl

Answer: D

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88. 01. ampere current is passed for 10 second through copper and silver voltameters . The metal that is deposited more is

A. Cu

B. Ag

C. both (a) and (b)

D. no effect

Answer: B

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89. One faraday is equal to

A. 96.5 $\text{coulomb equivalent}^{-1}$

B. 96.5×10^3 $\text{coulomb equivalent}^{-1}$

C. 96.5×10^{10} coulomb mol^{-1}

D. 96.5×10^{23} coulomb mol^{-1}

Answer: B

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90. More electropositive elements have

A. positive reduction potential

B. tendency to gain electrons

C. negative reduction potential

D. negative oxidation potential

Answer: C

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91. Faraday's laws hold good at

A. all pressures

B. only at 298 K

C. in different solvents

D. only at 1 atm pressure

Answer: A

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92. The number of faradays required to liberate 1 mole of any element indicates

A. weight of element

B. conductance of electrolyte

C. charge on the ion of that element

D. none

Answer: C

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93. Quantity of electricity is measured in

A. ampere sec

B. ampere

C. ampere $\sec^{-1}$

D. ampere^{-1} sec

Answer: A

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94. Faraday's first law of electrolysis can be expressed as

A. $W \alpha Q$

B. $W \alpha 1/Q$

C. $W \alpha Q^2$

D. $W \alpha Q^3$

Answer: A

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95. 1 faraday of electricity will liberate 1 gram atom of the metal from the solution of

A. $AuCl_3$

B. $AgNO_3$

C. $CaCl_2$

D. $CuSO_4$

Answer: B

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96. In an galvanic cell , the electrons flow

A. from cathode to anode

B. from anode to cathode

C. from anode to solution

D. from solution to cathode

Answer: B

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97. Electrochemical equivalent of a substance is equal to its quantity liberated at electrode on passing electricity equal to

A. 1 coulomb

B. 1 ampere

C. 1 volt

D. 96,500 coulomb

Answer: A

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98. The product (ampere $\times$ seconds) is equal to the number of

A. coulomb transferred

B. electrons transferred

C. faradays transferred

D. volt

Answer: A

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99. The unit of charge is :

A. volt

B. ampere

C. coulomb

D. none

Answer: C

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100. An apparatus used for the measurement of quantity of electricity is known as a

A. Calorimeter

B. Cathetometer

C. Coulometer

D. Colorimeter

Answer: C

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101. Which of the following aqueous solutions will conduct an electric current quite well?

A. Glycerol

B. Sugar

C. Hydrochloric acid

D. Pure water

Answer: C

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102. Identification of anode and cathode in an Galvanic cell is made by the use of

A. galvanometer

B. salt bridge

C. voltmeter

D. none

Answer: A

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103. Which of the following reactions occurs at the anode during the recharging of lead storage battery ?

A. $Pb^{2+} + SO_4^{2-} \rightarrow PbSO_4$

B. $PbSO_4 + 2H_2O \rightarrow PbO_2 + SO_4^{2-} + 2H^+$

C. $Pb \rightarrow Pb^{2+} + 2e^-$

D. $PbSO_4 + 2e^- \rightarrow Pb + SO_4^{2-}$

Answer: D

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104. If a salt bridge is removed between the half cells, the voltage

A. drops to zero

B. does not change

C. increases gradually

D. increases rapidly

Answer: A

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105. A fuel cell is

A. the voltaic cells in which discontinuous supply of fuels are send at anode to give oxidation

B. the voltaic cell in which fuels such as : CH_4, H_2, CO are used up at anode

C. it involves the reactions of $H_2 - O_2$ fuel cell such as

Cathode : $2H_2 + 4OH^- \rightarrow 4H_2O(l) + 4e$

Anode : $O_2 + 2H_2O(l) + 4e \rightarrow 4OH^-$

D. the efficiency of a $H_2 - O_2$ fuel cell is very low

Answer: B

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106. Which incorrect about fuel cells ?

A. Cells continuously run as long as fuels are supplied

B. These are more efficient and free from pollution

C. These are used to provide power and drinking water to astronauts in space programme

D. Fuel cell has low efficiency

Answer: D

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107. Which of the following statements is correct for a galvanic cell?

A. Reduction occurs at cathode

B. Oxidation occurs at anode

C. Electrons flow from anode to cathode

D. All the statements are correct .

Answer: D

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108. Which of the following is not a function of salt bridge ?

A. To allow the flow of cations from one solution to the other

B. To allow the flow of anions from one solution to the other

C. To allow the electrons to flow from one solution to the other

D. To maintain electrical neutrality of the two solutions .

Answer: C

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109. Other things being equal , the EMF of a Daniel cell may be increased by

A. keeping low temperature

B. using large copper electrodes

C. using large zinc electrodes

D. decreasing concentration of Cu^{2+} ions .

Answer: A

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110. When a zinc rod is suspended in copper sulphate solution

A. the temperature of the solution rises

B. the temperature of the solution falls

C. the temperature of the solution remains unchanged

D. copper is deposited on zinc rod thereby increasing its weight .

Answer: A

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111. Which one of following statements is wrong about in electrochemical cell (ECC) and an electrolytic cell (ELC)?

A. GC produces electricity , ELC consumes electricity .

B. GC uses a salt bridge/ porous pot , ELC does not .

C. Anode of GC is negative while anode of ELC is positive

D. In both GC and ELC , the redox reaction is spontaneous .

Answer: D

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112. In preparing a salt bridge we sue KCl because

A. K^{+} and Cl^{-} are iso-electronic

B. K^{+} and Cl^{-} have the same transport number

C. KCl is a strong electrolyte

D. KCl forms a good jelly with agar-agar.

Answer: B

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113. Point out the correct statement about $Zn - CuSO_4$ cell.

A. The flow of electrons occurs from copper to zinc .

B. The value of E°_{Red} of copper electrode is less then that of zinc electrode .

C. Zinc is anode while Cu is cathode electrode .

D. All the statements are correct .

Answer: C

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114. The cell reaction

$Zn(s) + 2Ag^+(aq) \rightarrow Zn^{2+}(aq) + Ag(s)$

is best represented by

A. $Ag|Ag^+||Zn \mid Zn^{2+}$

B. $Zn|Zn^{2+}| \mid Ag^+|Ag$

C. $2Ag|Ag^+||Zn \mid Zn^{2+}$

D. $Zn|Zn^{2+}||2Ag|Ag^+$

Answer: B

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115. The EMF of a galvanic cell is measured by

A. voltmeter

B. potentiometer

C. galvanometer

D. ammeter .

Answer: B

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

A. electrode potentials of both the electrodes becomes zero

B. electrode potentials of both the electrodes becomes equal

C. one of the electrode is eaten way

D. the reaction starts proceeding in opposite direction .

Answer: B

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117. KCl cannot be used as a salt bridge for all the cell Cu(s) | $CuSO_4(aq) \mid |AgNO_3(aq)|Ag(s)$ because

A. $CuCl_2$ gets precipitated

B. Cl_2 gas is evolved

C. $AgCl$ gets precipitated

D. None of the above .

Answer: C

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118. Salt bridge is used to

A. connect two half cells

B. maintain electrical neutrally

C. reduced junction potential

D. all

Answer: D

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119. In a galvanic cell

A. Chemical energy $\rightarrow$ Electrical energy

B. Electrical energy $\rightarrow$ Chemical energy

C. Chemical energy $\rightarrow$ Internal energy

D. Internal energy $\rightarrow$ Electrical energy

Answer: A

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

A. from Cu to Zn inside the cell

B. from Cu to Zn outside the cell

C. from Zn to Cu outside the cell

D. none

Answer: B

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121. A salt bridge

A. to allow ions to go from one cell to another

B. to provide link between two half cells

C. to keep the emf of the cell positive

D. to maintain electrical neutrality of the solution in two half cells

Answer: D

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122. It is impossible to measure the actual voltage of any half cell by itself because

A. both half cell reactions take place simultaneously

B. of resistance of wire

C. a reaction does not take place on its own

D. polarisation

Answer: A

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123. Which metal will dissolve if the cell work $Cu\left|Cu^{2+}\right|\left|Ag^{+}\right|Ag$:-

A. Cu

B. Ag

C. Both 'a' and 'b'

D. No reaction

Answer: A

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124. Which of the following is correct ?

A. Zinc acts as cathode in Daniel cell

B. In a Li-Zn couple , zinc acts as anode

C. Copper will displace iron in solution

D. Zinc displaces tin from its solution

Answer: D

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125. The approximate emf of a dry cell's :-

A. 2.0 V

B. 1.2 V

C. 6 V

D. 1.5 V

Answer: A

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126. Which defines the standard reduction electrode potential of Zn^{2+} ions

A. $Zn^{2+}(aq) + 2e^- \rightarrow Zn(s), \left[Zn^{2+}\right] = 1M$

B. $Zn(g) \rightarrow Zn^{2+} + 2e^-, \left[Zn^{2+}\right] = 1M$

C. $Zn^{2+}(aq) \rightarrow Zn(s) + 2e^-, \left[Zn^{2+}\right] = 1M$

D. $Zn^{2+}(g) + 2e^- \rightarrow Zn(s) - 2e^-, \left[Zn^{2+}\right] = 1M$

Answer: A

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127. Which of the following statements is wrong about galvanic cells?

A. Anode has negative polarity

B. Cathode has positive polarity

C. Reduction takes place at anode

D. Reduction takes place at cathode

Answer: C

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128. For the cell $Zn|Zn^{2+}||Cu^{2+}|Cu$, if the concentration of Zn^{2+} and Cu^{2+} ions is doubled , the emf of the cell

A. doubles

B. reduces to half

C. remains same

D. becomes zero

Answer: C

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129. Copper can be deposited from acidified copper sulphate and alkaline cuprous cyanide . If the same current is passed for a definite time

A. the amount of copper deposited from acidic copper sulphate will be higher

B. the amount of copper deposited from alkaline cuprous cyanide will be higher

C. the same amount of copper will be deposited

D. none

Answer: B

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130. A cell necessarily does not contain

A. an anode

B. a cathode

C. an electrolyte or a fuel

D. a porous diaphragm

Answer: D

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131. The standard emf of a galvanic cell can be calculated from

A. the size of the electrode

B. the pH of the solution

C. the amount of metal in the anode

D. the E° values of the half cells

Answer: D

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132. The electrode potential measures the

A. tendency of the electrode to gain or lose electrons

B. tendency of the cell reaction to occur

C. difference in the ionisation potential electrode and metal ion

D. current carried by an electrode

Answer: A

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

A. positive electrode , negative electrode

B. negative electrode , positive electrode

C. positive and negative electrode both

D. none

Answer: A

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134. When lead accumulator is charged, it is

A. an electrolytic cell

B. a galvanic cell

C. a Daniel cell

D. None of the above .

Answer: A

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135. Which of the following statements is true for a cell, $Pt|H_{2(g)}|H^+||Cu^{2+}|Cu$?

A. Reduction occurs at H_2 electrode

B. H_2 is cathode and Cu is anode

C. H_2 is anode and Cu is cathode

D. Oxidation occurs at Cu electrode

Answer: C

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136. Consider the following reaction,

$$\frac{1}{2}H_2(g) + AgCl(s) \rightarrow H^+(aq) + Cl^-(aq) + Ag(s)$$

Above reaction occurs in the galvanic cell

A. $Ag|AgCl(s)|KCl(aq)|AgNO_3(aq)|Ag$

B. $Pt|H_2(g)|HCl(aq)|AgNO_3(aq)|Ag$

C. $Pt|H_2(g)|HCl(aq)|AgCl(s)|Ag$

D. $Pt|H_2(g)|KCl(aq)|AgCl(s)|Ag.$

Answer: C

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137. The cathode in a galvanic cell and electrolytic cell is

A. negatively charged in both cases

B. positively charged in both cases

C. positively charged in galvanic cell but negatively charged in an electrolytic cell

D. negatively charged in a galvanic cell but positively charged in an electrolytic cell.

Answer: C

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138. The reaction,

$1/2H_2(g) + AgCl(s) = H^+(aq) + Cl^-(aq) + Ag(s)$

occurs in the galvanic cell . The anode is

A. AgCl

B. Ag

C. H_2

D. H^{+}

Answer: C

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139. Reaction taking place at anode in Daneil cell

A. $Zn^{2+} + 2e \rightarrow Zn(s)$

B. $Zn(s) \rightarrow Zn^{2+} + 2e$

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

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

Answer: B

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140. A galvanic cell is composed of two hydrogen electrods, one of which is a standard one. In which of the following solutions should the other electrode be immersed to get maximum e.m.f:

A. $0.1 M HCl$

B. $0.1 M CH_3COOH$

C. $0.1 M H_3PO_4$

D. $0.1 M H_2SO_4$

Answer: D

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141. Which of the following statement is 'false' about galvanic cell ?

A. cathode is positively charged

B. it is made up of two half-cells

C. reduction takes place at the anode

D. dry-cell is non reversible in nature

Answer: C

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142. The salt generally used in the salt bridge of electrochemical cell ?

A. KCl

B. KNO_3

C. NH_4NO_3

D. allof these

Answer: D

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143. The life span of a Daniel cell is increased by

A. larger Zn electrode

B. larger Cu electrode

C. lowering the temperature

D. lowering the concentration

Answer: A

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144. The reaction $Cl_{2(g)} + 2I^-_{(aq)} \rightarrow 2Cl^-_{(aq)} + I_{2(s)}$

In this anode reaction is -

A. $Cl_2 + 2e^- \rightarrow 2Cl^-$

B. $2I^- \rightarrow I_2 + 2e^-$

C. $2Cl^{-} \rightarrow Cl_2 + 2e^{-}$

D. $I_2 + 2e^{-} \rightarrow 2I^{-}$

Answer: B

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145. Statement-I: In the Daniel cell, if concentration of Cu^{2+} and Zn^{2+} ions are doubled the emf of the cell will not change.

Because Statement-II: If the concentration of ions in contact with the metals is doubled, the electrode potential is doubled.

A. is double

B. is reduced to half

C. remains same

D. becomes four times

Answer: C

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146. 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

Answer: C

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147. For the cell reaction

$$Zn_{(s)}+Cu^{2+}_{0.1\text{ M}}\rightarrow Zn^{2+}_{0.1M}+Cu_{(s)}$$

if the standard EMF of the cell is E° , then

A. $E > E^\circ$

B. $E < E^\circ$

C. $E = E^\circ$

D. $E \leq E^\circ$

Answer: C

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148. Which of the following is the reaction half- reaction for a storage battery ?

A. $PbO_{2(s)} + SO_4^{2-} + 4H^+ + 2e^- \rightarrow PbSO_{4(s)} + 2H_2O$

B. $Pb_{(s)} + PbO_{2(s)} + 2H_2SO_4 \rightarrow 2PbSO_{4(s)} + 2H_2O$

C. $Pb_{(s)} + H_2SO_4 \rightarrow PbSO_{4(s)} + 2H^+ + 2e^-$

D. $2PbSO_{4(s)} + 2H_2O \rightarrow Pb_{(s)} + PbO_{2(s)} + 2H_2SO_4$

Answer: A

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149. In a secondary cell ,

A. the electrical energy obtained is first hand

B. magnitude of emf depends on charging

C. the electrical energy is developed within the cell

D. we can draw a current of high magnitude

Answer: B

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150. During the charging of storage cell

A. concentration of lead is decreased

B. lead sulphate concentration is increased

C. concentration of H_2SO_4 is increased

D. concentration of PbO_2 is decreased

Answer: C

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151. When lead storage battery discharges , specific gravity of H_2SO_4 decreases to

A. zero

B. 1.17

C. 1.28

D. 1.215

Answer: B

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152. Which of the following statement is false for fuel cell?

A. they are light weight

B. they are efficient

C. they cause no pollution

D. they cannot work continuously

Answer: D

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153. During charging of lead storage cell

A. external emf is greater than the emf of cell

B. external emf is equal to the emf of cell

C. external emf is less than emf of the cell

D. none of these

Answer: A

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154. The thermodynamic efficiency of cell is given by

A. $\Delta H / \Delta G$

B. $\dfrac{nFE}{\Delta G}$

C. $\dfrac{-nFE}{\Delta H}$

D. nFE°

Answer: C

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155. During discharge of Dry cell , the gas liberated at the cathode is :

A. H_2

B. O_2

C. Cl_2

D. N_2

Answer: A

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156. The cell potential of dry cell when it is discharged will be :

A. Carbon dissolves

B. NH_3 evolved

C. MnO_2 decomposed to Mn

D. ZnO converted into Zn

Answer: B

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157. Which of the following is not a source of electrical energy ?

A. Lead storage batteries

B. A generator set

C. Fuel cells

D. Ni-Cd cells .

Answer: C

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158. Which of the following reaction occurs at the cathode during the working of alkaline dry cell ?

A. Zn is converted into ZnO

B. MnO_2 is converted into Mn_2O_3

C. Zn is converted into Zn^{2+}

D. Mn_2O_3 is converted into MnO_2

Answer: B

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159. The reaction occuring at the anode during the working of alkaline dry cell -

A. $Zn + H_2O \rightarrow ZnO + 2OH^- + 2e^-$

B. $Zn + 2OH^- \rightarrow ZnO + H_2O + 2e^-$

C. $Zn \rightarrow Zn^{2+} + 2e^-$

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

Answer: B

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160. When a fuel cell is discharged

A. H_2O is evolved

B. lead sulphate is consumed

C. lead is formed

D. sulphuric acid is consumed

Answer: A

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161. Which cell has a constant voltage thorughout its life ?

A. Leclanche cell

B. Electrolytic cell

C. Mercury cell

D. Daniel cell.

Answer: C

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162. The depolariser used in dry cell is

A. MnO_2

B. NH_4Cl

C. Carbon

D. $ZnCl_2$

Answer: A

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163. When a NICAD cell is charged , it acts as

A. a primary cell

B. an electrolytic cell

C. a galvanic cell

D. a concentration cell.

Answer: B

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164. In $H_2 - O_2$ fuel cell the reaction occuring at cathode is

A. $2H_2 + O_2 \rightarrow 2H_2(l)$

B. $H^+ + OH^- \rightarrow H_2O$

C. $O_2 + 2H_2O + 4e^- \rightarrow 4OH^-$

D. $H^+ + e^- \rightarrow (1/2)H_2$

Answer: C

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165. The operating temperature of a fuel cell is

A. $60^\circ C$

B. $80^\circ C$

C. $252^\circ C$

D. $120^\circ C$

Answer: C

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166. The EMF of a Daniel cell

A. 0 volt

B. 5 volts

C. 1.1 volts

D. 3 volts

Answer: C

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167. The reaction at anode in a fuel cell is

A. $Pb + SO_4^{2-} \rightarrow PbSO_4 + 2e^-$

B. $2H_2 + 4OH^- \rightarrow 4H_2O + 4e^-$

C. $O_2 + 2H_2O + 4e^- \rightarrow 4OH^-$

D. $2H_2 + O_2 \rightarrow 2H_2O$

Answer: B

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168. Which of the following is NOT used as a fuel in fuel cell

A. Nitrogen

B. Hydrogen

C. Carbon Dioxide

D. Methane

Answer: A

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169. Which of the following is a catalyst used in fuel cell

A. Hg

B. Ag

C. Fe

D. Pb

Answer: B

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170. The reaction at anode in NICAD cell is

A. $NiO_2 + 2OH^- \rightarrow Ni(OH)_2 + 2e^- + H_2O$

B. $Cd \rightarrow Cd^{2+} + 2e^-$

C. $Cd + 2OH^- \rightarrow Cd(OH)_2 + 2e^-$

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

Answer: B

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171. Mark the false statement

A. A salt bridge is used to eliminate liquid junction potential

B. The Gibbs free energy change , $\Delta G = -nFE$

C. Nernst equation for single electrode potential is $E = E^{\circ} - \frac{RT}{nF} \log \left[M^{n^{+}}\right]$

D. The efficiency of hydrogen -oxygen fuel cell is 23%

Answer: D

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172. An electrochemical cell is set up as follows :

$Pt(H_2$, atm) | 0.1 M HCl |0.1 M acetic acid | $(H_2,$ 1 atm) Pt

EMF of this cell will not be zero because

A. the temperature is constant

B. the pH of 0.1 M HCl and 0.1 M acetic acid is not the same

C. acids used in the two compartments are different

D. EMF of a cell depends on molarities of the acids used.

Answer: B

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173. Which one of the following statements is wrong ?

A. The electrode potential is called standard electrode potential if the electrode is set up in 1 M solution at 298 K

B. The electrode potential of Pt $H_{2(1\text{ atm})} \mid H^{+}(1M)$ is taken as zero

C. Metals which have higher standard electrode potential than N.H.E. react with 1 M H_2SO_4 to give H_2 gas

D. Greater the oxidation potential of a metal , more active is the metal .

Answer: C

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174. Normal aluminium electrode coupled with normal hydrogen electrode gives an emf of 1.66 volts . So the standard electrode potential of aluminium is

A. -1.66 V

B. $+1.66$ V

C. -0.83 V

D. $+0.83$ V

Answer: A

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175. Which one of the following statements is incorrect ?

A. The tendency of an electrode to lose electrons with respect to Normal Hydrogen Electrode is called its oxidation potential .

B. The standard oxidation potentials are taken as positive whereas standard reduction potentials are taken as negative .

C. Oxidation potential and reduction potential of an electrode are equal in magnitude .

D. The absolute value of the electrode potential cannot be determined .

Answer: B

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176. The electrode potential of calomel electrode , used as a reference electrode

A. is taken as zero always

B. is a taken as zero if concentration of KCl solution is 1 M

C. can be zero , negative or positive

D. depends upon the concentration of KCl solution used .

Answer: D

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177. A standard hydrogen electrode has zero electrode potential is assumed to be

A. negative

B. zero

C. positive

D. fractional

Answer: B

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178. CALOMEL ELECTRODE

A. 1^0 reference electrode

B. 2^0 reference electrode

C. platinum electrode

D. mercury electrode

Answer: B

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179. The emf of standard H-electrode depends on

A. conc. , of HCl

B. pressure of H_2

C. temperature

D. all

Answer: D

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180. Which reference electrode is used to measure the electrode potnetial of other electrodes?

A. Calomel electrode

B. Ag|Ag Cl electrode

C. $Hg \mid Hg_2Cl_2 - KCl$ electrode

D. $H^{+} \mid H_2$, Pt electrode

Answer: B

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181. (a). What is standard hydrogen electrode?

(b). Give the reactions that occurs at this electrode wen it acts as positive in an electrochemical cell.

A. anode

B. cathode

C. neither cathode nor anode

D. both anode and cathode

Answer: A

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182. The calomel contain the ion is

A. Hg_2^{2+}

B. Hg^{+}

C. Hg^{2+}

D. Hg_2^{+}

Answer: A

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183. The electrode potential of a SHE depends upon

A. concentration of chloride ions

B. concentration of hydrogen ions

C. concentration of KCl solution

D. concentration of H_2SO_4

Answer: B

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184. The standard H electrode is written as

A. $Pt|H_2|H^+(a=1)$

B. $Pt|H_2|H^+$

C. $H^+(a=1)\big|H_{2(g)}\big|Pt$

D. $H^+(a=1)\big|H_{2(s)}\big|Pt$

Answer: C

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

A. The hydrogen ion concentration is 1 M

B. Temperature is $25^{\circ}C$

C. Pressure of hydrogen is 1 atm

D. It contains a metallic conductor which does not adsorb hydrogen

Answer: D

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186. Indicator electrode is

A. SHE

B. Calomel electrode

C. $Sn^{4+} \mid Sn^{2+}$ electrode

D. $Zn \mid ZnSO_4$ electrode

Answer: C

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187. A half-cell reaction is one that

A. takes place at one electrode

B. consumes half a unit of electricity

C. goes only half way to completion

D. involves only a half mole of electrolyte

Answer: A

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188. The calomel electrode is represented by

A. $Pt, Hg_2Cl_{2(s)}|KCl_{(aq)}|Hg$

B. $KCl_{(aq)}|Hg_2Cl_{2(s)}|Hg_{(l)}$

C. $Hg|KCl_{(aq)}|Hg_2Cl_{2(s)}$

D. $Hg|HgCl_{(s)}|KCl_{(aq)}$

Answer: B

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189. Why is standard hydrogen electrode called reversible electrode?

A. the reaction involved is standard

B. it is a reference electrode

C. assigning zero electrode potential to SHE makes the calculation easy

D. the potential developed by SHE is extremely small , it is arbitrarily taken as zero volt

Answer: D

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190. Hydrogen electrode is

A. reversible with respect to H^{+} ions

B. a secondary reference electrode

C. an indicator electrode

D. irreversible with respect to H^{+} ions

Answer: A

View Text Solution

191. For a calomel electrode , which of the following is 'FALSE' statement ?

A. it is a secondary reference electrode

B. the potential of calomel electrode is fixed on Hydrogen scale

C. standard oxidation value of potential is independent on concentration of KCl solution

D. it is reversible with respect to chloride ions

Answer: C

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192. In a calomel electrode glass tube is filled with

A. paste of calomel in Hg and saturated KCl solution

B. paste of calomel in Hg

C. paste of $PbCl_2$ in Hg

D. saturated KCl and $PbCl_2$

Answer: A

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193. CALOMEL ELECTRODE

A. its potential is arbitrarily fixed

B. its potential is exactly known with respect to a standard

C. the effects of temperature on e.m.f. of electrode is negligible

D. both a and c

Answer: B

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194. Which of the following is false for normal hydrogen electrode ?

A. the temperature is 298 K

B. the concentration of H^{+} ions in its solution is 1 M

C. the hydrogen gas pressure is 2 atmospheres

D. an electrode to Pt , coated with platinum black is used

Answer: C

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195. The calomel electrode is reversible with repect to :

A. Cl^{-} ioins

B. H^{+} ions

C. both H^+ and Cl^- ions

D. neither , it is irreversible

Answer: A

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196. The standard Hydrogen electrode in which the inert metal used is

A. Pb

B. Pd

C. Pt

D. Ni

Answer: A

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197. In electroplating, the article to be electoplated serves as:

A. cathode

B. electrolyte

C. anode

D. conductor

Answer: A

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198. A decinormal calomel electrode contains

A. N/10 solution of Hg_2Cl_2

B. 1 N solution of HCl

C. 1 N solution of Hg_2Cl_2

D. N/10 solution of KCl

Answer: D

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199. When calomel electrode acts as an anode then the reaction is

A. $2Hg + 2Cl^{-} \rightarrow Hg_2Cl_2 + 2e^{-}$

B. $Hg_2Cl_2 \rightarrow 2Hg^{+} + Cl_2 + 2e^{-}$

C. $Hg_2Cl_2 + 2e^{-} \rightarrow 2Hg + Cl_2$

D. $Hg_2Cl_2 + 2e^{-} \rightarrow 2Hg + 2Cl^{-}$

Answer: A

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200. Calomel is the name of

A. Hg

B. Hg_2Cl_2

C. $Hg + Hg_2Cl_2$

D. $HgCl_2$

Answer: B

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201. For a cell containing copper and silver electrodes ,

which of the following statements is correct ?

A. copper accepts electrodes and gets reduced

B. silver electrode is the negative electrode

C. oxidation occurs at the copper electrode

D. reduction occurs at the copper electrode

Answer: C

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202. The standard potential of $Cu \mid Cu^{2+}$ electrode is -0.34 V . It corresponds to the reaction

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

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

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

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

Answer: A

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203. The e.m.f. of the cell

$Ti|Ti^{+}(0.001M)||Cu^{2+}(0.01M)|Cu$ is 0.83V the emf of this cell could b e increased by

A. increasing the concentration of TI^{+} ions

B. increasing the concentration of Cu^{2+} ions

C. increasing the concentration of both

D. none of above .

Answer: B

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204. The potential of a single electrode depends upon

A. nature of metal

B. concentration of metal ions is solutions

C. temperature

D. all.

Answer: D

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205. For the reaction

$2A(s) + B^{2+}(aq) \rightarrow 2A^{+}(aq) + B(s)$, Nernst equation for the EMF of the cell is

A. $E = E^{\circ} - \frac{RT}{2F} \ln \frac{[A^{+}]}{[B^{2+}]}$

B. $E = E^{\circ} - \frac{RT}{2F} \ln \frac{[A^{+}]}{[B^{2+}]^{2}}$

C. $E = E^{\circ} - \frac{RT}{F} \ln \frac{[A^{+}]}{\sqrt{[B^{2+}]}}$

D. $E = E^{\circ} + \frac{RT}{F} \ln \frac{[A^{+}]}{\sqrt{[B^{2+}]}}$

Answer: B

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206. How the reduction potential of an electrode can be decreased?

A. increases with increase in concentration of ions

B. decreases with increase in concentration of ions

C. remains unaffected with increase in concentration of ions

D. increases with increase of temperature .

Answer: D

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207. In an electrode reaction , no electrode potential is developed when

A. solution pressure is less than osmotic pressure

B. solution pressure is greater than osmotic pressure

C. solution pressure equals osmotic pressure

D. both 'a' and 'b'

Answer: C

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208. Blue colour of $CuSO_4$ solution is discharge slowly when an iron rod is dipped into it. Why?

A. blue colour of the solution turns red

B. brown layer is deposited on iron rod

C. no change occurs in the colour of the solution

D. none

Answer: B

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209. The algebraic sum of potentials of two electrodes of a galvanic cell is called

A. potential difference

B. ionic difference

C. EMF

D. electrode difference

Answer: C

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210. NERNST EQUATION

A. $E_{RP} = E^{\circ}_{RP} - \frac{0.059}{n} \log \frac{[\text{oxidant}]}{[\text{reductant}]}$

B. $E_{OP} = E^{\circ}_{OP} - \frac{0.059}{n} \log \frac{[\text{oxidant}]}{[\text{reductant}]}$

C. $E_{OP} = E^{\circ}_{OP} - \frac{0.059}{n} \log \frac{[\text{reductant}]}{[\text{oxidant}]}$

D. $E_{RP} = E^{\circ}_{RP} + \frac{0.059}{n} \log \frac{[\text{reductant}]}{[\text{oxidant}]}$

Answer: B

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211. In the cell reaction

$Cu(S) + 2Ag^{+}(aq) \rightarrow Cu^{2+}(aq) + 2Ag(s), E^{\circ}_{\text{cell}} = 0.46$ V

By doubling the concentration of Cu^{2+}, E°_{cell} is

A. doubled

B. halved

C. increases but less than double

D. decreases by a small fraction .

Answer: C

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212. The Nernst equation E=E°-RT/nF in Q indicates that the Q will be equal to equilibrium constant K_c when:

A. $E = E^{\circ}$

B. $\frac{RT}{nF} = 1$

C. E = zero

D. $E^{\circ} = 1$

Answer: C

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213. Nernst equation halps us to understand the effect of ______ on the electrode of the half-cell and emf of the voltiv cell

A. temperature on EMF

B. concentration on EMF

C. pressure of the gas (if any) on EMF

D. All the three above

Answer: D

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214. In the electrochemical reaction, $2Fe^{3+} + Zn \rightarrow Zn^{2+} + 2Fe^{2+}$ increasing the concentration of Fe^{2+}:

A. increasing cell emf

B. increasing the current flow

C. decreases the cell emf

D. alters the pH of the solution .

Answer: C

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215. Two Daniel cells were set up one with 1 M $ZnSO_4$ and $1 M CuSO_4$, the other with 2 $M ZnSO_4$ and $2 M CuSO_4$. Their emf's are E_1 and E_2 respectively . Then

A. $E_1 = 2E_2$

B. $E_2 = 2E_1$

C. $E_2 = 4E_1$

D. $E_1 = E_2$

Answer: D

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216. If E_1, E_2 and E_3 are the emf values of the three galvanic cells respectivley

(i)$Zn|Zn^{2+}(1M)||Cu^{2+}(0.1M)|Cu$

(ii) $Zn|Zn^{2+}(1M)||Cu^{2+}(1M)|Cu$

(iii) $Zn|Zn^{2+}(0.1)||Cu^{2+}(1M)|Cu.$

Which one of the following is true.

A. $E_1 > E_2 > E_3$

B. $E_3 > E_2 > E_1$

C. $E_3 > E_1 > E_2$

D. $E_2 > E_1 > E_3$

Answer: D

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217. which of the following will increase the voltage of the cell with following cell reaction?

$Sn(s) + 2Ag^{+} + (aq) \rightarrow Sn^{+2}(aq) + 2Ag(s)$

A. Increase in the size of the silver rod

B. Increase in the concentration of Sn^{2+} ions

C. Increase in the concentration of Ag^{+} ions

D. None of the above .

Answer: C

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218. The emf of a voltaic cell is negative . So oxidation and reduction process respectively can be written at the

A. LHE , RHE

B. RHE , LHE

C. both (a) and (b)

D. None

Answer: B

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219. $Cu^{2+} + 2e^- \rightarrow Cu$. For this, graph between E_{red} versus $\ln[Cu^{2+}]$ is a straight line of intercept $0.34V$, then the electrode oxidation potential of the half cell $Cu \mid Cu^{2+}(0.1M)$ will be

A. $-0.34 + \dfrac{0.0591}{2}V$

B. $0.34 + 0.0591$ V

C. 0.34 V

D. None

Answer: A

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220. The reduction potential of a hydrogen electrode at $pH 10$ at $298 K$ is : $(p = 1$ atm)

A. 0.51 V

B. 0.000 V

C. 0.59 V

D. 0.059 V

Answer: C

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221. Assume a metal is in contact with its salt solution and the salt solution pressure (P_S) is greater than the osmotic pressure (P_O) . Which of the following statement is TRUE ?

A. electronation take place

B. the developed electrode potential difference is called oxidation potential

C. the developed electrode potential difference is called reduction potential

D. both 'a' and 'c'

Answer: B

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222. NERNST EQUATION

A. $\frac{2.303}{nF}$

B. $\frac{2.303RT}{F}$

C. $\frac{RT}{nF}$

D. $\frac{2.303RT}{nF}\log_{10}\frac{\text{reduction state}}{\text{oxidised state}}$

Answer: B

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223. If $P_{(S)}$ (solution pressure of metal tendency) $> P_O$ (osmotic pressure of ions in solution tendency) , then

A. the electrode gets negative charged

B. the electrode gets positively charged

C. Both 'a' and 'b'

D. the electrode remains neutral

Answer: A

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224. For some reactions the standard reduction potentials are given below :

$Zn^{2+} + 2e \rightarrow Zn, \qquad E^{\circ} = -0.762V$

$Fe^{2+} + 2e \rightarrow Fe, \qquad E^{\circ} = -0.440V$

$Cu^{2+} + 2e \rightarrow Cu, \qquad E^{\circ} = +0.345V$

$Ag^{+} + e \rightarrow Ag \qquad E^{\circ} = +0.800V$

Which one of the following is most easily oxidised ?

A. Zn

B. Cu

C. Fe

D. Ag

Answer: A

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225. Arrange the following in the order of their decreasing electrode potentials:Mg, K, Ba,Ca

A. K , Ba , Ca, Mg

B. Ba, Ca , K , Mg

C. Ca, Mg , K , Ba

D. Mg , Ca , Ba , K

Answer: D

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226. The position of some metals in the electrochemical series in dectreasing electropositeve character is given as $Mg > Al > Zn > Cu > Ag$. What will happen if a copper spoon is used to stir a solution of aluminimum nitrate ?

A. The spoon will get coated with aluminium

B. An alloy of copper and aluminium is formed

C. The solution becomes blue

D. There is no reaction

Answer: D

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227. The values of the standard oxidation potentials for some reactions are given below :

$$
\begin{aligned}
&Zn \rightarrow Zn^{2+} + 2e^{-}, && E^{\circ} = +0.762V \\
&Fe \rightarrow Fe^{2+} + 2e^{-}, && E^{\circ} = +0.440V \\
&Cu + Cu^{2+} + 2e^{-}, && E^{\circ} = -0.345V \\
&Ag \rightarrow Ag^{+} + e^{-}, && E^{\circ} = -0.800V
\end{aligned}
$$

Which one of the following is most easily reduction undergo ?

A. Zn^{2+}

B. Fe^{2+}

C. Cu^{2+}

D. Ag^{+}

Answer: D

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228. Red hot carbon will remove oxygen from the oxides XO and Yo but not from $ZO. Y$ will remove oxygen from XO. Use this evidence to deduce the order of activity of the three metals $X, Y,$ and $Z,$ putting the most reactive first.

A. X , Y , Z

B. Z , Y , X

C. Y , X , Z

D. Z , X, Y

Answer: B

Watch Video Solution

229. The position of some metals in the electrochemical series in dectreasing electropositeve character is given as $Mg > Al > Zn > Cu > Ag$. What will happen if a copper spoon is used to stir a solution of aluminimum nitrate ?

A. The spoon will get coated with aluminium

B. aluminium sulphate is formed

C. the solution contain aluminium nitrate

D. There is no reaction

Answer: C

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230. Four colourless salt solutions are placed in separate test tubes and a strip of copper is dipped in each. Which solution finally turns blue ?

A. $Pb(NO_3)_2$

B. $Zn(NO_3)_2$

C. $AgNO_3$

D. $Cd(NO_3)_2$

Answer: C

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231. If a spoon of copper metal is placed in a solution of ferrous sulphate .

A. copper will precipitate out

B. iron will precipitate out

C. both copper and iron will be dissolved

D. no reaction will take place

Answer: D

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232. Which metal can deposit copper from copper sulphate solution ?

A. mercury

B. iron

C. gold

D. platinum

Answer: B

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233. A student made the following observations in the laboratory

i) clean copper metal did not react with 1 molar Pb $(NO_3)_2$ solution

ii) clean lead metal dissolved in a 1 molar $AgNO_3$ solution and crystals of Ag metal appeared

iii) clean silver metal did not react with 1 molar $Cu(NO_3)_2$ solution

The order of decreasing reducing character of the three metals is

A. Cu , Pb , Ag

B. Cu , Ag , Pb

C. Pb , Cu , Ag

D. Pb , Ag , Cu

Answer: C

View Text Solution

234. In a simple Galvanic cell , which is in standard state , half cell reactions with their appropriate oxidation potentials are

$$Pb(s) - 2e^- \rightarrow Pb^{2+}(aq)E^\circ = +0.13\text{volt}$$
$$Ag(s) - e^- \rightarrow Ag^{2+}(aq)E^\circ = -0.80\text{volt}$$

Which of the following reaction takes place ?

A. $Pb^{2+}(aq.) + 2Ag(s) \rightarrow 2Ag^+(aq.) + Pb(s)$

B. $Pb^{2+}(aq.) + Ag(s) \rightarrow Ag^+(aq.) + Pb(s)$

C. $Ag^+(aq.) + Pb(s) \rightarrow Ag(s) + Pb^{2+}(aq.)$

D. $2Ag^+(aq.) + Pb(s) \rightarrow 2Ag(s) + Pb^{2+}(aq.)$

Answer: D

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235. The oxidation potential of Mg and Al are +2.37 and +1.66 volts respectively . The Mg in chemical reactions

A. will be replaced by Al

B. will replace Al

C. will not be able to replace Al

D. none of these

Answer: B

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236. The standard potentials at $25^{\circ} C$ for the following half reactions are given against them

$Zn^{2+} + 2e^{-} \rightarrow Zn, E^{0} = -0.762V$

$Mg^{2+} + 2e^{-} \rightarrow Mg, = -2.37V.$

When zinc dust is added to a solution of magnesium chloride .`

A. no reaction will take place

B. zinc chloride is formed

C. zinc dissolves in the solution

D. magnesium is precipitated .

Answer: A

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237. A solution is one molar in each of NaCl , $CdCl_2$, $ZnCl_2$ and $PbCl_2$. To this , tin metal is added . Which of the following is true ? Given :

$$E^{\circ}_{Pb^{2+}\,|\,P} = -0.126V, E_{Sn^{2+}\,|\,Sn} = -0.136V$$
$$E^{\circ}_{Cd^{2+}\,|\,Cd} = -0.40V, E^{\circ}_{Zn^{2+}\,|\,Zn} = -0.763V$$
$$E^{\circ}_{Na^{+}\,|\,Na} = -2.71V$$

A. Sn can reduce Na^+ to Na

B. Sn can reduce Zn^{2+} to Zn

C. Sn can reduce Cd^{2+} to Cd

D. Sn can reduce Pb^{2+} to Pb .

Answer: D

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238. To a mixture containing places of zinc , copper and silver , $1MH_2SO_4$ was added . H_2 gas was found to be evolved . Which of the metal/metals do you think has/have reacted ? Given

$E^\circ Zn \mid Zn^{2+} = +0.76V$, $E^\circ_{Cu^{2+} \mid Cu} = +0.34V$,

$E^\circ_{Ag^+ \mid Ag} = +0.80$ V

A. All the metals

B. Only Zn

C. Both Zn and Cu

D. Only Ag

Answer: B

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239. $CuSO_4$ is not stored in aluminium bottles because

A. Cu gets oxidised

B. Cu gets reduced

C. Al gets reduced

D. $CuSO_4$ gets decomposed

Answer: B

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240. The reduction potential of the two half cell reaction (occuring in an electrochemical cell) are

$PbSO_4(s) + 2e^- \rightarrow Pb(s) + SO_4^{2-}(aq)(E^\circ = -0.31V)$

$Ag^+(aq) + e^- \rightarrow Ag(s)(E^\circ = 0.80V)$

The fessible reaction will be

A. $Pb + SO_4^{2-} + 2Ag^+(aq) \rightarrow 2Ag(s) + PbSO_4$

B. $PbSO_4 + 2Ag^+(aq) \rightarrow Pb + SO_4^{2-} + 2Ag(s)$

C. $Pb + SO_4^{2-} + Ag(s) \rightarrow Ag^+(aq) + PbSO_4$

D. $PbSO_4 + Ag(s) \rightarrow Ag^+(aq) + Pb + SO_4^{2-}$

Answer: A

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241. If a strip of gold metal is placed in a solution of ferrous sulphate

A. Gold will precipitate out

B. Iron will precipitate out

C. Gold and iron both will be dissolved

D. no reaction will take place

Answer: D

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242. Which of the following solutions can be safely stored in a copper vessel ?

A. $ZnSO_4$

B. $AgNO_3$

C. $AlCl_3$

D. all of them.

Answer: B

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243. Out of Cu, Ag, Fe and Zn, the metal which can displace all others from their salt solutions is :

A. Ag

B. Zn

C. K

D. Fe

Answer: C

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244. Two platinum electrodes were immersed in a solution of $CuSO_4$ and electric current was passed through the solution. After some time, it was found that colour of $CuSO_4$ disappeared with evolution of gas at the electrode. The colourless solution contains.

A. Plantinum sulphate

B. copper hydroxide

C. copper sulphate

D. sulphuric acid

Answer: D

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245. On the basis of position in the electrolchemical series, the metal which does not displace H_2 from water and acid is :

A. Hg

B. Al

C. Pb

D. Ba

Answer: A

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246. A gas X at 1 atm is bubbled through a solution containing a mixture of $1MY^{-}$ and $1MZ^{-}$ at $25^{\circ}C$. If the order of reduction potentials is $Z > Y > X$, then

A. Y will oxidise X and not Z

B. Y will oxidise Z and not X

C. Y will oxidise both X and Z

D. Y will reduce both X and Z

Answer: A

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247. The standard reduction potential values of three metallic cation X, Y, Z are $0.52, \ -3.03$ and $-1.18V$ respectively. The order of reducing power to the corresponding metals is:

A. $Y > Z > X$

B. $X > Y > Z$

C. $Z > Y > X$

D. $Z > X > Y$

Answer: A

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248. The standard electrode potentials of elements A,B and C are+0.68, -2.50 and -0.50 V respectively.The correct order of their reducing powers is:

A. $A > B > C$

B. $A > C > B$

C. $C > B > A$

D. $B > C > A$

Answer: D

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249. If the half-cell reaction $A = E^{-} \rightarrow A^{-}$ has a large negative reduction potential, it follows that .

A. A is readily reduced

B. A is readily oxidised

C. A^{-} is readily reduced

D. A^{-} is readily oxidised

Answer: D

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250. A solution containing one mole per litre of each $Cu(NO_3)_2$, $AgNO_3$, $Hg_2(NO_3)_2$ is being electrolysed by using inert electrodes. The values of standard electrode potentials in volts (reduction potentials) are

$Ag^+/Ag = +0.80V, HG_2^{2+}/Hg = +0.79V$

$Cu^+/Cu = +0.34V, Mg^{2+}/Mg = -2.37V$

With increasing valtage, the sequence of deposition of metals on the cathode will be

A. Ag , Hg , Cu , Mg

B. Mg , Cu , Hg , Ag

C. Ag, Hg , Cu

D. Cu , Hg , Ag

Answer: C

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251. Is the reaction, $2Al + 3Fe^{2+} \Leftrightarrow 2Al^{3+} + 2Fe$ possible ?

A. No, because standard oxidation potential of $Al < Fe$

B. Yes , because standard oxidation potential of $Al > Fe$

C. Neither (a) nor (b)

D. Data are unpredictable

Answer: B

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252. Find E°_{cell} for the cell :

$Zn | Zn^{2+}(1M) || Ag^{+}(1M) | Ag$

[Given that : $E^{\circ}_{Zn/Zn^{2+}} = 0.76 \text{ V}, E^{\circ}_{Ag^{+}/Ag} = 0.80 \text{ V}.$

A. 0.04 V

B. $-0.04V$

C. $+1.56V$

D. -1.56V

Answer: C

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253. The element that is easiest to be reduced is

A. Fe

B. Cu

C. Ag

D. Sn

Answer: C

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254. Which of the following is the correct order of chemical reactivity with water according to electrochemical series ?

A. $K > Mg > Zn > Cu$

B. $Mg > Zn > Cu > K$

C. $K > Zn > Mg > Cu$

D. $Cu > Zn > Mg > K$

Answer: A

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255. Which species is the strongest oxidising agent

A. Br^{-}

B. Zn^{2+}

C. Pb^{2+}

D. Cu^{2+}

Answer: D

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256. Which is the strongest reducing agent

A. Ag

B. Na

C. Br^{-}

D. Cu

Answer: B

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257. For a redox reaction to proceed spontaneously in a given direction , the emf should

A. be zero

B. have + ve sign

C. have - ve sign

D. have either +ve or -ve sign

Answer: B

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258. When a rod of metal A is dipped in an aqueous solution of metal B (concentration of B^{2+} ion being 1 M) at $25^{\circ}C$, the standard electrode potentials are $A^{2+}/A = -0.76$ volts, $B^{2+}/B = +0.34$ volts .

A. A will gradually dissolve

B. B will deposit on A

C. No reaction will occur

D. Water will decompose into H_2 and O_2.

Answer: A

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259. Consider the reaction

$M^{n+}_{(aq)} + \mathrm{ne}^- \to M$(s)

The standard reduction potential values of the elements M_1, M_2 and M_3 are $-0.34V, -3.05V$ and $-1.66V$ respectively . The order of their reducing power will be

A. $M_1 > M_2 > M_3$

B. $M_3 > M_2 > M_1$

C. $M_1 > M_3 > M_2$

D. $M_2 > M_3 > M_1$.

Answer: D

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260. Which one of the following reaction is not possible ?

A. $Fe + H_2SO_4 \rightarrow FeSO_4 + H_2$

B. $Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$

C. $2KBr + I_2 \rightarrow 2KI + Br_2$

D. $CuO + H_2 \rightarrow Cu + H_2O$

Answer: C

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261. Br_2 and I_2 are added to a solution containing $1M$ each of Br^{c-} and I^{c-} . What reaction will occur ?

A. Iodine will reduce bromide ions

B. Bromine will reduce iodide ions

C. Iodide ions will reduce bromine

D. Bromide ions will reduce iodine .

Answer: C

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262. Given :

$Ag^{+} + / Ag \rightarrow \ + 0.80V$

$Co^{2+} / C \text{ or } \ \rightarrow \ - .28V$

$Cu^{2+} / Cu \rightarrow \ + 0.34V$

$Zn^{2+} / Zn \rightarrow \ - 0.76V.$

The most reactive metal which displaces other metals from their salts in solution is

A. Ag

B. Cu

C. Co

D. Zn

Answer: D

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263. E° for Fe/Fe^{2+} is $+0.44V$ and E° for Cu/Cu^{2+} is $-0.32V$. Then, in the cell,

A. Cu oxidises Fe^{2+} ion

B. Cu^{2+} oxidises iron

C. Cu reduces Fe^{2+} ion

D. Cu^{2+} ion reduces Fe .

Answer: B

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264. The standard reduction potentials at 298K, for the following half cells are given:

$Zn^{2+}(aq) + 2e^{-} \Leftrightarrow Zn(s) : E^{\circ} = -0.762V$

$Cr^{3+}(aq) + 3e^{-} \Leftrightarrow Cr(s) : E^{\circ} = -0.740V$

$2H^{+}(aq) + 2e^{-} \Leftrightarrow H_2(g), E^{\circ} = 0.000V$

$Fe^{3+}(aq) + e^{-} \Leftrightarrow Fe^{2+}(aq), E^{\circ} = 0.770V$

Which is the stronget reducing agent?

A. Zn(s)

B. Cr(s)

C. $H_2(s)$

D. $Fe^{2+}(aq)$

Answer: A

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265. Select the strongest reducing agent from amongest the substances involved in the following half-reactions .

$$\begin{array}{ll} Cl_2(g) + 2e^- \rightarrow 2Cl^-(aq) & +1.36V \\ Br_2(g) + 2e^- \rightarrow 2Br^-(aq) & +1.09V \\ Sn^{2+} + 2e^- \rightarrow Sn & -0.14V \end{array}$$

A. Cl^-

B. Br^-

C. Sn

D. Sn^{2+}

Answer: C

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266. A metal having negative reduction potential when dipped in the solution of its own ions, has a tendency

A. to pass into the solution

B. to be deposited from the solution

C. to become electrically positive

D. to remain neutral

Answer: A

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267. Standard reduction potential of an element equal to

A. $+1 \times$ its reduction potential

B. $-1 \times$ its standard oxidation potential

C. 0.00V

D. $+1 \times$ its standard oxidation potential

Answer: B

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268. Which represents disproportionation?

A. $2Cu^{+} \rightarrow Cu^{2+} + Cu$

B. $3I_2 \rightarrow 5I^{-} + I^{5+}$

C. $H_2O + Cl_2 \rightarrow Cl^{-} + ClO^{-} + 2H^{+}$

D. All

Answer: D

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269. Which of the following is the most powerful oxidizing agent?

A. F_2

B. Cl_2

C. Br_2

D. I_2

Answer: A

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270. Stronger the oxidising agent , greater is the :

A. reduction potential

B. oxidation potential

C. ionic behaviour

D. none

Answer: A

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271. Which one will liberate Br_2 from KBr?

A. HI

B. I_2

C. Cl_2

D. SO_2

Answer: C

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272. The electrolytic bath used in gold plating of copper articles contains

A. molten gold

B. $CuSO_4$

C. $AuCl_3$

D. $AuCl_3 + NaCN$

Answer: D

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273. The standard reduction potentials of 4 elements are given below . Which of the following will be the most suitable oxidising agent ?

$$I = -3.04V, \qquad II = -1.90V$$
$$III = 0V, \qquad IV = 1.98V$$

A. I

B. II

C. III

D. IV

Answer: D

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274. Standard potentials (E°) for some half-reactions are given below :

$Sn^{4+} + 2e \rightarrow Sn^{2+}, E^\circ = +0.15V$

$2Hg^{2+} + 2e \rightarrow Hg_2^{2+}, E^\circ = 0.92V$

$PbO_2 + 4H^+ + 2e \rightarrow Pb^{2+} + 2H_2O, E^\circ = +1.45V$

Based on the above , which one of the following statements is correct ?

A. Sn^{4+} is a strongest oxidising agent than Pb^{4+}

B. Sn^{2+} is a strongest reducing agent than Hg_2^{2+}

C. Pb^{2+} is a strongest oxidising agent than Pb^{4+}

D. Pb^{2+} is a strongest reducing agent than Sn^{2+}

Answer: B

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275. The standard reduction potentials at $25^{\circ}C$ of $Li^{+}/Li, Ba^{2+}/Ba, Na^{+}/Na$ and Mg^{2+}/Mg are $-3.05, -2.73, -2.71$ and -2.37 volt respectively. Which one of the following is the strongest oxidising agent ?

A. Na^{+}

B. Li^{+}

C. Ba^{2+}

D. Mg^{2+}

Answer: D

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276. For the electrochemicl cell,

$M|M^{+}||X^{-}|XE^{\circ}_{(M^{+}/M)} = 0.44V$ and $E^{\circ}_{(X/X^{-})} = 0.33V$

From this data one can deduce that :

A. $M+X \rightarrow M^{+} + X^{-}$ is the spontaneous reaction

B. $M^{+} + X^{-} \rightarrow M + X$ is the spontaneous reaction

C. $E_{\text{cell}} = 0.77$V

D. $E_{\text{cell}} = -0.77$V .

Answer: B

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277. An unknown metal M displaces nickel from (II) sulphate solution but does not displace manganese from manganese sulphate solution . Which order represents the correct order of reducing power ?

A. $Mn > Ni > M$

B. $Ni > Mn > M$

C. $Mn > M > Ni$

D. $M > Ni > Mn.$

Answer: C

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278. The oxidation potentials of A and B are +2.37 and +1.66 V respectively . In chemical reactions

A. A will be replaced by B

B. A will replace B

C. A will not replace B

D. A and B will not replace each other .

Answer: B

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279. When $E^{\circ}_{Ag^{+}/Ag} = 0.8V$ and $E_{Zn^{2+}/Zn} = -0.76V$. Which of the following is correct?

A. Ag^{+} can be reduced by H_2

B. Ag can oxidise H_2 into H^{+} ion

C. Zn^{2+} can be reduced by H_2

D. Ag can reduce Zn^{2+} ion .

Answer: A

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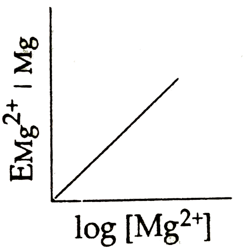
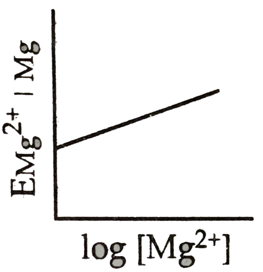
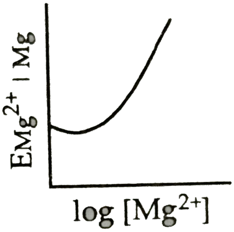
280. Electrode potential for Mg electrode varies according to the equation

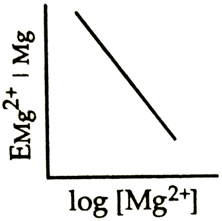
$$E_{Mg^{2+}|Mg}=E^{\ominus}_{Mg^{2+}|Mg}-\frac{0.059}{2}\log\frac{1}{\left[Mg^{2+}\right]}$$

The graph of $E_{Mg^{2+}|Mg}$ vs $\log\left[Mg^{2+}\right]$ is

A. 

B. 

C. 

D. 

Answer: B

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281. What will be the emf of given cell -

$Pt|H_2(P_1)|H^+_{(aq)} \; | \; |H_2(P_2)|Pt$?

A. $\frac{RT}{2F}\log_e\frac{P_1}{P_2}$

B. $\frac{RT}{F}\log_e\frac{P_1}{P_2}$

C. $\frac{RT}{F}\log_e\frac{P_2}{P_1}$

D. $\frac{RT}{2F}\log_e\frac{P_2}{P_1}$

Answer: A

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282. In $H_2 - O_2$ fuel cell , combustion of H_2 occurs to

A. generate heat

B. create P.D. between two electrodes .

C. produce high purity water

D. absorbs heat

Answer: B

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283. The standard Gibb's free energy change, ΔG° is related to equilibrium constant, kp as

A. $\Delta G = RT$ ln K

B. $-\Delta G = RT$ log K

C. $-\Delta G = 2.303RT$ log K

D. $-\Delta G = (RT \log K)$ / 2.303

Answer: C

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284. The EMF of a cell is related to the equilibrium constant of the cell reaction as

A. $\ln K_c = \dfrac{nFE^{\circ}_{\text{cell}}}{RT}$

B. $K_c = \dfrac{nFE^{\circ}_{\text{cell}}}{RT}$

C. $E^{\circ}_{\text{cell}} = \frac{RT}{nF} \ln K_c$

D. $K_c = \frac{RT}{nF} \ln E^{\circ}_{\text{cell}}$

Answer: A

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285. The correct relationship between Gibb's free energy change and the EMF of a cell is

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

B. $\Delta G^{\circ} = -nFE^{\circ}$

C. $-\Delta G^{\circ} = \frac{nF}{E^{\circ}}$

D. $-\Delta G^{\circ} = \frac{nE^{\circ}}{F}$

Answer: B

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286. The emf of a galvanic cell is positive when free energy change of reaction is

A. zero

B. positive

C. negative

D. not definite

Answer: A

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287. The emf of a galvanic cell is positive when free energy change of reaction is

A. > 0

B. < 0

C. $= 0$

D. has a very large value .

Answer: B

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288. Which of the following statement is correct?

A. E_{cell} and $\Delta_r G$ of the cell reaction both are extensive properties.

B. E_{cell} and $\Delta_r G$ of the cell reaction both are intensive properties .

C. E_{cell} is an intensive and $\Delta_r G$ of cell reaction an extensive property .

D. E_{cell} is an extensive and $\Delta_r G$ of the cell reaction is an intensive property .

Answer: C

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289. In electrochemical corrosion of metals, the metal undergoing corrosion

A. anode

B. cathode

C. neither anode nor cathode

D. either anode or cathode depending upon its standard reduction potential.

Answer: A

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290. Zinc is used to protect corrosion of iron because

A. E°_{Red} of $Zn > E^{\circ}_{\text{Red}}$ of Fe

B. E°_{Ox} of $Zn > E^{\circ}_{\text{Ox}}$ of Fe

C. Zinc does not melt easily

D. Zinc is cheap

Answer: B

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291. The most durable metal plating on iron to protect it againt corrosion is

A. nickel plating

B. copper plating

C. tin plating

D. zinc plating

Answer: D

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292. In which of the following will the corrosion of iron be most rapid?

A. In pure water

B. In pure oxygen

C. In air and moisture

D. In air and saline water .

Answer: D

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293. Iron can be protected by coating with zinc or tin. If coating is broken.

A. iron will corrode faster if coated with zinc

B. iron will corrode faster if coated with tin

C. iron will corrode faster in both cases

D. iron will not undergo any corrosion in both cases.

Answer: B

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294. Galvanized iron sheets and coated with

A. Nickel

B. Chromium

C. Copper

D. Zinc.

Answer: D

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295. A metal is left exposed to the atmosphere for some time . It gets coated with green carbonate . The metal must be

A. silver

B. copper

C. iron

D. zinc .

Answer: B

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296. During rusting the anode is

A. Cu

B. H_2

C. Fe

D. Carbon

Answer: C

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297. Zn acts as sacrifical or cathodic protect iont to prevent rusting of iron because

A. E°_{OP} of $Zn < E^{\circ}_{OP}$ of Fe

B. E°_{OP} of $Zn > E^{\circ}_{OP}$ of Fe

C. E°_{OP} of $Zn = E^{\circ}_{OP}$ of Fe

D. Zn is cheaper than iron

Answer: B

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298. The corrosion of iron object is not favoured by

A. presence of H^{+} ion

B. presence of moisture in air

C. presence of impurities in iron object

D. presence of vacuum

Answer: D

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299. In the electrodeposition of Ag , the silver ions are

A. reduced to anode

B. reduced to anode

C. oxidised to anode

D. oxidised to cathode

Answer: B

View Text Solution

300. The art of electroplating was given by

A. Faraday

B. Edison

C. Graham

D. Brugan

Answer: A

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301. In electrochemical corrosion of metals, the metal undergoing corrosion:

A. acts as anode

B. acts as cathode

C. undergoes reduction

D. neutral

Answer: A

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302. Which of the following does not promote corrosion ?

A. presence of impurity

B. presence of moisture

C. higher activity of the metal

D. higher temperature

Answer: A

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303. Prevention of corrosion of iron by Zn coating is called

A. galvanization

B. electrolysis

C. photo-electrolysis

D. cathodic protection

Answer: A

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304. Rust is a mixture of

A. $Fe_2O_3.\ xH_2O$

B. FeO

C. $Fe(OH)_3$

D. Fe

Answer: A

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305. Some statement are given about corrosion . The incorrect statement is

A. corrosion can not occur in vacuum

B. pure metals can undergo corrosion

C. corrosion is prevented by formation of oxide layer on metal .

D. Fe is more easily corroded than Cu .

Answer: B

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306. Tarnishing of silver is an example of

A. rusting

B. corrosion

C. oxidation

D. reduction

Answer: B

View Text Solution

307. According to electrochemical theory the metal which rusting take place as a result of

A. hydrolysis

B. local action

C. electrolysis

D. none

Answer: B

View Text Solution

308. For an electrolyte solution of $0.05 mol L^{-1}$, the conductivity has been found to be $0.0110 S cm^{-1}$. The molar conductivity is

A. $0.055 cm^2 mol^{-1}$

B. $550 S cm^2 mol^{-1}$

C. $0.22 S cm^2 mol^{-1}$

D. $220 S cm^2 mol^{-1}$

Answer: D

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309. The molar conductance of NaCl, HCl and CH_3COONa at infinite dilution are 126.45, 426.16 and 91 $ohm^{-1} cm^2 mol^{-1}$ respectively. The molar conductance of CH_3COOH at infinite dilution is :

A. $201.28 ohm^{-1} cm^2$

B. $390.71 ohm^{-1} cm^2$

C. $698.28 ohm^{-1} cm^2$

D. $540 ohm^{-1} cm^2$.

Answer: B

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310. The molar ionic conductances at infinte dilution of Mg^{2+} and Cl^- are 106.1 and $76.3 ohm^{-1} cm^2$ solution of $MgCl_2$ at infinite dilution will be

A. $29.8 ohm^{-1} cm^2 mol^{-1}$

B. $183.4 ohm^{-1} cm^2 mol^{-1}$

C. $285.7 ohm^{-1} cm^2 mol^{-1}$

D. $258.7 ohm^{-1} cm^2 mol^{-1}$

Answer: A

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311. 0.1 M solution of an electrolyte A^+B^- placed in a conductivity cell wilth electrodes 4 cm apart and each with area of cross-section equal to 2 sq cm was found to have a resistance of 200Ω. The molar conductivity of the solution will be

A. $25\Omega^{-1} cm^2$

B. $100\Omega^{-1} cm^2$

C. $0.25\Omega^{-1} cm^2$

D. $400\Omega^{-1} cm^2$

Answer: B

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312. The cell constant of a given cell is 0.47 c/m The resistance I of a solution placed · in this cell is measured to be 31.6 ohm. The conductivity of the solution (in S c/m) is

A. 0.15

B. 1.5

C. 0.015

D. $150.$

Answer: C

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313. The molar ionic conductivities of $NH_4^+ a \cap dOH^-$ at infinite dilution are 72 and 198 $ohm^{-1}cm^2$, respectively, the molar

conductivity of a centinormal NH_4OH solution aththe same temperature is found to be 9 $ohm^{-1}cm^2$. The percentage dissociation of NH_4OH at this concentration will be

A. $33\,\%$

B. $7.14\,\%$

C. $12.5\,\%$

D. $4.54\,\%$

Answer: C

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314. The specific conductance of a solution is 0.03568 ohm/cm and when placed in a cel, the conductance is 0.0268 per ohm. The cell constant is

A. $0.0751 cm^{-1}$

B. $0.330cm^{-1}$

C. $0.3836cm^{-1}$

D. $1.331cm^{-1}$

Answer: D

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315. The conductivity of 0.01 mol/dm^3 aqueous acetic acid at 300 K is $19.5 \times 10^{-5} ohm^{-1} cm^{-1}$ and the limiting molar conductivity of acetic acid at the same temperature is $390 ohm^{-1} cm^2 mol^{-1}$. The degree of dissociattion of acetic acid is :

A. 0.5

B. 0.05

C. 5×10^{-3}

D. 5×10^{-7}

Answer: B

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316. A conductivity cell having cell constant $8.76cm^{-1}$ placed in 0.01 M solution of an electrolyte offered a resistance of 1000 ohms . What is the conductivity of the electrolyte ?

A. $8.76 \times 10^{-4} ohm^{-1} cm^{-1}$

B. $8.76 \times 10^{-3} ohm^{-1} cm^{-1}$

C. $8.76 \times 10^{-2} ohm^{-1} cm^{-1}$

D. $8.76 \times 10^{-1} ohm^{-1} cm^{-1}$

Answer: B

View Text Solution

317. The standard electrode potentials (E°) for Ocl^{-}/Cl^{-} and $Cl^{-}/\frac{1}{2}Cl_2$ respectively are 0.94 V and $-1.36V$. The E° value for $Ocl^{-}/\frac{1}{2}Cl^2$ will be:

A. $-0.42V$

B. $0.52V$

C. $-2.20V$

D. 1.04 V

Answer: B

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318. Given $\wedge^{\circ} = \left(\frac{1}{3}Al^{3+}\right) = 63cm^2/\Omega$ mol and $\wedge^{\circ}\left(\frac{1}{2}SO_4^{2-}\right) = 80cm^2/\Omega mol.$

The value of $\wedge^{\circ} Al_2(SO_4)_3$ would be

A. $143\Omega^{-1}cm^2mol^{-1}$

B. $206\Omega^{-1}cm^2mol^{-1}$

C. $286\Omega^{-1}cm^2mol^{-1}$

D. $858\Omega^{-1}cm^2mol^{-1}$

Answer: D

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319. The specific conductances of four electrolytes in $ohm^{-1}cm^{-1}$ are given below. Which one offers higher resistance to passage of electric current?

A. 7.0×10^{-5}

B. 9.2×10^{-9}

C. 6.0×10^{-7}

D. 4.0×10^{-8}

Answer: B

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320. The equivalent conductances at infinite dilution (A_0) for electrolytes BA and CA are 140 and 120 S cm^2/eg. For equivalent conductance at infinite dilution for BX is 198 S cm^2 /eg. The A_0 (in S cm^2 / eq) of CX is

A. 178

B. 198

C. 218

D. 130

Answer: A

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321. On passing one faraday of elecricity throuth the electrolytic cells containing Ag^{+}, Ni^{+3} and Cr^{+3} ion solutions, the deposited Ag $(AT.Wt. = 108) Ni(At.Wt = 59)$ and $Cr(Atwt. = 52)$ is .

A. $\begin{matrix} \text{Ag} & \text{Ni} & \text{Cr} \\ 108g & 29.5g & 17.3g \end{matrix}$

B. $\begin{matrix} \text{Ag} & \text{Ni} & \text{Cr} \\ 108g & 59.0g & 52.0g \end{matrix}$

C. $\begin{matrix} \text{Ag} & \text{Ni} & \text{Cr} \\ 108.0g & 108.0g & 180.0g \end{matrix}$

D. $\begin{matrix} \text{Ag} & \text{Ni} & \text{Cr} \\ 108.0g & 117.5g & 166.0g \end{matrix}$

Answer: A

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322. How many c.c. of oxygen will be liberated by 2 ampere current flowing for 3 minutes and 13 seconds through acidulated water ?

A. 11.2 c.c.

B. 33.6 c.c.

C. 44.8 c.c.

D. 22.4 c.c.

Answer: D

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323. 2.5 faradays of electricity is passed through solution of $CuSO_4$. The number of gram equivalents of copper depsoited on the cathode would be

A. 1

B. 2

C. 2.5

D. 1.25.

Answer: C

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324. How much quantity of electricity has to be passed through 200 mL of 0.5 M $CuSO_4$ solution to completely deposite copper ?

A. 96500 C

B. $2 \times 9650C$

C. $2 \times 96500C$

D. $4 \times 96500C$

Answer: B

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325. A factory produces 40 kg of calcium in two hours by electrolysis. How much aluminium can be produced by same current in 2 hours if current efficiency is 50%?

A. 22 kg

B. 18 kg

C. 9 kg

D. 27 kg

Answer: B

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326. At STP 1.12 litre of H_2 is obtained on flowing a current for 965 seconds in a solution . The value of current in amperes is

A. 10

B. 1.0

C. 1.5

D. 2.0

Answer: A

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327. The time required to coat a metal surface of $80cm^2$ with $5 \times 10^{-3} cm$ thick layer of silver (density $1.05 gcm^{-3}$) with the passage of $3A$ current through a silver nitrate solution is:

A. 1150 s

B. 1250 s

C. 1350 s

D. 1450 s

Answer: B

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328. The number of electrons passing per second through a cross-section of copper wire carrying 10^{-6} ampere:

A. 1.6×10^{-19}

B. 6×10^{-35}

C. 6×10^{-16}

D. 6×10^{12}

Answer: D

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329. How many coulombs of electricity are c onsumed when a 100mA current is passed through a solution of $AgNO_3$ for half an hour during an electrolysis experiment?

A. 108

B. 180

C. 1800

D. 18000

Answer: B

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330. A certain quantity of electricity is passed through an aqueous solution of $AgNO_3$ and cupric salt solution connected in series . The amount of Ag deposited is 1.08 g. then the amount of copper deposited is (At. Mass Cu = 63.5 , Ag = 108) .

A. 0.6454 g

B. 6.354 g

C. 0.3177 g

D. 3.177 g

Answer: C

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331. A current of strength $2.5A$ was passed through $CuSO_4$ solution for 6 minute 265 seconds. The amount of copper deposited is (At. Of $Cu = 63.\ 5,\ 1F = 96500C$) .

A. 0.3175 g

B. 3.175 g

C. $0.635g$

D. 6.35 g

Answer: A

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332. How many coulombs of electricity are required for the reduction of 1 mole of MnO_4^- to Mn^{2+} ?

A. $96500C$

B. $1.93 \times 10^5 C$

C. $4.83 \times 10^5 C$

D. $9.65 \times 10^6 C$

Answer: C

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333. 9.65 amp of current was passed for one hour through Daniel cell. The loss of mass of zinc anode is

A. 11.77 g , 11.43 g

B. 11.43 g , 11.77 g

C. 23.54 g , 22.84 g

D. 22.86 g 23.54 g

Answer: A

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334. The same two separate electrolytic was passed through two separate electrolytic cells containing solutions of nickel nitrate and chromium nitrate respectively . If 0.3 g of nickel was deposited in the first cell , the amount of chromium deposited is

(At.mass of Ni= 59 , Cr = 52)

A. 0.1 g

B. 0.17 g

C. $0.3g$

D. $0.6g$

Answer: B

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335. The electrochemical equivalent of silver is 0.001114 g . When an electric current of 0.5 ampere is passed through an aqueous silver nitrate solution for 200 seconds , the amount of silver deposited is

A. 1.118 g

B. $0.1118g$

C. 5.590 g

D. $0.5590g$

Answer: B

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336. How much electricity is required in coulomb for the oxidation of :

(a) 1 mol of H_2O to O_2,

(b) 1 mole of FeO to Fe_2O_3 ?

A. 1 F

B. 2 F

C. 4 F

D. 0.5 F

Answer: A

Watch Video Solution

337. How many coulombs are required for the oxidation of 1 mol of H_2O_2 ?

A. $93000C$

B. $1.93 \times 10^5 C$

C. $9.65 \times 10^4 C$

D. $19.3 \times 10^3 C$.

Answer: B

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338. Two electrolytic cells, one containing acidified ferrous sulphate and another acidified ferric chloride, are in series. The ratio of masses of Iron deposited at the cathode in the two cells will be

A. $3:1$

B. $2:1$

C. $1:1$

D. $3:2$

Answer: D

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339. On carrying out the electrolysis of acidified water, the volume of hydrogen liberated at STP condition is $22.4L$. The volume of oxygen liberated is

A. $2.8cm^3$

B. $5.6cm^3$

C. $8.4cm^3$

D. $11.2cm^3$

Answer: A

Watch Video Solution

340. How many coulombs are required for the oxidation of $1mol$ of H_2O to O_2?

A. 9.65×10^4

B. 1.93×10^5

C. 1.93×10^4

D. 1.93×10^2

Answer: B

Watch Video Solution

341. The charge required for the reduction of 1 mole of $Cr_2O_7^{2-}$ ions to Cr^{3+} is

A. 96500 C

B. $2 \times 96500C$

C. $3 \times 96500C$

D. $6 \times 96500C$.

Answer: D

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342. The cost of electricity required to deposit $1gMg$ is Rs. 5.00. the cost of $30g$ of Al to be deposited is Rs. X. Find the value of $\frac{x}{40}$?

A. Rs 10.00

B. Rs. 27.00

C. Rs 44.44

D. 66.67

Answer: D

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343. When 9.65 coulomb of electricity is passed through a solution of silver nitrate (Atomic mass of Ag = 108 g mol^{-1}, the amount of silver deposited is :

A. 10.8 mg

B. 5.4 mg

C. 16.2 mg

D. 21.2 mg

Answer: A

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344. 1 mole of Al is deposited by X coulomb of electricity passing through aluminium nitrate solution . The number of mole of silver deposited by X coulomb of electricity from silver nitrate solution is

A. 3

B. 4

C. 2

D. 1

Answer: A

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345. Number of faraday's required to generate one gram atom of magnesiu from molten $MgCl_2$ is :

A. 1

B. 2

C. 3

D. 4

Answer: B

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346. A certain current liberated 0.504 g of hydrogen in 2 hours. How many gram of copper can be liberated by the same current flowing for the same time in $CuSO_4$ solution ?

A. 12.7

B. 16

C. 31.8

D. 63.5

Answer: B

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347. How many faraday are required to reduce one mol of MnO_4^- to Mn^{2+}:

A. 4

B. 5

C. 3

D. 2

Answer: B

Watch Video Solution

348. How many atoms of hydrogen are liberated at cathode , when 965 coulombs of charge is passed through water ?

A. 6.02×10^{21}

B. 6.02×10^{23}

C. 6.02×10^{-19}

D. 6.02×10^{19}

Answer: A

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349. An electrolytic cell contains a solution of Ag_2SO_4 and have platinum electrodes. A current is passed until 1.6gm of O_2 has been liberated at anode. The amount of silver deposited at cathode would be

A. 1.6 g

B. 0.8 g

C. 21.6 g

D. 107.88 g

Answer: C

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350. A current of 2 ampere was passed through solutions of $CuSO_4$ and $AgNO_3$ in series . 0.635 g of copper was deposited . Then the weight of silver deposited will be

A. 0.59 g

B. 3.24 g

C. 1.08 g

D. 2.16 g

Answer: D

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351. A current of 2.6 ampere was passed through $CuSO_4$ solution for 380 sec . The amount of Cu deposited is (atomic mass of Cu 63.5)

A. $0.3250g$

B. 0.635 g

C. 6.35 g

D. $3.175g$

Answer: A

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352. E° of $Mg^{2+}||Mg$, $Zn^{2+}||Zn$, and $Fe^{2+}\,|\,|\,Fe$ are -2.37V, -0.76V and -0.44 V respectively. Which of the following is correct?

A. Mg oxidises Fe

B. Zn oxidises Fe

C. Zn reduces Mg^{2+}

D. Zn reduces Fe^{2+}

Answer: D

Watch Video Solution

353. The ratio of mass of hydrogen and megnesium deopisted by the same amount of electricity from H_2SO_4 and $MgSO_4$ is

A. $1:8$

B. $8:1$

C. $16:1$

D. $1:16$

Answer: A

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354. In the electrolysis of an aqueous solution of $NaOH$, 2.8 litres of $O_2(g)$ is liberated at the anode at NTP. Volume of hydrogen gas liberated at the cathode at NTP will be

A. 5.6

B. 6.5

C. 22.2

D. 11.2

Answer: A

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355. When 2 Faraday of electricity is passed in an aqueous solution of cupric sulphate, the amount of copper deposited on cathode is

A. 1930

B. 3860

C. 9650

D. 4825

Answer: A

Watch Video Solution

356. The number of electron involved when one faraday of electricity is passed through an electrolytic solution is:

A. 6×10^{23}

B. 8×10^{19}

C. 96500

D. 6×10^{-23}

Answer: A

Watch Video Solution

357. A certain current liberated 0.504 g of hydrogen in 2 hours. How many gram of copper can be liberated by the same current flowing for the same time in $CuSO_4$ solution ?

A. 31.8 g

B. 63.6 g

C. 15.9 g

D. 6.36 g

Answer: C

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358. An ion is reduced to the element when it absorbs 6×10^{20} electrons. The number of equivalents of the ion is:

A. 0.10

B. 0.01

C. 0.001

D. 0.0001

Answer: C

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359. How many electrons are there in one coulomb of electricity?

A. 6.02×10^{21}

B. 6.24×10^{18}

C. 6.24×10^{15}

D. 6.02×10^{16}

Answer: B

Watch Video Solution

360. The number of electrons passing per second through a cross section of Cu wire carrying 10 ampere is

A. 6×10^{19}

B. 8×10^{19}

C. 1×10^{19}

D. 1.6×10^{19}

Answer: C

View Text Solution

361. On passing a current of 1.0 ampere for 16 min and 5 sec through one litre solution of $CuCl_2$, all copper of the solution of $CuCl_2$ solution was (Molar mass of Cu = 63.5 , Faraday constant = $96500 C mol^{-1}$).

A. 0.07 M

B. 0.2 M

C. 0.005 M

D. 0.02 M

Answer: C

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362. When the electrolytis of silver sulphate was carried out by Pt electrodes. 1-6 g oxygen was liberated at the anode, the amount of silver deposited at cathode will be

A. 0 g

B. 0.108 g

C. 0.108 g

D. 1.08 g

Answer: A

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363. On passing 3 A of electricity for 50 min, 1.8 g of metal deposits. The equivalent mass of metal is

A. 20.533

B. 25.8

C. 19.3

D. 30.7.

Answer: C

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364. From the solution of an electrolyte , one mole of electrons will deposit at cathode ,

A. 63.5 gm of Cu

B. 24 gm of Mg

C. 11.5 gm of Na

D. 9.0 gm of Al

Answer: D

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365. What current strength in ampere will be required to liberate 5 g of iodine from potassium iodide solution in 30 minutes ?

A. 1.11 amp

B. 2.11 amp

C. 4 amp

D. 10 amp

Answer: B

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366. Four moles of electrons were transferred from anode to cathode in an experiment on electrolysis of water. The total volume of the tow gases (dry and at STP) produced will be approximately (in litres)

A. 22.4

B. 44.8

C. 67.2

D. 89.4

Answer: C

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367. The volume of hydrogen gas liberated at STP when a current of 5.36 ampere is passed through dil. H_2SO_4 for 5 hours will be

A. 5.6 litres

B. 11.2 litres

C. 16.8 litres

D. 22.4 litres

Answer: B

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368. Three faradays of electricity was passed through an aqueous solution of iron (II) bromide. The mass of iron metal (at mass 56) deposited at the cathode is:

A. 56

B. 84

C. 112

D. 168

Answer: A

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369. A current of 2.0A passed for 5 hours through a molten metal salt deposits 22.2 g of metal (At. Wt. =177). The oxidation state of the metal in the metal salt is

A. $+1$

B. $+2$

C. $+3$

D. $+4$

Answer: C

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370. In an electroplating experiment m g of silver is deposited, whe 4 amperes of current flows for 2 mimtes. The amout (in g) of silver deposited by 6 amperes of current flowing for 40 seconds will be .

A. 4 m

B. m/2

C. m/4

D. 2m

Answer: B

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371. When an electric current is passed through acidified water, $112 ml$ of H_2 gas at NTP is collected at the cathode is 965 seconds. The current passed in amperes is

A. 1.0

B. 0.5

C. 0.1

D. 2.0

Answer: A

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372. Chromium plating can involve the electrolysis of an electrolyte of an acidified mixture of chromic acid and chromium sulphate. If during electrolysis the article being plated increases in mass by $2.6g$ and $0.6dm^3$ of oxygen are evolved at an inert anode, the oxidation state of chromium ions being discharged must be : (assuming atomic weight of $Cr = 52$ and $1mole$ of gas at room temperature and pressure occupies a volume at $24dm^3$)

A. -1

B. Zero

C. $+1$

D. $+2$

Answer: D

Watch Video Solution

373. When 0.5 ampere of electricity is passed in aqueous solution of $AgNO_3$ for 200 seconds, the amount of silver deposited on cathode is

$(Z = 0.00118gC$ for Ag)

A. 1.1180g

B. $0.11180g$

C. 5.590 g

D. 0.5590 g

Answer: B

Watch Video Solution

374. When an electric current is passed through acidified water, $112ml$ of H_2 gas at NTP is collected at the cathode is 965 seconds. The current passed in amperes is

A. 1

B. 0.5

C. 0.1

D. 2

Answer: A

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375. 10 mL of gas having density $1.6 gm L^{-1}$ liberated by passing 10 amp for 100 minute . The equivalent mass of gas is

A. 2

B. 20

C. 26

D. 18

Answer: C

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376. A Current of 9.65 ampere flowing for 10 minutes deposits 3.0g of the metal which is monovalent. The atomci mass of the metal is

A. 10

B. 30

C. 50

D. 96.5

Answer: C

Watch Video Solution

377. The same amount of electricity was passed through two separate electrolytic cells containing solutions of nickel nitrate and chromium nitrate respectively . If 0.3 g of nickel was deposited in the first cell the amount of chromium deposited is (at .mass Ni = 59 , Cr = 52)

A. 0.1 g

B. 0.17 g

C. 0.3 g

D. $0.6g$

Answer: B

View Text Solution

378. The volume of H_2 gas at NTP obtained by passing 4 amperes through acidified H_2O for 30 minutes is

A. 0.0836 litre

B. 0.1672 litre

C. 0.0432 litre

D. 0.836 litre

Answer: A

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379. A current is passed through 2 voltmeters connected in series. The first voltmeter contians $XSO_4)(aq)$ and second has Y_2SO_4(aq). The relative atomic masses of X and Y are in the ratio $2:1$. The ratio of the mass of X liberated to the mass of Y liberated is:

A. $1:1$

B. $1:2$

C. $2:1$

D. None of these

Answer: A

Watch Video Solution

380. The time required to coat a metal surface of $80cm^2$ with $5 \times 10^{-3}cm$ thick layer of silver (density $1.05gcm^{-3}$) with the passage of $3A$ current through a silver nitrate solution is:

A. 115 sec

B. 125 sec

C. 135 sec

D. 145 sec

Answer: B

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381. How many coulombs of electricity are c onsumed when a 100mA current is passed through a solution of $AgNO_3$ for half an hour during an electrolysis experiment?

A. 108

B. 180

C. 1800

D. 18000

Answer: B

Watch Video Solution

382. The time required to pass 36,000 coulombs through an electroplating bath using a current of 10 amperes is

A. thirty minutes

B. one hour

C. one hour 30 mins

D. two hours

Answer: B

View Text Solution

383. Mass of copper deposited by the passage of 2 A of current for 965 seconds through a 2M solution of $CuSO_4$ is (At.mass of Cu = 63.5)

A. 0.325 g

B. 0.635 g

C. 1 g

D. 1.2 g

Answer: B

View Text Solution

384. The time required to deposit 90 g of Al from an electrolytic cell containing Al_2O_3 by a current of 965 A (At.mass of Al = 27)

A. 20 min . 20 sec

B. 16 min . 40 sec

C. 40 min 20 sec

D. 26 min

Answer: B

View Text Solution

385. When 48250 C of electricity is passed through an aqueous solution of NiI_2 (at.mass of Ni = 58.8) , the weight of nickel metal deposited be

A. 7.3 gm

B. 14.7 gm

C. 22.0 gm

D. 29.4 gm

Answer: B

View Text Solution

386. The number of electron involved when one faraday of electricity is passed through an electrolytic solution is:

A. 12×10^{46}

B. 96500

C. 6.023×10^{23}

D. 22.4×10^{23}

Answer: C

Watch Video Solution

387. Chromium metal can be plated out from an acidic solution containing CrO_3 according to the following equation :

$CrO_3(aq) + 6H^{\oplus} + 6H^{\oplus}(aq) + 6e^- \rightarrow Cr(s) + 3H_2O$

$a.$ How many grams of chromium will be plated out by $24000C$?

$b.$ How long will take to plate out $1.5g$ of chromium by using $12.5A$ current ?

A. $1/13$ g

B. $13/6$ g

C. $4/5$ g

D. $5/4$ g

Answer: B

Watch Video Solution

388. How long will it take for a current of 3 amperes to decompose 36g of water? (Eq. wt. of hydrogen is 1 and that of oxygen is 8)

A. 36 hrs .

B. 18 hrs

C. 9 hrs

D. 4.5 hrs

Answer: A

Watch Video Solution

389. Weight of Ag (At.mass = 108) deposited when 560 ml of O_2 (NTP) is evolved is

A. 207 gm

B. 5.4 gm

C. 8.1 gm

D. 10.8 gm

Answer: D

View Text Solution

390. How many hour are required for a current of 3.0 ampere to decompose $18g$ water?

A. 9 hrs

B. 12 hrs

C. 18 hrs

D. 24 hrs

Answer: C

Watch Video Solution

391. The same quantity of electricity that liberated 2.158 g silver was passed through a solution of a gold salt and 1.314 g of gold was deposited. The equivalent mass of silver is 107.9. Calculate the equivalent mass of gold. What is the oxidation state of gold salt ? (At. mass of gold =197)

A. 16 A

B. 26.5 A

C. 56 A

D. 100 A

Answer: A

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392. The valency of the metal , if its at.mass and ECE respectively are 63.56 and 3.29×10^{-4} is

A. 1

B. 2

C. 3

D. 4

Answer: B

View Text Solution

393. The mass of copper that will be deposited at cathode in electrolysis of $0.2M$ solution of copper sulphate when a quantity of electricity equal to that required to liberate $2.24L$ of hydrogen from $0.1M$ aqueous H_2SO_4 is passed (atomic mass of $Cu = 63.5$) will be

A. 1.59 g

B. 6.35 g

C. 3.18 g

D. 12.70 g

Answer: B

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394. The atomic mass of oxygen is 16 , hence the electrochemical equivalent (ECE) of oxygen in kg per coulomb is

A. $\dfrac{8 \times 10^{-3}}{96,500}$

B. $\dfrac{8}{96,500}$

C. $\dfrac{16 \times 10^{-3}}{96,500}$

D. $\dfrac{16}{96,500}$

Answer: A

View Text Solution

395. The cost of electricity required to deposit 1 g of Mg is Rs.3.00.

The cost of deposit 8 g of Al is

(al.mass Al = 27 , Mg = 24)

A. Rs.12.00

B. Rs. 24.00

C. Rs. 32.00

D. Rs.42.50

Answer: C

View Text Solution

396. The number of coulombs required to liberate 0.224 dm^3 of chlorine at $0^\circ C$ and 1 atm pressure is

A. 2×965

B. 965/2

C. 965

D. 9650

Answer: A

View Text Solution

397. The number of moles of oxygen obtained by the electrolytic decomposition of 90g water is :

A. 1 mole

B. 2.5 mole

C. 2 mole

D. Data sufficient

Answer: B

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398. How long does it take to deposit 100 g of Al from an electrolytic cell containing Al_2O_3 using a current of 125 ampere ?

A. 95.30 min

B. 143 min

C. 47.65 min

D. 10 min

Answer: B

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399. Element A (atomic mass 112) and element B (atomic mass 27) form chlorides . Solutoins of these chlorides are electrolysed separately and it is found that the same quantity of electricity is passed 5.6 gm of A deposited while only 0.9 gm of B was deposited . if the valency of B is 3 , the valency of A is

A. 2

B. 3

C. 4

D. -2

Answer: A

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400. The weight of chlorine that would be deposited from molten NaCl in one minute by current of 300 milliamperes is

A. 1.123×10^{20}

B. 6.621×10^{-3}

C. 2.216×10^{20}

D. 5.6×10^{19}

Answer: B

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401. A metal is known to form fluoride MF_2. When 10 ampere electricity is passed through a molten salt for 330 sec, $1.95g$ metal is deposited. Find out the atomic weight of metal. What will be the quantity of charge required to deposit the same mass of Cu from $CuSO_4(aq.)$? ($At.\ wt.$ of $Cu = 63.6$)

A. 57.02

B. 148

C. 228

D. 114

Answer: D

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402. In passing the electricity through the acidulated $H_2O, 5.6dm^3$ of O_2 liberated at anode . The volume of H_2 liberated at cathode will be

A. $5.6dm^3$

B. $22.4dm^3$

C. $11.2dm^3$

D. $44.8 dm^3$

Answer: C

View Text Solution

403. If the atomic mass of M is x , the electrochemical equivalent of M in the solution of $M_2(SO_4)_3$ will be

A. $\frac{3x}{F}$

B. $\frac{x}{3F}$

C. $\frac{2x}{F}$

D. $\frac{x}{F}$

Answer: B

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404. Salts of A (atomic weight 7), B (atomic weight 27) and C (atomic weight 48) were electolysed under idential condition using the same quanity of electricity. It was found that when $2.1g$ of A was deposited, the weights of B and C deposited were 2.7 and $7.2g$. The valencies A, B and Crespectively:

A. 1 , 2 and 3

B. 1 , 3 and 2

C. 3 , 1 and 2

D. 2 , 3 and 1

Answer: B

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405. The current in amp required to liberate Ag from a solution containing 1.7×10^{-3} kg of $AgNO_3$ was electrolysed in 1 hr is

A. 1.342

B. 0.27

C. 0.027

D. 0.1342

Answer: B

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406. A current of 5 amp is passed through a solution of NaCl for 3.25 hrs . The weight of NaOH formed is

A. 6.50 g

B. 17.25 g

C. 24.25 g

D. 13.0 g

Answer: C

View Text Solution

407. $10800C$ of electricity passed through the electrolyte deposited $2.977g$ of metal with atomic mass $106.4gmol^{-1}$. The charge on the metal cation is

A. $+4$

B. $+3$

C. $+2$

D. $+1$

Answer: A

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408. 1 coulomb of charge passes through solution of $AgNO_3$ and $CuSO_4$ connected in series and the concentration of two solution being in the ratio $1:2$. The ratio of amount of Ag and Cu deposited on Pt electrode is

A. $107.9:63.54$

B. $54:31.77$

C. $107.9:31.77$

D. $54:63.54$

Answer: C

View Text Solution

409. During electrolysis of H_2O, the molar ratio of H_2 and O_2 formed is

A. $2:1$

B. $1:2$

C. $1:3$

D. $1:1$

Answer: A

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410. Given that $E^\circ\left(Zn^{2+}/Zn\right) = -0.763V$ and $E^\circ\left(Cd^{2+}/Cd\right) = -0.403V$, the emf of the following cell :

$Zn/Zn^{2+}(a = 0.04) \mid \mid Cd^{2+}(a = 0.2)$ ce is given by ,

A. $E = -0.36 + 0.0296$ (log 0.004/2)

B. $E = +0.36 + 0.0296$ (log 0.004/2)

C. $E = +0.36 + 0.0296$ (log 0.2 /0.004)

D. $E = -0.36 + 0.0296$ (log 0.2/004)

Answer: C

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411. The weight of silver (at $wt. = 108$) displaced by a quantity of electricity which displaced $5600 mL$ of O_2 at STP will be:

A. 54 g

B. 108 g

C. 5.4 g

D. None of these

Answer: A

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412. A current of 0.96 A is passed for 3 hours between Ni electrodes in 0.5 L of 92 M solution $Ni(NO_3)_2$. The molarity of the solution after electrolysis is would be -

A. 0.92 M

B. 0.625 M

C. 0.22 M

D. 1.25 M

Answer: A

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413. In the electrolysis of alkaline water , a total of mass 1 mole of gases is volved . The amount of water decomposed is

A. 1 mole

B. 2 moles

C. 2/3 mole

D. 1/3 mole

Answer: C

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414. To produce 160 g of oxygen , the number of mole of water required to be electrolysed is

A. 2.5

B. 5

C. 10

D. 20

Answer: C

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415. The weight of nickel (at.mass = 58.78) liberated by a current of 5 ampere flowing for 193 second through $NiSO_4$ solution is

A. 0.587 g

B. 5.87g

C. 0.2935 g

D. 2.935 g

Answer: C

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416. 2.5 faradays of electricity is passed through solution of $CuSO_4$. The number of gram equivalents of copper depsoited on the cathode would be

A. 1

B. 2

C. 2.5

D. 1.25

Answer: C

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417. Ag is removed electrolyticaly from 20cc of a 0.1 N solution of $AgNO_3$ by a current of 0.1 amp. How long will it take to remove half of the silver from the solution?

A. 10 sec

B. 16 sec

C. 100 sec

D. 9650 sec

Answer: D

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418. A current of 12 ampere is passed through an electrolytic cell containing aq. $NiSO_4$ solution . Both Ni and H_2 gas are formed at the cathode . The current efficiency is 60% . What is the mass of nickel deposited on the cathode per hour ?

(At.mass of Ni = 98.7)

A. 5.91 g

B. 3.941 g

C. 7.883 g

D. 2.645 g

Answer: C

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419. Equal quantities of electricity of passed through three voltameters containing $FeSO_4, Fe_2(SO_4)_3$ and $Fe(NO_3)_3$. Consider the following statements in this regard :

1 . The amount of iron deposited in $FeSO_4$ and $Fe_2(SO_4)_3$ are equal

2 . The amount of iron deposited in $Fe(NO_3)_3$ is two third of the amount of iron deposited in $FeSO_4$

3 . The amount of iron deposited is $Fe_2(SO_4)_3$ and $Fe(NO_3)_3$ is equal

A. 1 alone is correct

B. 1 and 2 are correct

C. 2 and 3 are correct

D. 3 alone is correct .

Answer: C

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420. In an electrolytic cell , one litre of a 1 M aqueous solution of MnO_4^- is reduced at the cathode . The quantity of electricity required so that the final solution of 0.1 MnO_4^{2-} will be

A. 10 F

B. 1 F

C. 0.1 F

D. 100 F

Answer: C

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421. The emf of cell containing Zn and hydrogen electrodes represented as below $\left(E^0_{Zn} = -0.76V\right)$

$Zn\left|Zn^{2+}(0.2M)\right|\left|H^+(0.4M)\right|H_{2(g)}$ Pt at 298 K is

A. 0.742 V

B. -0.472 V

C. 0.769 V

D. -0.769 V

Answer: C

View Text Solution

422. $MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O, E^\circ = 1.51V$

$MnO_2 + 4H^+ + 2e^- rig \leftrightarrow owMn^{2+} + 2H_2O\ E^\circ = 1.23V$

$E_{MnO_4^- | MnO_2}$

A. $-1V$

B. -1.70 V

C. $+1$ V

D. 1.70 V

Answer: D

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423. The EMF of the cell

$Mg|Mg^{2+}(0.01M)||Sn^{2+}(0.1M)|Sn$ at 298 K is

(Given $E^{\circ}_{Mg^{2+}|Mg} = -2.34V, E^{\circ}_{Sn^{2+}|Sn} = -0.14$ V)

A. 2.17 V

B. 2.23 V

C. 2.51 V

D. 2.45 V

Answer: B

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424. In the cell $Zn/Zn^{+2}(c_1)/cu^{+2}/Cu, E_{cell}-E^0_{cell}=0.059V$

The ratio $\frac{C_1}{C_2}at298K$ will be

A. 2

B. 100

C. 10^{-2}

D. $1.$

Answer: C

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425. The reduction potential of a hydrogen electrode at $pH 10$ at $298 K$ is : $(p = 1$ atm)

A. -0.0592 V

B. $+0.0592$ V

C. -0.592 V

D. 0.592 V

Answer: C

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426. The emf of the cell in which the following reactions,

$Zn(s) + Ni^{2+}(0.1M) \rightarrow Zn^{2+}(1.0M) + Ni(s)$ occurs, is found to 0.5105 V at 298 K. The standard emf of the cell is :

A. 0.540 V

B. 0.4810 V

C. 0.5696 V

D. 0.5105V

Answer: D

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427. Consider the cell reaction :

$$Mg(s) + Cu^{2+}(aq) \rightarrow Cu(s) + Mg^{2+}(aq)$$

If $E^{c-}{}_{\cdot Mg^{2+} \mid Mg(s)}$ and $E^{c-}{}_{\cdot Cu^{2+} \mid Cu(s)}$ are -2.37 and $0.34V$, respectively. $E^{c-}{}_{\cdot cell}$ is

A. 2.71 V

B. 2.30 V

C. 2.80 V

D. 1.46 V

Answer: A

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428. The reduction electrode potential E , or 0.1 M solution of M^{+} ions $(E^{\circ}_{RP} = -2.36$ V) is

A. -2.41

B. $+2.41$

C. -4.82

D. None

Answer: A

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429. The solution of $CuSO_4$ in which copper rod is immersed is diluted to times. The reduction electrode potential

A. increases by 0.030 V

B. decreases by 0.030 V

C. increases by 0.059

D. decreases by 0.059 V

Answer: B

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430. For the cell $Tl|Tl^+(0.001M)||Cu^{2+}(0.01M)|Cu$. E_{cell} at $25^\circ C$ is 0.83V, which can be increased:

A. by increasing $[Cu^{2+}]$

B. by increasing $[Tl^+]$

C. by decreasing $[Cu^{2+}]$

D. none

Answer: A

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431. How much will the reduction potential of a hydrogen electrode change when its solution initially at $pH = 0$ is neutralized to $pH = 7$?

A. increase by 0.059 V

B. decrease by 0.059 V

C. increase by 0.413 V

D. decrease by 0.413 V

Answer: D

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432. What is the potential of the cell containing two hydrogen electrodes as represented below ?

$$Pt\left|\frac{1}{2}H_2(g)\right|H^+\left(10^{-8}M\right)\left|\right|H^+(0.001M)|\frac{1}{2}H_2(g)\left|Pt\right.$$

A. -0.295 V

B. -0.0591 V

C. 0.295

D. 0.0591 V

Answer: C

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433. A hydrogen electrode is dipped in a solution at $25^\circ C$. The potential of cell is $-0.177V$. Calcualte the pH of the solution.

A. 0.177 V

B. $-0.177V$

C. 0.087 V

D. 0.059 V

Answer: B

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434. The standard emf for the cell cell reaction $Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$ is 1.10 volt at $25^\circ C$. The emf for the cell reaction when $0.1 M Cu^{2+}$ and $0.1 M ZN^{2+}$ solutions are used at $25^\circ = C$ is .

A. 1.10 V

B. 0.110 V

C. $-1.10V$

D. -0.110V

Answer: A

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435. The emf of the cell

$Zn|Zn^{2+}(1M)||Cu^{2+}|Cu(1M)$

is 1.1V. If the standard reduction potential of $Zn^{2+} \mid Zn$ is -0.78V, what is the oxidation potential of $Cu \mid Cu^{2+}$?

A. $+1.86$ V

B. 0.32 V

C. -0.32 V

D. 1.86 V

Answer: C

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436. An electrochemical cell is shown below $Pt, H_2(1\text{atm})|HCl(0.1M)|CH_3COOH(0.1M) \mid H_2(1\text{atm})$, The emf of the cell will not be zero, because

A. The pH of 0.1 M HCl and 0.1 M acetic acid is not the same

B. Acids used in the two compartments are different

C. E.M.F of a cell depends on the molarities of acids used

D. The temperature is constant

Answer: A

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437. The standard reduction potential of Cu^+/Cu couple is 0.34 V at $25^\circ C$ calculate the reduction potential at $pH = 14$ for this couple.

(Given $K_{sp}, Cu(OH)_2 = 1.0 \times 10^{-19}$)

A. -0.22 V

B. $+0.22$ V

C. -0.34 V

D. $+0.34$ V

Answer: A

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438. For $Pt(H_2) \mid H_2O$, reduction potential at $298K$ and $1atm$ is :

A. -0.207

B. -0.414 V

C. 0.207 V

D. 0.414 V

Answer: B

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439. Consider the given data.

	Half-cell reaction	Standard reduction potential E° (volts)
1.	$Cr_2O_7^{2-} + 14H^+ + 6e \Leftrightarrow 2Cr^{3+} + 7H_2O$	1.33
2.	$Cr^{3+} + 3e \Leftrightarrow Cr(s)$	-0.74
3.	$Cu^+ + e \Leftrightarrow Cu(s)$	0.51
4.	$Cu^{2+} + 2e \Leftrightarrow Cu(s)$	0.34

The numerical value of the standard cell potential for the reaction,

$Cr(s) + 3Cu^{+2} rar 3Cu^+ + Cr^{+3}(aq)$ is:

A. -1.08 volts

B. -0.40 volts

C. 1.08 volts

D. 2.50 volts .

Answer: C

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440. for the electrochemical cell:

$Ag|AgCl(s)|KCl(aq) \mid |AgNO_3(aq)|Ag.$

The overall cell reaction is

A. $Ag^{+} + KCl \rightarrow AgCl(s) + K^{+}$

B. $Ag + AgCl \rightarrow Ag + \frac{1}{2}Cl_2$

C. $AgCl(s) \rightarrow Ag^{2+} + Cl^{-}$

D. $Ag^{+} + Cl^{-} \rightarrow AgCl(s)$

Answer: C

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441. $E^{\circ}\left(Ni^{2+}/Ni\right) = -0.25$ volt, $E^{\circ}\left(Au^{3+}/Au\right) = 1.50$ volt.

The emf of the voltaic cell $Ni|Ni^{2+}(1.0M)||Au^{3+}(1.0M)|Au$ is:-

A. $+1.25$ V

B. -1.75 V

C. $+1.75$ V

D. $+4.0$ V

Answer: C

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442. The standard oxidation potential E° for the half cell reaction are

$Zn \rightarrow Zn^{2+} + 2e^{-}$

$E^{\circ} = +0.76V$

$Fe \rightarrow Fe^{2+} + 2e^-$

$E^\circ = +0.41V$

EMF of the cell rection is $Zn + Fe^{2+} \rightarrow Zn^{2+} + Fe$

A. -0.35 V

B. $+0.35$ V

C. $+1.17$ V

D. -0.17 V

Answer: B

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443. The standard electrode potentials of four elements A, B, C and D are $-3.05, 1.66, -0.40$ and 0.80 volt. The highest chemical activity will be shown by :

A. A

B. B

C. C

D. D

Answer: A

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444. The standerd potential at 25° for the following Half rection is given :

$Zn^{2+} + 2e^{-} \rightarrow Zn, E^{\circ} = -0.762V$

$Mg^{2+} + 2e^{-} \rightarrow Mg, E^{\circ} = -2.37V$

When Zinc dust is added to the solution of $MgCl_2$.

A. $ZnCl_2$ is formed

B. Zinc dissolves in the solution

C. No reaction takes place

D. Mg is precipitated

Answer: C

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445. Normal aluminimum electrode cupled with normal hydrogen electrode gives an emf of $1.66V$. So the standard electrode potential of aluminimu is ,

A. -1.66 V

B. $+1.66$ V

C. -0.83 V

D. $+0.83$ V

Answer: B

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446. E° for Fe/Fe^{2+} is $+0.44V$ and E° for Cu/Cu^{2+} is $-0.32V$. Then, in the cell,

A. Cu oxidises Fe^{2+} ion

B. Cu^{2+} oxidises Fe

C. Cu reduces Fe^{2+} ion

D. Cu^{2+} reduces Fe

Answer: B

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447. The SOP , E° for the half reactions are

$Zn \rightarrow Zn^{2+} + 2e, E^{\circ} = +0.76V$

$Ag \rightarrow Ag^{+} + e, E^{\circ} = -0.77V$

E° of the cell , $Ag^{+} + Zn \rightarrow Zn^{2+} + Ag$ is :

A. $+1.53$

B. -1.53

C. -0.01

D. $+0.01$

Answer: A

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448. Deduce from the following E^{c-} values of half cells, what combination of two half cells would results in a cell with the largest potential?

$$\begin{array}{lll} I. & A+e(-)\rightarrow A^{c-} & E^{c-}=-0.24V \\ II. & B^{c-}+e^{-}\rightarrow B^{2-} & E^{c-}=+1.25V \\ III. & C^{c-}+2e^{-}\rightarrow C^{3-} & E^{c-}=-1.25V \\ IV. & D+2e^{c-}\rightarrow D^{2-} & E^{c-}=+0.68V \end{array}$$

A. (ii) and (iii)

B. (ii) and (iv)

C. (i) and (iii)

D. (i) and (iv)

Answer: A

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449. i) $AgCl_{(S)} + e^{-} \rightarrow Ag_{(S)} + Cl^{-}_{(aq)} E^{\circ} = 0.22$ V .

ii) $Ag_{(aq)} e^{-} \rightarrow Ag_{(S)}, E^{\circ} = -0.8V$

then SRP for the reaction is

$AgCl_{(S)} \rightarrow Ag^{+}_{(aq)} + Cl^{-}_{(aq)}$ is

A. 1.20 V

B. -1.20 V

C. 0.58 V

D. $+0.58$ V

Answer: C

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450. The $E^{\circ}_{Ag} = 0.80V$ and $E^{\circ}_{\text{cell}} = 1.20$ V , for the cell .

$2Ag^{+} + Cd \rightarrow 2Ag + Cd^{2+}$, the E^{o}_{Cd} is

A. $+0.4$ V

B. $-0.4V$

C. 0.8

D. -0.8

Answer: B

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451. E° for $F_2 + 2e^{-} \Leftrightarrow 2F^{-}$ is $2.8V$, E° for $\frac{1}{2}F + e^{-} = F^{-}$ is

$-$

A. 2.8 V

B. 1.4 V

C. -2.8 V

D. 1.4 V

Answer: A

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452. The standard cell potential for the cell

$Zn|Zn^{2+}(1M)||Cu^{2+}(1M)|Cu$

given $E^{\circ}_{Cu^{2+}/Cu} = 0.34V$

and $E^{\circ}_{Zn^{2+}/Zn} = -0.76V$ is

A. $-0.76 + 0.34 = -0.42V$

B. $-0.34 - (-0.76) = +0.42$ V

C. $0.34 - (-0.76) = +1.10V$

D. $-0.76 - (+0.34) = -1.10V$

Answer: C

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453. The standard electrode potential for the reactions,

$Ag^{+}(aq) + e^{-} \rightarrow Ag(s)$

$Sn^{2+}(aq) + 2e^{-} \rightarrow Sn(s)$

at $25^{\circ}C$ are 0.80 volt and -0.14 volt, respectively. The $emf$of the cell $Sn|Sn^{2+}(1M)||Ag^{+}(1M)Ag$ is :

A. 0.66 V

B. 0.80 V

C. 0.94 V

D. 1.08 V

Answer: A

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454. Given electrode potentials asre

$Fe^{3+} + e^{-} \rightarrow Fe^{2+}, \qquad E^{c-} = 0.771V$

I_(2)+2e^(-) rarr 2I^(c-)," "E^(c-)=0.536VE^(c-)._(cell)

f or $thecellreaction$, 2Fe^(3+)+2I^(c-) rarr Fe^(2+)+I_(2)` is

A. $(2 \times 0.771 - 0.536) = 1.006$ V

B. $(0.771 - 0.5 \times 0.536) = 0.503V$

C. $0.771 - 0.536 = 0.235V$

D. $0.536 - 0.771 = -0.236V$

Answer: C

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455. For, $I_2 + 2e \rightarrow 2I^-$, standard reduction potential $= +0.54$ volt. For, $2Br^- \rightarrow Br_2 + 2e^-$ standard oxidation potential $= -1.09$ volt. For $Fe \rightarrow F^{2+} + 2e^-$, standard oxidation potential $= +0.44$ volt. Which of the follwoing reactions is non-spontaneous ?

A. $Br_2 + 2I^- \rightarrow 2Br^- + I_2$

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

C. $Fe + I_2 \rightarrow Fe^{2+} + 2I^-$

D. $I_2 + 2Br^- \rightarrow 2I^- + Br_2$

Answer: D

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456. For the cell prepared from electrode A and B ,

Electrode $A : Cr_2O_7^{2-} \mid Cr^{3+}, E^{\circ}_{\text{red}} = 1.33V$ and

Electrode $B : Fe^{3+} \mid Fe^{2+}, E^{\circ}_{\text{red}} = 0.77V$. Which of the following statement is correct ?

A. The electrons will flow from B to A when connection are made

B. The emf of the cell will be -0.56V

C. A will be negative electrode

D. B will be positive electrode

Answer: A

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457. The following facts are availabel :

$2A^{c-} + B_2 \rightarrow 2B^{-} + A_2,$

$2C^{c-} + B_2 \rightarrow Noreaction,$

$2D^{c-} + A_2 \rightarrow 2A^{c-} + D_2$

Which of the following statement is correct ?

A. $E^{\circ}_{C^- \mid C_2} > E^{\circ}_{B^- \mid B_2} > E^{\circ}_{A^- \mid A_2} > E^{\circ}_{D^- D_2}$

B. $E^{\circ}_{C^- \mid C_2} < E^{\circ}_{B^- \mid B_2} < E^{\circ}_{A^- \mid A_2} < E^{\circ}_{D^- \mid D_2}$

C. $E^{\circ}_{C^- \mid C_2} < E^{\circ}_{B^- \mid B_2} > E^{\circ}_{A^- \mid A_2} > E^{\circ}_{D^- \mid D_2}$

D. $E^{\circ}_{C^- \mid C_2} > E^{\circ}_{B^- \mid B_2} < E^{\circ}_{A^- \mid A_2} < E^{\circ}_{D^- \mid D_2}$

Answer: B

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458. Calculate the standard free energy change for the reaction ,

$2Ag + 2H^+ \rightarrow H_2 + 2Ag^+$,

E° for $Ag^+ + e^- \rightarrow Ag$ is 0.80 V

A. $+154.4$ kJ

B. $+308.8$ kJ

C. -154.4 kJ

D. -308.8 kJ

Answer: C

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459. For a reaction $A(s) + 2B^{+}(aq) \rightarrow A^{2+}(aq) \rightarrow A^{2+}(aq) + 2B$, K_C has been found to be 10^{12}. The E°_{cell} is

A. 0.354 V

B. 0.708 V

C. 0.0098 V

D. 1.36 V

Answer: A

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460. The standard EMF of a Daniell cell is 1.10 volt. The maximum electrical work obtained from the Daniell cell is .

A. 212 . 3 kJ

B. 175 . 4 k J

C. 106.15 k J

D. 53.07 k J

Answer: A

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461. The standard Gibbs free energy change $\left(\Delta G^{\circ} \text{ in kJ mol}^{-1}\right)$, in a Daniel cell $\left(E^{\circ}_{\text{cell}} = 1.1V\right)$, when 2 moles of $Zn(s)$ is oxidized at 298 K, is closest to

A. 212 . 30

B. -212.30

C. 106.15

D. -106.15

Answer: B

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462. The equilibrium constant (K) for the reaction

$Cu(s) + 2Ag^{+}(aq) \rightarrow Cu^{2+}(aq) + 2Ag(s)$, will be

[Given, $E^{\circ}_{cell} = 0.46V$]

A. K_c = Antilog 15.6

B. K_c = Antilog 2.5

C. $K_c =$ Antilog 1.5

D. K_c = Antilog 12.2

Answer: A

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463. What is the free energy change for the half reaction

$Li^+ + e^- \rightarrow Li$?

Given $E^\circ_{LI^+|Li} = -3.0V, F = 96500Cmol^{-1}$ and T = 298 K

A. $298.5kJmol^{-1}$

B. $-298.5kJmol^{-1}$

C. $32.166CV^{-1}mol^{-1}$

D. $-289500 CV mol^{-1}$

Answer: A

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464. A galvanic cell is set up from a zinc bar weighing $100g$ and $1.0L$ of $1.0 M CuSO_4$ solution. How long would the cell run if it is assumed to deliver a steady current of $1.0A$. (Atomic mass of $Zn = 65$).

A. 1.1 hr

B. 46 hr

C. 53.6 hr

D. 24.00 hr

Answer: C

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465. If the oxidation potential be defined with reference to $Ag \mid Ag^{+}$ half cell (for which oxidation potential is taken to be zero) , which of the following will give the correct value of oxidation potential of $Cu \mid Cu^{2+}$ half cell (Given that $Cu \mid Cu^{2+} = -0.34$ V and $Ag \mid Ag^{+} = -0.80$ V)

A. -0.46 volts

B. -1.14 volts

C. 1.14 volts

D. 0.46 volts

Answer: D

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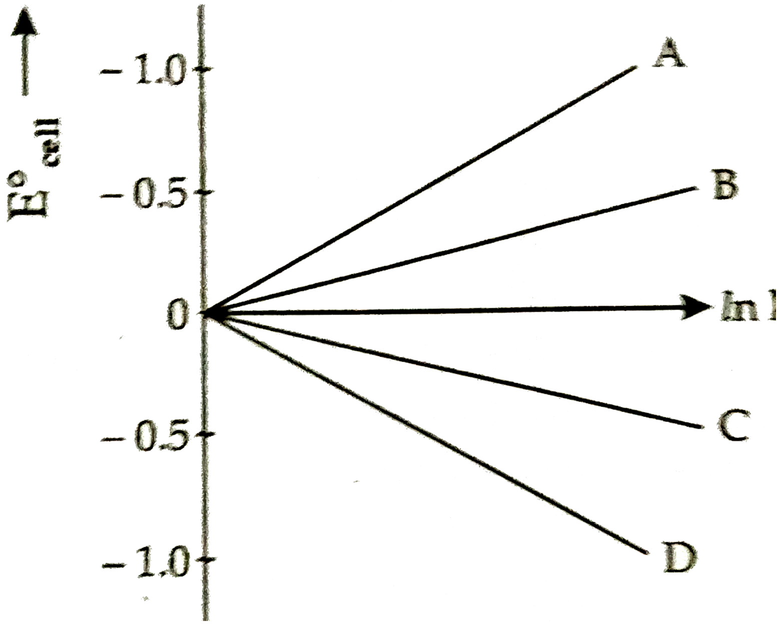
466. Given $\Delta G^\circ = -nFE^\circ_{\text{cell}}$ and $\Delta G^\circ = -RT$ ln K

The value of n = 2 will be given by the slope of which line in the fig.



A. OA

B. OB

C. OC

D. OD

Answer: B

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467. Given, standard electrode potentials,

$$Fe^{3+} + 3e^- \rightarrow Fe \qquad E^\circ = -0.036 \text{ volt}$$
$$Fe^{2+} + 2e^- \rightarrow Fe \qquad E^\circ = -0.440 \text{ volt}$$

The standard electrode potential E° for $Fe^{3+} + e^- \rightarrow Fe^{2+}$ is :

A. -0.476 V

B. -0.404 V

C. 0.404 V

D. $+0.772$ V

Answer: D

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468. If $E^0_{Cd} = 0.408V$ and $E^0_{Ag} = -799V$, the emf of the cell $Cd|Cd^{2+}||Ag^+|Ag$ is

A. -1.207 V

B. $+1.207$ V

C. $-0.391V$

D. $+0.391V$

Answer: B

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Questions From Competitive Exam

1. A current 0.5 ampere when passed through $AgNO_3$ solution for 193 sec. Deposited 0.108 g of Ag. Find the equivalent weight of Ag.

A. 108

B. 54

C. 10.8

D. 5.4

Answer: A

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2. A factory produces 40 kg of calcium in two hours by electrolysis. How much aluminium can be produced by same current in 2 hours if current efficiency is 50%?

A. 22 kg

B. 18 kg

C. 9 kg

D. 27 kg

Answer: B

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3.

Electrolyte	$\wedge.^{\infty}\ (Scm^2mol^{-1})$
KCl	149.9
KNO_3	145.0
HCl	426.2
$NaOAc$	91.0
$NaCl$	126.5

Calculate $\wedge^{\infty}_{HOAc}$ using appropriate molar conductance of the electrolytes listed above at infinite dilution in H_2O at $25^\circ C$

A. 517.2

B. 552.7

C. 390.7

D. 217.5

Answer: C

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4. At certain temperature and infinite dilution, the equivalent conductances of sodium benzoate, hydrochloric acid, and sodium chloride are 240, 349 and $229\Omega^{-1}cm^2eq^{-1}$ respectively. The equivalent conductance of benzoic acid in $\Omega^{-1}cm^2eq^{-1}$ at the same condition is

A. 80

B. 328

C. 360

D. 408

Answer: C

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5. A solution of concentration 'C' g equiv/litre has a specific resistance R. The equivalent conductance of the solution is

A. $\frac{R}{C}$

B. $\frac{C}{R}$

C. $\frac{1000}{RC}$

D. $\frac{1000R}{C}$

Answer: C

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6. The solution of $CuSO_4$ in which copper rod is immersed is diluted to times. The reduction electrode potential

A. increases by 29.5 m V

B. decreases by 29.5 m V

C. increases by 529 m V

D. decreases by 592 m V

Answer: D

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7. The standard oxidation potential E° for the half cell reaction are

$Zn \rightarrow Zn^{2+} + 2e^-$

$E^\circ = +0.76V$

$Fe \rightarrow Fe^{2+} + 2e^-$

$E^\circ = +0.41V$

EMF of the cell rection is $Zn + Fe^{2+} \rightarrow Zn^{2+} + Fe$

A. 1.17 V

B. 0.35 V

C. $-1.17V$

D. -0.35 V

Answer: B

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8. The Gibbs energy for the decomposition of Al_2O_3 at $500^\circ C$ is as follows:

$$\frac{2}{3}Al_2O_3 \rightarrow \frac{4}{3}Al + O_2, \Delta_r G = +966 kJ mol^{-1}$$

The potential difference needed for electrolytic reeduction of Al_2O_3 at $500^\circ C$ is at least:

A. 2.5 V

B. $5.0V$

C. $4.5V$

D. 3.0 V

Answer: A

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9. The correct order of $E^{\circ}_{M^{2+}/M}$ Values with negative sign for the four successive elements Cr, Mn, Fe and Co is:

A. $Fe > Mn > Cr > Co$

B. $Cr > Mn > Fe > Co$

C. $Mn > Cr > Fe > Co$

D. $Cr > Fe > Mn > Co$

Answer: C

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10. The concentration of potassium ions inside a biological cell is at least 20 times higher than outside. The resulting potential difference across the cell is important in several processes such as transmission of nerve impulses and maintaining the ion balance. A simplel model for a concentration cell involving a metal M is

$M(s) \mid M^{\oplus}(aq, 0.05 \text{ molar}) \mid \mid M^{\oplus}(aq, 1 \text{ molar}) \mid M(s)$

For the abov electrolytic cell, the magnitude of the cell potential is

$|E_{cell}| = 70mV$.

For the above cell

A. $E_{cell} < 0, \Delta G > 0$

B. $E_{cell} > 0, \Delta G < 0$

C. $E_{cell} < 0, \Delta G^{\circ} > 0$

D. $E_{cell} > 0, \Delta G^{\circ} < 0$

Answer: B

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11. The concentration of potassium ions inside a biological cell is at least 20 times higher than outside. The resulting potential difference across the cell is important in several processes such as transmission of nerve impulses and maintaining the ion balance. A simplel model for a concentration cell involving a metal M is

$M(s) \mid M^{\oplus}(aq, 0.05 \text{ molar}) \mid \mid M^{\oplus}(aq, 1 \text{ molar}) \mid M(s)$

For the abov electrolytic cell, the magnitude of the cell potential is $|E_{cell}| = 70mV$.

If the 0.05 moolar solution of $M^{\oplus}$ is replaced by a 0.0025 molar $M^{\oplus}$ solution, then the magnitude of the cell potential would be

A. 35 m V

B. 70 m V

C. 140 m V

D. 700 m V

Answer: C

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12. For the reduction of silver ions with copper metal, the standard cell potential was foound to be $+0.46V$ at $25^{\circ}C$. The value of standard Gibbs energy, ΔG° will be $\left(F = 96, 500 Cmol^{-1}\right)$:

A. -89.0 k J

B. -89.0 J

C. -44.5 kJ

D. -98.0 kJ

Answer: A

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13. An increase in equivalent conductance of a strong electrolyte with dilution is mainly due to:

A. increase in ionic mobility of ions

B. 100 % ionisation of electrolyte at normal dilution

C. increase in both i.e., number of ions and ionic mobility of ions

D. increase in number of ions

Answer: A

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14. Which of the following expressions correctly repesents the equivalent conductance at infinte dilution of $Al_2(SO_4)_3$. Given that $\Lambda^\circ_{Al^{3+}}$ and $\Lambda^\circ_{SO_4^{2-}}$ are the equivalent conductance at infinte dilution of the respective ions?

A. $2\Lambda^\circ_{Al^{3+}} + 3\Lambda^\circ_{SO_4^{2-}}$

B. $\Lambda^\circ_{Al^{3+}} + \Lambda^\circ_{SO_4^{2-}}$

C. $\left(\Lambda^\circ_{Al^{3+}} + \Lambda^\circ_{SO_4^{2-}}\right) \times 6$

D. $\frac{1}{3}\Lambda^\circ_{Al^{3+}} + \frac{1}{2}\Lambda^\circ$

Answer: B

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15. Consider the following relations for emf of a electrochemical cell

(i) emf of cell = (Oxidation potential of anode)-(Reduction potential of cathode)

(ii) emf of cell = (Oxidation potential of anode)+(Reduction potential of cathode)

(iii) emf of cell = (Reduction potential of anode)+(Reduction potential of cathode)

(iv) emf of cell = (Oxidation potential of anode)-(Oxidation potential of cathode)

Which of the above realtions are correct?

A. (iii) and (iv)

B. (i) and (ii)

C. (iii) and (iv)

D. (ii) and (iv)

Answer: D

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16. The equilibrium constant (K) for the reaction

$Cu(s) + 2Ag^{+}(aq) \rightarrow Cu^{2+}(aq) + 2Ag(s)$, will be

[Given, $E^{\circ}_{cell} = 0.46V$]

A. $K_C = AL(15.6)$

B. $K_C = AL(2.5)$

C. $K_C = AL(1.5)$

D. $K_C = AL(12.2)$

Answer: A

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17. E° for Fe/Fe^{2+} is $+0.44V$ and E° for Cu/Cu^{2+} is $-0.32V$.

Then, in the cell,

A. Cu oxidises Fe^{2+} ion

B. Cu^{2+} oxidises iron

C. Cu reduces Fe^{2+} ion

D. Cu^{2+} ion reduces Fe .

Answer: B

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18. For the electrochemical cell, $M|M^{+}||X^{-}|X, E^{\circ}_{M^{+}/M} = 0.44V$ and $E^{\circ}_{X/X^{-}} = 0.33V$. From this data we can deduce that :

A. $M + X \rightarrow M^{+} + X^{-}$ is the spontaneous reaction

B. $M^{+} + X^{-} \rightarrow M + X$ is the spontaneous reaction

C. $E_{cell} = 0.77$ V

D. $E_{cell} = -0.77$ V

Answer: B

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19. Match the followings .

List - I		List- II
(A)Potential of Hydrogen electrode at pH $= 10$	(I)	$0.76V$
	(II)	$0.0592V$
$(B) Cu^{2+} \mid Cu$	(III)	$-0.592V$
$(C) Zn \mid Zn^{2+}$	(IV)	$0.337V$
$(D) \frac{2.303RT}{F}$	(V)	$-.76V$

The correct is -

A. $\begin{array}{llll} A & B & C & D \\ V & I & IV & II \end{array}$

B. $\begin{array}{llll} A & B & C & D \\ III & I & II & V \end{array}$

C. $\begin{array}{llll} A & B & C & D \\ II & V & I & IV \end{array}$

D. $\begin{array}{llll} A & B & C & D \\ III & IV & I & II \end{array}$

Answer: D

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20. If values of Λ_0 of $NH_4Cl, NaOH$ and $NaCl$ are 130 , 127 and $109\Omega^{-1}cm^2eq^{-1}$ respectively . The $\Lambda^{\circ}_{NH_4OH}$ in $\Omega^{-1}cm^2eq^{-1}$ is

A. 456

B. 238

C. 196

D. 22

Answer: B

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21. Standard electrode potential of three metal X, Y and Z are $-1.2V, +0.5V$ and $-3.0V$ respectively. The reducing power of these metals will be:

A. $Y > Z > X$

B. $Y > X > Z$

C. $Z > X > Y$

D. $X > Y > Z$

Answer: C

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22. The electrode pptenticals for

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

and $Cu^{+}(aq) + e^{-} \rightarrow Cu(s)$

are $+0.15V$ and $+0.50V$ repectively. The value of $E^{\circ}_{cu^{2+}/Cu}$ will be.

A. 0.500 V

B. 0.325 V

C. 0.650 V

D. 0.150 V

Answer: B

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23. Standard electrode potential for Sn^{4+}/Sn^{2+} couple is $0.15V$ and that for the Cr^{3+}/Cr couple is $-0.74V$. These two couples in their standard state are connected to make a cell. The cell potential will be

A. $+1.19$ V

B. $+0.89$ V

C. $+0.18$ V

D. $+1.83$ V

Answer: B

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24. If $E^{\ominus}_{cell}$ for a given reaction is negative, which gives the correct relationships for the values of $\Delta G^{\ominus}$ and K_{eq}?

A. $\Delta G^{\circ} > , K_{eq} > 1$

B. $\Delta G^{\circ} < 0, K_{eq} > 1$

C. $\Delta G^{\circ} < 0, K_{eq} < 1$

D. $\Delta G^{\circ} > 0, K_{eq} < 1$

Answer: D

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25. Limiting molar conductivity of NH_4OH [i.e., $\Lambda_m^{\circ}(NH_4OH)$] is equal to:

A. $\Lambda^{\circ}_{m(NH_4Cl)} + \Lambda^{\circ}_{m(NaCl)} - \Lambda^{\circ}_{m(NaOH)}$

B. $\Lambda^{\circ}_{m(NaOH)} + \Lambda^{\circ}_{m(NaCl)} - \Lambda^{\circ}_{m(NH_4Cl)}$

C. $\Lambda^{\circ}_{m(NH_4OH)} + \Lambda^{\circ}_{m(NH_4Cl)} - \Lambda^{\circ}_{m(HCl)}$

D. $\Lambda^{\circ}_{m(NH_4Cl)} + \Lambda^{\circ}_{m(NaOH)} - \Lambda^{\circ}_{m(NaCl)}$

Answer: D

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26. The reduction potential of hydrogen half cell will be negative if :

A. $p(H_2) = 1$ atm and $\left[H^+\right] = 1.0$ M

B. $p(H_2) = 2$ atm and $\left[H^+\right] = 1.0$ M

C. $p(H_2) = 2$ atm and $\left[H^+\right] = 2.0$ M

D. $p = (H_2) = 1$ atm and $\left[H^+\right] = 2.0$ M

Answer: B

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27. Resistance of $0.2M$ solution of an electrolyte is 50Ω. The specific conductance of the solution is $1.3Sm^{-1}$. If resistance of the $0.4M$ solution of the same electrolyte is 260Ω, its molar conductivity is .

A. $6250Sm^2mol^{-1}$

B. $6.25 \times 10^{-4} Sm^2 mol^{-1}$

C. $625 \times 10^{-4} Sm^2 mol^{-1}$

D. $62.5 Sm^2 mol^{-1}$

Answer: B

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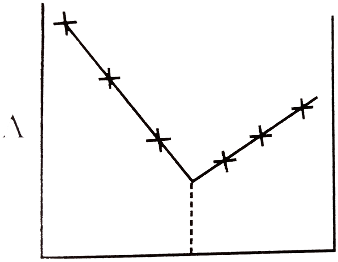
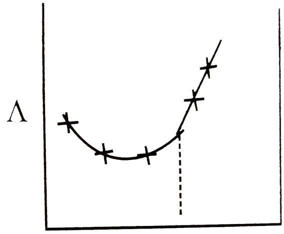
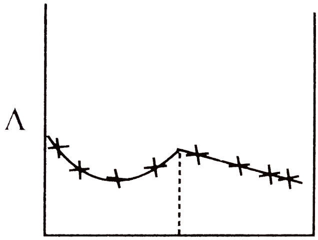
28. $AgNO_3(aq.)$ was added to an aqeous KCl solution gradually and the conductivity of the solution was measured. The plot of conductance (Λ) versus the volume of $AgNO_3$ is :



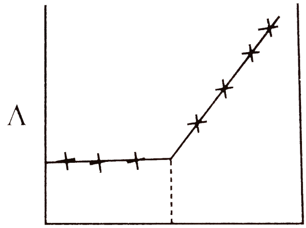
volume
(P)



volume
(Q)

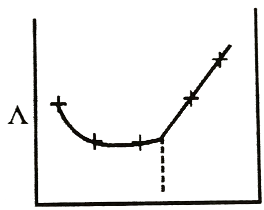


volume
(R)

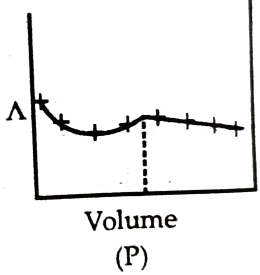


volume
(S)

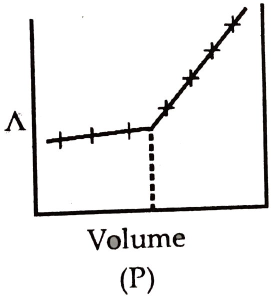
Volume
A. (P)



Volume
B. (P)



C.



D.

Answer: D

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29. Consider the following cell reaction.

$2Fe(s) + O_2(g) + 4H^+(aq) \rightarrow 2Fe^{2+}(aq) + 2H_2O(l)$,

$E^\circ = 1.67V$

At $[Fe^{2+}] = 10^{-3}M$, $P(O_2) = 0.1$ atm and pH=3, the cell potential at $25^\circ C$ is

A. 1.47 V

B. 1.77 V

C. 1.87 V

D. 1.57 V

Answer: D

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30. A solution contains Fe^{2+}, Fe^{3+} and T^{-} ions. This solution was treated with iodine at $35^{\circ}C$. E° for Fe^{3+}, Fe^{2+} is $0.77V$ and E° for $I_2/2I^{-}$ = 0.536 V. The favourable redox reaction is:

A. I_2 will be reduced to I^{-}

B. there will be no redox reaction

C. I^{-} will be oxidised to I_2

D. Fe^{2+} will be oxidised to Fe^{3+}

Answer: C

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31. The ionic conductance of Ba^{2+} and Cl^{-} respectively are 127 and $76\Omega^{-1}cm^{2}$ at infinite dilution. The equivalent conductance $\left(\text{in } \Omega^{-1}cm^{2}\right)$ of $BaCl_2$ at infinite dilute will be

A. 330

B. 203

C. 139.5

D. 51

Answer: C

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32. What volume of O_2 at NTP liberated by 5 A current flowing for 193 and through acidulated water ?

A. 56 mL

B. 112 m L

C. 158 mL

D. 965 m L

Answer: A

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33. Find E°_{cell} for the cell :

$Zn|Zn^{2+}(1M)||Ag^{+}(1M)|Ag$

[Given that : $E^{\circ}_{Zn/Zn^{2+}} = 0.76 \text{ V}, E^{\circ}_{Ag^{+}/Ag} = 0.80 \text{ V}.$

A. $-0.76V$

B. $0.76V$

C. 0.38 V

D. -0.38 V

Answer: B

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34. The number of moles of electrone required to deposits 36 g of Al from an aqueous solution of $Al(NO_3)_3$ is (atomic mass of Al = 27)

A. 4

B. 2

C. 3

D. 1

Answer: A

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35. The emf in V of Danneil cell containing 0.1 M $ZnSO_4$ and 0.01 M $CuSO_4$ solutions their respective electrodes is $E^{\circ}_{Cu^{2+} \mid Cu} = 0.34$V and $E^{\circ}_{Zn^{2+} \mid Zn} = -0.76$ V

A. 1.10 V

B. 1.16 V

C. 1.13 V

D. 1.07 V

Answer: D

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36. Cell constant of a conductivity cell is ?

A. Conductance/ specific conductance

B. Specific conductance/ Resistance

C. Specific conductance/ Conductance

D. Specific conductance $\times \frac{1000}{N}$

Answer: C

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37. The standard reduction potential for Zn^{2+} / Zn, Ni^{2+} / Ni and Fe^{2+} / Fe are $-0.76, -0.23$ and $-0.44V$ respectively. The reaction $X + Y^{2} \rightarrow X^{2+} + Y$ will be spontaneous when:

A. X = Zn, Y = Ni

B. X = Ni , Y = Fe

C. X = Ni , Y = Zn

D. X = Fe , Y = Zn

Answer: A

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38. The solubility product (K_{sp}, mol^3dm^{-9}) of MX_2 at 298 K based on the information available for the given concentration cell is

(take $2.303 \times R \times 298 / F = 0.059$V)

A. 1×10^{-15}

B. 4×10^{-15}

C. 1×10^{-12}

D. 4×10^{-12}

Answer: B

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39. The value of $\Delta G(kJmol \mid \; -1)$ for the given cell is (take 1 F = 96500 $Cmol^{-1}$)

A. -5.7

B. 5.7

C. 11.4

D. -11.4

Answer: D

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40. Al_2O_3 is reduced by electrolysis at low potentials and high current. If 4.0×10^4 amperes of currernt is passed through molten Al_2O_3 for 6 hours, what mass of aluminium is produced? (Assume 100 % current efficiency, At. Mass of $Al = 27u$)

A. 8.1×10^4 g

B. 2.4×10^5 g

C. 1.3×10^4 g

D. 9.0×10^3 g

Answer: A

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41. The equivalent conductance of $M/32$ solution of a weak monobasic acid is 8.0 and at infinite dilution is 400. The dissociation constant of this acid is :

A. 1.25×10^{-6}

B. 6.25×10^{-4}

C. 1.25×10^{-4}

D. 1.25×10^{-5}

Answer: D

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42. The ionic conductance is least for

A. Cs^{+}

B. Rb^{+}

C. K^{+}

D. Na^{+}

Answer: D

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43. Given, standard electrode potentials

$Fe^{2+} + 2e^- \rightarrow Fe, E^\circ = -0.440V$

$Fe^{3+} + 3e^- \rightarrow Fe, E^\circ = -0.036V$

The standarde potential (E°) for

$Fe^{2+} + e^- \rightarrow Fe^{2+}$, is

A. $+0.772$ V

B. -0.772 V

C. $+0.589V$

D. $-0.589V$

Answer: A

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44. Electrode potential of hydrogen electrode is 18 m V then $[H^+]$ is -

A. 0.2

B. 1

C. 2

D. 5

Answer: C

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45. A certain quantity of electricity is passed through aq. $Al_2(SO_4)_3$ and $CuSO_4$ solutions connected in series 0.09 g of Al is deposited on cathode during electrolysis . The amount of copper deposited on cathode in grams is (At., mass of Al = 27 , Cu = 63.6)

A. 3.18

B. 0.318

C. 31.8

D. 0.636

Answer: B

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46. Standard reduction potentails of the half reactions are given below:

$F_2(g) + 2e^- \rightarrow 2F^-(aq.), , E^\ominus = +2.87$

$Cl_2(g) + 2e^- \rightarrow 2Cl^-(aq.), , E^\ominus = +1.36V$

$Br_2(g) + 2e^- \rightarrow 2Br^-(aq.), , E^\ominus = +1.09V$

$I_2(s) + 2e^- \rightarrow 2l^-(aq.), , E^\ominus = +0.54V$

The strongest oxidizing and reducing agents respectively are:

A. F_2 and I^-

B. Br_2 and Cl^-

C. Cl_2 and Br^-

D. Cl_2 and I_2

Answer: A

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