



11-12 + JEE/GUJCET
CHEMISTRY
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GUJCET CRASH COURSE

SEM- 3 - Ch- 3 electrochemistry

- (1) What is the cell reaction for:
 $\ominus \text{Zn} | \text{Zn}^{2+}_{(0.1\text{M})} || \text{Cd}^{2+}_{(0.1\text{M})} | \text{Cd}^{\oplus}$
- (a) $\text{Cd} \rightarrow \text{Cd}^{2+} + 2\text{e}^{-}$
 (b) $\text{Zn}^{+2} \rightarrow \text{Zn} + 2\text{e}^{-}$
 (c) $\text{Cd} + \text{Zn}^{2+} \rightarrow \text{Cd}^{2+} + \text{Zn}$
 (d) $\text{Cd}^{2+}_{(\text{aq})} + \text{Zn}_{(\text{s})} \rightarrow \text{Cd}_{(\text{s})} + \text{Zn}^{2+}$
- (2) If the cell reaction is
 $\text{Zn} + 2\text{Ag}^{+} \rightarrow \text{Zn}^{+2} + 2\text{Ag}$, what will be the correct presentation of cell?
- (a) $\ominus \text{Ag} | \text{Ag}^{+} || \text{Zn} | \text{Zn}^{2+\oplus}$
 (b) $\ominus \text{Zn} | \text{Zn}^{+} || 2\text{Ag}^{+} | \text{Ag}^{\oplus}$
 (c) $\ominus 2\text{Ag} | \text{Ag}^{+} || \text{Zn}^{+} | \text{Zn}^{2+\oplus}$
 (d) $\ominus \text{Zn} | \text{Zn}^{+2} || 2\text{Ag}^{+} | \text{Ag}^{\oplus}$
- (3) KCl solution cannot be filled in the salt bridge
- in the following cell
 $\ominus \text{Cu}_{(\text{s})} | \text{CuSO}_{4(\text{aq})} || \text{AgNO}_{3(\text{aq})} | \text{Ag}_{(\text{s})}^{\oplus}$ why?
- (a) CuCl_2 is precipitated
 (b) Cl_2 gas produce
 (c) AgCl is precipitated
 (d) Nothing happened
- (4) Which reaction is possible in Galvanic cell?
- (a) $\text{Zn}_{(\text{s})} \rightarrow \text{Zn}^{2+}_{(\text{aq})} + 2\text{e}^{-}$
 (b) $\text{Cu}^{2+} + 2\text{e}^{-} \rightarrow \text{Cu}_{(\text{s})}$
 (c) $\text{Zn}_{(\text{s})} + \text{Cu}^{2+}_{(\text{aq})} \rightarrow \text{Zn}^{2+}_{(\text{aq})} + \text{Cu}_{(\text{s})}$
 (d) All of these
- (5) The combination of Zn metal strip
 ZnSO_4 solution is called-
- (a) Cell
 (b) Concentration cell
 (c) Half cell
 (d) None of

these

(6) Which apparatus is used to measure exact potential?

- (a) Ammeter (b) Galvanometer
(c) Voltmeter (d) Potentiometer

Potentiometer

(7) The difference of intensity to lose electrons of electrode is called -

- (a) Oxidation potential
(b) Reduction potential
(c) Cell potential
(d) All of these

(8) The potential of the standard hydrogen electrode is

- (a) 1.1 volt (b) 0.0 volt
(c) 0.5 volt (d) 1.5 volt

(9) The potential of the half cell cannot be measured alone because-

- (a) Redox reaction cannot be completed
(b) Salt bridge is not there
(c) Cell cannot be completed
(d) All are correct

(10) $E_{\text{red}}^{\circ} = \dots$

- (a) E_{oxi}° (b) $-E_{\text{red}}^{\circ}$
(c) $-E_{\text{oxi}}^{\circ}$ (d) E_{Redox}°

(11) The tendency to lose electron of an unknown electrode is more than the standard hydrogen electrode, so the unknown electrode work as

- (a) Anode (b) Cathode
(c) Neutral (d) None of these

(12) In the cell, which electrode is acting as an anode?

- (a) The electrode whose oxidation potential is

less

(b) The electrode whose oxidation potential is more

(c) The electrode whose reduction potential is less

(d) The electrode whose reduction potential is more

(13) The cell in which both electrodes are of same metal and the conc. of solution is different is called....

- (a) Standard H electrode
(b) Electrolytic cell
(c) Concentration cell
(d) Dry cell

(14) Which is the correct formula to get oxidation potential non standard half cell $\text{Co}|\text{Co}^{2+}$

- (a) $E_{(\text{Co}^{2+}|\text{Co})} = E_{(\text{Co}^{2+}|\text{Co})}^{\circ} - \frac{0.059}{2} \log [\text{Co}^{2+}]$
(b) $E_{(\text{Co}^{2+}|\text{Co})} = E_{(\text{Co}^{2+}|\text{Co})}^{\circ} - \frac{0.059}{2} \log \left[\frac{1}{\text{Co}^{2+}} \right]$
(c) $E_{(\text{Co}^{2+}|\text{Co})} = E_{(\text{Co}^{2+}|\text{Co})}^{\circ} - \frac{0.059}{n} \log [\text{Co}^{2+}]$
(d) $E_{(\text{Co}^{2+}|\text{Co})} = E_{(\text{Co}^{2+}|\text{Co})}^{\circ} + \frac{0.059}{n} \log [\text{Co}^{2+}]$

(15) What is the value of cell potential at equilibrium state?

- (a) Positive (b) Negative
(c) Zero (d) Infinite

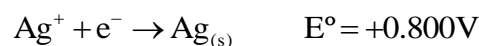
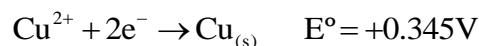
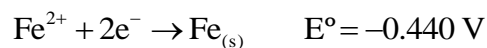
(16) Which reaction takes place by combination of the following two half cell?

$$E_{\text{Fe}^{2+}|\text{Fe}}^{\circ} = 0.44\text{V}; E_{\text{Pb}^{2+}|\text{Pb}}^{\circ} = 0.20\text{V}$$

- (a) $\text{Fe}^{2+}_{(\text{aq})} + \text{Pb}_{(\text{s})} \rightleftharpoons \text{Pb}^{2+}_{(\text{aq})} + \text{Fe}_{(\text{s})}$

- (b) $\text{Fe}_{(s)} + \text{Pb}^{2+}_{(aq)} \rightleftharpoons \text{Fe}^{2+}_{(aq)} + \text{Pb}_{(s)}$
- (c) $\text{Fe}_{(s)} + \text{Pb}_{(s)} \rightleftharpoons \text{Fe}^{2+}_{(aq)} + \text{Pb}^{2+}_{(aq)}$
- (d) $\text{Pb}^{2+}_{(aq)} + \text{Fe}^{2+}_{(aq)} \rightleftharpoons \text{Pb}_{(s)} + \text{Fe}_{(s)}$
- (17) KNO_3 solution is used in the salt bridge because-
- (a) KNO_3 is soluble in water
 (b) KNO_3 is good conductor
 (c) The speed of the ions K^+ and NO_3^- are same
 (d) None of these
- (18) The value of E°_{red} for the metal A, B, and C are +0.5 volt, -3.0 volt and -1.2 volt respectively then what will be the correct order of decrease in the reducing property?
- (a) $B > C > A$ (b) $A > B > C$
 (c) $C > B > A$ (d) $A > C > B$
- (19) The potential of the cell is actually
- (a) potential applied to electrodes
 (b) ionization potential
 (c) a relative difference of intensity to accept or lose electrons.
 (d) the potential energy of electrons.
- (20) The half cell potential Zn and Mg are as $\frac{\text{Zn}^{+2}}{\text{Zn}} = +0.76 \text{ V}$ and $\frac{\text{Mg}^{+2}}{\text{Mg}} = +2.37 \text{ V}$ What happened when powder of 'Zn' is added to MgCl_2 solution?
- (a) No reaction (b) ZnCl_2 will form
 (c) Mg will precipitated (d) None
- (21) CuSO_4 solution cannot be stored in Aluminium container why?
- (a) 'Cu' undergo oxidation
 (b) Cu undergo reduction
 (c) 'Al' undergo Reduction
 (d) CuSO_4 will be decompose
- (22) On which factor the value of cell potential does not depend?
- (a) Temperature
 (b) Colour of solution
 (c) Nature of electrode
 (d) Conc.
- (23) In Nernst's equation 0.059 is value of which constant at 298 K?
- (a) $\frac{RT}{F}$ (b) $\frac{RT}{nF}$
 (c) $2.303 \frac{RT}{nF}$ (d) $2.303 \frac{RT}{F}$
- (24) What will be 'n' for $\text{Mg} | \text{Mg}^{2+}_{(0.5M)} || \text{Al}^{3+}_{(0.25M)} | \text{Al}$ cell?
- (a) 2 (b) 3 (c) 6 (d) 4
- (25) Which is produced in the solution of CuSO_4 when it is electrolysed with graphite electrodes?
- (a) $\text{Cu}(\text{OH})_2$ (b) H_2O
 (c) Na_2SO_4 (d) H_2SO_4
- (26) What can be measured with help of wheatstone bridge?
- (a) Electric current (b) Conductivity
 (c) Resistance (d) All of these
- (27) The relative tendency of electrode to release (lose) e^- is commonly known as-
- (a) E_{red} (b) E°_{red} (c) E°_{oxi} (d) E_{cell}
- (28) The potential of $E^\circ_{\text{Mg}+2|\text{Mg}} = -2.36$ volt, then what will be potential of $E^\circ_{\text{Mg}|\text{Mg}^{+2}}$?

- (a) +2.36 volt (b) +0.236 volt
(c) -1.10 v (d) -2.36 volt
- (29) Which is the correct formula to get coulomb?
(a) $Q = \frac{1}{t}$ (b) $Q = 1 \times t$
(c) $Q = I^2 \times t$ (d) $Q = \frac{I}{t^2}$
- (30) Pick the correct formula for the efficiency of cell in %?
(a) $\frac{\text{Exp. value of product}}{\text{Theoretical value of product}} \times 100$
(b) $\frac{\text{Theoretical value of product}}{\text{Exp. value of product}} \times 100$
(c) $\frac{\text{Theoretical value of product}}{\text{Practical value of product}} \times 100$
(d) None of these
- (31) The cell potential of the cell with $\frac{1}{2}\text{Cu}_{(s)} + \frac{1}{2}\text{Cl}_{2(g)} \rightarrow \frac{1}{2}\text{Cu}^{2+} + \text{Cl}^-$ reaction at 298 K temperature is 1.02 volt. What will be the free energy?
(a) 98430 J (b) -98430 J
(c) 96500 J (d) -49215 J
- (32) Which of the following equation gives the correct for potential?
(a) $E = E^\circ - \frac{RT}{nF} \ln \left[\frac{\text{Product}}{\text{Reactant}} \right]$
(b) $E = E^\circ - \frac{RT}{nF} \ln \left[\frac{\text{Reactant}}{\text{Product}} \right]$
(c) $E = E^\circ + \frac{RT}{nF} \ln \left[\frac{\text{Product}}{\text{Reactant}} \right]$
(d) $E = -\frac{RT}{nF} \log \left[\frac{\text{Product}}{\text{Reactant}} \right]$
- (33) E°_{red} value of A, B, C are +0.5V, -3.0 V and -1.2 V respectively, then intensity of reducing power in decreasing order will be
(a) $B > C > A$ (b) $A > B > C$
(c) $C > B > A$ (d) $A > C > B$
- (34) $\text{Zn}^{2+} + 2e^- \rightarrow \text{Zn}_{(s)}$ $E^\circ = -0.762 \text{ V}$



From the above information say that which metal will oxidised easily?

- (a) Zn (b) Cu (c) Fe (d) Ag

- (35) Calculate the equilibrium constant for the following reaction:



$$E^\circ_{\text{cell}} = 0.46 \text{ volt}$$

- (a) 1.941×10^{15} (b) 3.92×10^{15}
(c) 0.392×10^{15} (d) 39.20×10^{10}

- (36) The values of limiting molar conductivity of NaCl, HCl and CH_3COONa are 126.4, 425.9 and $91.05 \text{ S cm}^2\text{mol}^{-1}$ what is the molar conductivity of CH_3COOH solution?

- (a) $271.6 \text{ S cm}^2\text{mol}^{-1}$
(b) $266.0 \text{ S cm}^2\text{mol}^{-1}$
(c) $590.6 \text{ S cm}^2\text{mol}^{-1}$
(d) $390.5 \text{ S cm}^2\text{mol}^{-1}$

- (37) 1.08 gm 'Ag' deposited by passing 7.5 amp current for 200 sec. through AgNO_3 solution. What is the efficiency of cell?

- (a) 90% (b) 100% (c) 95% (d) 64.51%

- (38) What is the free energy of the cell formed by the combination of $E^\circ_{\text{Cu}^{2+}|\text{Cu}} = 0.34 \text{ V}$ and $E^\circ_{\text{Fe}^{2+}|\text{Fe}} = -0.45 \text{ V}$?

- (a) -154 J (b) 152470 J (c) 96500 J
(d) -96487 J

- (39) Pick up the correct cell presentation formed by the, $E^\circ_{\text{Ni}^{2+}|\text{Ni}} = -0.23 \text{ V}$; $E^\circ_{\text{Ag}^+|\text{Ag}} = 0.80 \text{ V}$ volt?

- (a) $\ominus \text{Ni} | \text{Ni}^{2+}_{(1M)} || \text{Ag}^+_{(1M)} | \text{Ag}^\oplus$
(b) $\ominus \text{Ag} | \text{Ag}^{2+}_{(1M)} || \text{Ni}^{2+}_{(1M)} | \text{Ni}$
(c) $\ominus \text{Ni}^{2+} | \text{Ni} || \text{Ag} | \text{Ag}^{+\oplus}$
(d) $\ominus \text{Ag}^+_{(1M)} | \text{Ag} || \text{Ni} | \text{Ni}^{2+}_{(1M)}$

- (40) How much Calcium will be obtained on cathode by passing 1 Faraday electric current? (At wt. of Ca = 40 gm/mole)

- (a) 40 gram (b) 80 gram
(c) 20 gram (d) 50 gram