

## CLASS 12 : VACATION HOMEWORK

- Revise the topics covered till now and complete writing notes for the same.
- Prepare the list of the formulas of chapter 1 : solutions and chapter 2 : electrochemistry

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CLASS: XII

WORKSHEET No: 03

CHAPTER: ELECTROCHEMISTRY

TIME: 35 MINUTES

Q.1 The difference between the electrode potentials of two electrodes when no current is drawn through the cell is called \_\_\_\_\_

- (a) Cell potential (b) Cell emf (c) Potential difference (d) Cell voltage

Q.2 An electrochemical cell can behave like an electrolytic cell when \_\_\_\_\_

- (a)  $E_{\text{cell}} = 0$  (b)  $E_{\text{cell}} > E_{\text{ext}}$  (c)  $E_{\text{ext}} > E_{\text{cell}}$  (d)  $E_{\text{cell}} = E_{\text{ext}}$

Q.3 The positive value of the standard electrode potential of  $\text{Cu}^{2+}/\text{Cu}$  indicates that \_\_\_\_\_

- (I) This redox couple is a stronger reducing agent than the  $\text{H}^+/\text{H}_2$  couple.  
(II) this redox couple is a stronger oxidising agent than  $\text{H}^+/\text{H}_2$ .  
(III) Cu can displace  $\text{H}_2$  from acid.  
(IV) Cu cannot displace  $\text{H}_2$  from acid.

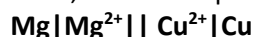
Identify the correct statement/s:

- (a) Statement I & III (b) Statement I & IV  
(c) Statement II & III (d) Statement II & IV

Q.4 Which of the following statement is wrong about a galvanic cell?

- (a) cathode is positive charged (b) anode is negatively charged  
(c) reduction takes place at the anode (d) reduction takes place at the cathode

Q.5 For the given cell, Incorrect option is:



- (a) Mg is Anode (b) The cell reaction is  $\text{Mg}^{2+} + \text{Cu} \rightarrow \text{Mg} + \text{Cu}^{2+}$   
(c) Cu is cathode (d) Cu is the oxidising agent

Given below are two statements labelled as Assertion (A) and Reason (R) Select the most appropriate answer from the options given below:

- (a) Both A and R are true and R is the correct explanation of A  
(b) Both A and R are true but R is not the correct explanation of A  
(c) A is true but R is false  
(d) A is false but R is true

Q.5 **Assertion** : Assertion: Copper sulphate can be stored in zinc vessel.

**Reason**: Zinc is more reactive than copper.

Q.6 **Assertion**:  $E_{\text{cell}}$  should have a positive value for the cell to function.

**Reason**: for a possible/feasible cell reaction the reduction potential should be in order  $E_{\text{cathode}} < E_{\text{anode}}$ .

Answer the questions in short

Q.1 Given that the standard electrode potentials ( $E^\ominus$ ) of metals are

$\text{K}^+/\text{K} = -2.93 \text{ V}$ ,  $\text{Ag}^+/\text{Ag} = +0.80 \text{ V}$ ,  $\text{Cu}^{2+}/\text{Cu} = +0.34 \text{ V}$ ,  $\text{Mg}^{2+}/\text{Mg} = -2.97 \text{ V}$ ,  $\text{Cr}^{3+}/\text{Cr} = -0.74 \text{ V}$ ,  $\text{Fe}^{2+}/\text{Fe} = -0.44 \text{ V}$ .

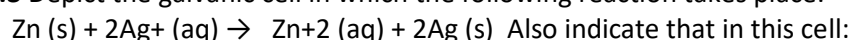
Arrange these metals in an increasing order of their reducing power.

Ans: \_\_\_\_\_

Q.2 Fluoride does not exhibit any positive oxidation state. Why?

Ans: \_\_\_\_\_

Q.3 Depict the galvanic cell in which the following reaction takes place:



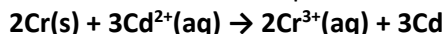
- (i) Which electrode is negatively charged?  
(ii) What is the carrier of the current in the cell?  
(iii) What is the individual reaction at each electrode?

Ans:(i) \_\_\_\_\_

(ii) \_\_\_\_\_

(iii) \_\_\_\_\_

Q.04 Calculate the standard cell potentials of galvanic cell in which the following reaction take place:



Calculate the  $\Delta_r G^0$  value for the reaction. Given  $E^0_{(\text{Cr}^{3+}/\text{Cr})} = -0.74 \text{ V}$  ;  $E^0_{(\text{Cd}^{2+}/\text{Cd})} = -0.40 \text{ V}$  ,  $F = 96500 \text{ C mol}^{-1}$

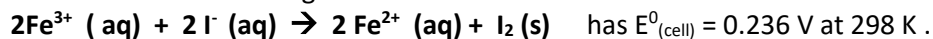
Ans: \_\_\_\_\_

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Q.05 The cell where the following reaction occurs



Calculate the standard Gibbs energy of the cell reaction. (Given:  $1 \text{ F} = 96500 \text{ C mol}^{-1}$ )

Ans: \_\_\_\_\_

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Q.06 A voltaic cell is set up at  $25^{\circ}\text{C}$  with the following half cells:



(i) Write the equation for the cell reaction that occurs when the cell generates an electric current.

(ii) Determine the cell potential. (Given  $E^0_{(\text{Ni}^{2+}/\text{Ni})} = -0.25 \text{ V}$  ,  $E^0_{(\text{Al}^{3+}/\text{Al})} = -1.66 \text{ V}$ )

(iii) Write the direction of flow of current when an external opposite potential applied is

(a) less than 1.41 V and (b) greater than 1.41 V

Ans:(i) \_\_\_\_\_

Ans:(ii) \_\_\_\_\_

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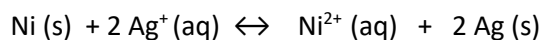
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Ans:(iii) (a) \_\_\_\_\_

Ans:(iii) (b) \_\_\_\_\_

Q.7 Calculate the  $\log K_c$  for the given reaction at 298K :



Given:  $E^0_{\text{Ni}^{2+}/\text{Ni}} = -0.25 \text{ V}$  ,  $E^0_{\text{Ag}^{+}/\text{Ag}} = +0.80 \text{ V}$  ,  $1 \text{ F} = 96500 \text{ C mol}^{-1}$

Ans: \_\_\_\_\_

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## CLASS 12 : VACATION HOMEWORK

- Revise the topics covered till now and complete writing notes given for the same.
- Prepare the list of the formulas of chapter 1: solutions and chapter 2 : electrochemistry
- Complete the investigatory project given individually.
- Solve the following questions:

1. Calculate the equilibrium constant for the reaction  $\text{Fe} + \text{CuSO}_4 \rightleftharpoons \text{FeSO}_4 + \text{Cu}$  at  $25^\circ\text{C}$ . (Given  $E^\circ(\text{OP}/\text{Fe}) = 0.5 \text{ V}$ ,  $E^\circ(\text{OP}/\text{Cu}) = -0.4 \text{ V}$ )

- a)  $3.46 \times 10^{30}$
- b)  $3.46 \times 10^{26}$
- c)  $3.22 \times 10^{30}$
- d)  $3.22 \times 10^{26}$

2. Calculate the e.m.f. of the half-cell given below.

Pt,  $\text{H}_2$  | HCl at 1-atmosphere pressure and 0.1 M. Given,  $E^\circ(\text{OP}) = 2 \text{ V}$ .

3. The unit of cryoscopic constant is\_\_\_\_\_.

4. Determine the elevation of the boiling point of a aqueous solution with 1 mol of solute(glucose). ( density=1.2g/mL)

- a) Kb
- b) 0.2 Kb
- c) 0.02Kb
- d) 0.98Kb

Investigatory projects of class 12:

Names of student	Topic chosen by the student
1. Dhruv mehta	Stereochemistry
2. Vedant radia	organic compounds
3. Payal rathod	Types of solutions and expressing concentration of solutions.
4. Tanvi modhwadiya	Electrochemical cells
5. Kuldeep odedra	Electrolytic cells
6. Janvi chudasma	Carbohydrates
7. Grishma	Colloids
8. Ranjit bhutiya	Amines
9. Parth karavadra	Biomolecules
10. Priyanshu maru	Green chemistry: biodiesel and biopetrol
11. Prashant kumavat	Theodynamics
12. Isha masani	S block elements
13. Neha lakhani	P block elements
14. Sunishi jayswar	D block elements
15. Pragati sindhva	F block elements
16. Bhavik chavda	Aldehydes
17. Halo alkanes	Mayank sain
18. Jigar madlani	Alcohols
19. Harsh mori	Ethers
20. Sanskriti rana	Haloarenes
21. Hardik makwana	Ketones
22. Diksha	Nomenclature of organic compounds

