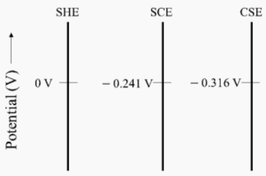
Unit 5 - Week 3

Assignment 3

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-02-19, 23:59 IST.

1) Figure below shows the conversion relation between three different reference electrodes. If the potential of a metal M with respect to SHE is - 0.500 V, the value of this potential (in V) with respect to SCE is; (SHE: Standard Hydrogen Electrode, SCE: Saturated Calomel Electrode, CSE: Copper Sulphate Electrode) *1 point*



- - 0.741
- 0.741
- - 0.259
- 0.259

No, the answer is incorrect.
Score: 0
Accepted Answers:
- 0.741

2) Based on Q1, if the potential of a metal M with respect to CSE is 0.25 V, the value of this potential (in V) with respect to SHE is; *1 point*

- - 0.566
- 0.566
- - 0.066
- 0.066

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.566

3) A Zinc rod is immersed in 0.5M $ZnSO_4$ solution. The standard chemical potential ($\mu^0_{Zn^{2+}}$) for Zn^{2+} ion is – 147030 J/mol. The value of chemical potential (kJ/mol) of Zn^{2+} ion in the solution is; (Given: Activity coefficient $\gamma_{Zn^{2+}} = 0.15$) *1 point*

- - (189 to 200)
- - (99 to 110)
- - (122 to 130)
- - (147 to 158)

No, the answer is incorrect.
Score: 0
Accepted Answers:
- (147 to 158)

4) The equilibrium constant (K_c) for the reaction ZnO (s) + C (s) = Zn (s) + CO (g) at 1000 K is 5.5 x 10^{-8}. The standard entropy change (ΔS^o) associated with the reaction at 1000 K is 150.5 J/K/mol. The value of standard enthalpy change (ΔH^o) in kJ/mol for the given reaction at 1000 K is; *1 point*

- - (100 to 110)
- - (12 to 22)
- (52 to 64)
- - (75 to 88)

No, the answer is incorrect.
Score: 0
Accepted Answers:
- (12 to 22)

5) Which of the following is true for the standard reduction potential series? *1 point*

- it indicates both thermodynamics and kinetics of corrosion
- it lists the electrode potential of alloys
- it lists the electrode potential of pure components
- tendency of a pure component to passivate in a solution can be predicted

No, the answer is incorrect.
Score: 0
Accepted Answers:
it lists the electrode potential of pure components

6) Consider the reduction reaction $A^{3+} + 3e^- = A$. The value of the standard reduction (V) potential of A is; (Given, $\mu^0_{A^{3+}} = -58500$ J/mol, F = 96500 coulomb) *1 point*

- – (0.18 to 0.25)
- – (0.02 to 0.10)
- – (0.55 to 0.60)
- (0.18 to 0.25)

No, the answer is incorrect.
Score: 0
Accepted Answers:
- (0.18 to 0.25)

7) The value of reduction potential (V) at hydrogen electrode for hydrogen evolution reaction in a solution of pH 2 is; *1 point*

- - (0.24 to 0.30)
- - (0.10 to 0.15)
- (0.24 to 0.30)
- (0.10 to 0.15)

No, the answer is incorrect.
Score: 0
Accepted Answers:
- (0.10 to 0.15)

8) The value of the reduction potential (V) for the reaction as shown below is; *1 point*

$2H_2O + 2e^- = H_2 + 2(OH)^-$

(Given: $\mu^0_{OH^-} = -157147.1$ J/mol , $\mu^0_{H_2O} = -236964.2$ J/mol, $P_{H_2} = 1$ atm and pH = 12)

- - (0.68 to 0.75)
- - (0.45 to 0.52)
- - (0.92 to 0.98)
- - (0.10 to 0.18)

No, the answer is incorrect.
Score: 0
Accepted Answers:
- (0.68 to 0.75)

9) The value of the reduction potential (in V) with respect to standard hydrogen electrode for the reaction as shown below is; *1 point*

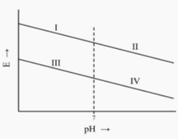
$O_2 + 2H_2O + 4e = 4(OH)^-$

(Given: $E^0_{O_2/4(OH)^-} = 0.401$ V, pH = 10 and $P_{O_2} = 1$ atm)

- (1.32 to 1.44)
- (0.60 to 0.69)
- – (0.55 to 0.68)
- – (0.15 to 0.28)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(0.60 to 0.69)

10) Figure below shows the potential (E) vs pH diagram. Match set 1 with set 2 and mark the correct option. *1 point*



Set 1	Set 2
Line I	(A) $O_2 + 2H_2O + 4e^- = 4OH^-$
Line II	(B) $2H_2O + 2e^- = H_2 + 2OH^-$
Line III	(C) $O_2 + 4H^+ + 4e^- = 2H_2O$
Line IV	(D) $2H^+ + 2e^- = H_2$

- I – C, II – A, III – D, IV – B
- I – A, II – C, III – D, IV – B
- I – C, II – D, III – A, IV – B
- I – C, II – A, III – B, IV – D

No, the answer is incorrect.
Score: 0
Accepted Answers:
I – C, II – A, III – D, IV – B