Unit 4 - Week 2

Assignment 2

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

Due on 2019-09-11, 23:59 IST.

1) Identify the correct statement for the corrosion behavior of iron (surface area: 5 cm^2) in a deaerated 3.5% NaCl solution when it is galvanically coupled to (A) a gold piece of 5 cm^2 area and (B) a gold piece of 50 cm^2 area: **1 point**

- Iron will corrode more in case (A)
- Iron will corrode more in case (B)
- Iron will passivate
- No change in corrosion rates of iron in both the cases

No, the answer is incorrect.
Score: 0
Accepted Answers:
Iron will corrode more in case (B)

2) Consider that a 0.8 wt% carbon steel obtained by furnace cooling is immersed in 3.5% NaCl solution. Which of the following statements is correct? **1 point**

- galvanic couple will form between ferrite and cementite
- cementite will act as cathode and ferrite will act as anode
- ferrite will corrode severely
- all of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
all of the above

3) Consider that two dissimilar metals (A and B) of equal area are galvanically coupled and immersed in an electrolyte having solution resistance R. Which of the following statement is correct with respect to the junction point of A and B? **1 point**

- R is high and corrosion rate is more
- R is low and corrosion rate is more
- R is high and corrosion rate does not change
- R is low and corrosion rate is less

No, the answer is incorrect.
Score: 0
Accepted Answers:
R is low and corrosion rate is more

4) Consider that a piece of iron is immersed in a deaerated H_2SO_4 solution of pH 2 along with $FeCl_3$ as impurity in the solution. The anodic and cathodic Tafel slopes are 0.15 V/decade of current density. The value of E_{corr} (V) without $FeCl_3$ addition with reference to standard hydrogen electrode is: **1 point**

(Given: i_{corr} (without $FeCl_3$ addition) = 10^{-11} A/cm^2

i_{corr} (with $FeCl_3$ addition) = 10^{-10} A/cm^2

$i^{0}_{Fe^{2+}/Fe} = 10^{-11}$ A/cm^2

$i^{0}_{Fe^{3+}/Fe^{2+}} = 10^{-11}$ A/cm^2

$i^{Fe^{3+}/Fe^{2+}}_{lim} = 10^{-12}$ A/cm^2)

- (1.02 to 1.10)
- (0.67 to 0.73)
- (0.38 to 0.45)
- (0.12 to 0.20)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(0.38 to 0.45)

5) Based on the data provided in Q4, the value of E^{Fe}_{eq} (V) is: **1 point**

- (0.95 to 1.11)
- (0.09 to 0.15)
- (0.14 to 0.22)
- (0.68 to 0.75)

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

6) Based on the data provided in Q4, the value of E_{corr} (V) with the addition of $FeCl_3$ with reference to standard hydrogen electrode is: **1 point**

- (1.74 to 1.82)
- (0.13 to 0.21)
- (0.24 to 0.31)
- (1.74 to 1.82)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(0.24 to 0.31)

7) Based on the data provided in Q4, the value of $(i^{Fe^{3+}/Fe^{2+}}_{(c)})$ (A/cm^2) at E_{corr} (V) with the addition of $FeCl_3$ is: **1 point**

- -10^{-14}
- -10^{-10}
- -10^{-8}
- -10^{-6}

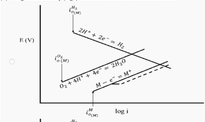
No, the answer is incorrect.
Score: 0
Accepted Answers:
-10^{-10}

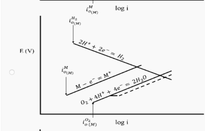
8) Based on the data provided in Q4, the value of $E^{Fe^{3+}/Fe^{2+}}_{eq}$ (V) is: **1 point**

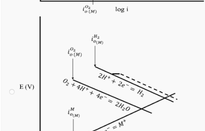
- (0.72 to 0.80)
- (0.01 to 0.07)
- (0.41 to 0.50)
- (0.53 to 0.61)

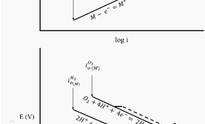
No, the answer is incorrect.
Score: 0
Accepted Answers:
(0.01 to 0.07)

9) Consider that a metal M is corroding in an aerated pure HCl solution. Which of the following plots illustrates the correct voltage (E) vs log current density (log i) for all the cathodic and anodic reactions: **1 point**

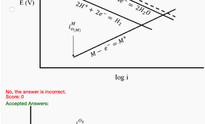




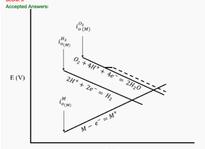


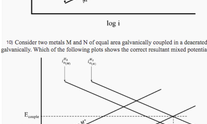


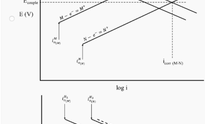
No, the answer is incorrect.
Score: 0
Accepted Answers:

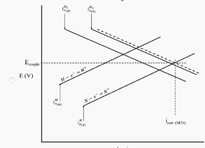


10) Consider two metals M and N of equal area galvanically coupled in a deaerated acidic solution. N is going to protect M galvanically. Which of the following plots shows the correct resultant mixed potential for the couple? **1 point**









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