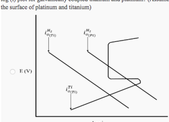
Unit 9 - Week 7

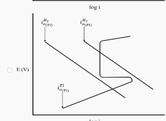
Assignment 7

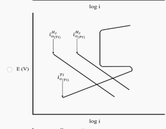
The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

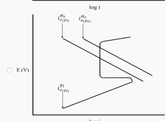
Due on 2019-10-16, 23:59 IST.

1) Consider that a piece of titanium immersed in an acidic electrolyte exhibits active-passive behavior. It has been observed that when a piece of platinum is galvanically coupled to titanium, the corrosion rate decreases drastically. Which of the following shows the correct E vs log (i) plot for galvanically coupled titanium and platinum? (Assume large difference in the exchange current density of hydrogen evolution on the surface of platinum and titanium) 1 point

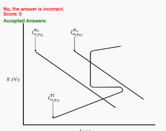








No, the answer is incorrect.
Score: 0
Accepted Answers:

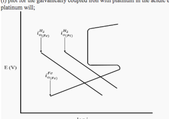


2) In an alloy system AB, metal B is more active than metal A. The term dealloying, in general, for AB alloy in an electrolyte refers to: 1 point

- Selective dissolution of metal A
- Selective dissolution of metal B
- Simultaneous dissolution of both the metals A and B
- Deposition of metal B on metal A

No, the answer is incorrect.
Score: 0
Accepted Answers:
Selective dissolution of metal B

3) Consider that a piece of iron immersed in an acidic electrolyte exhibits active-passive behaviour. Figure below shows the E vs log (i) plot for the galvanically coupled iron with platinum in the acidic electrolyte. The resultant corrosion rate of iron after coupling with platinum will; 1 point



- increase
- decrease
- no effect of galvanic coupling
- initially increases and then decreases

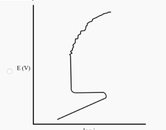
No, the answer is incorrect.
Score: 0
Accepted Answers:
Increase

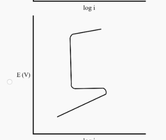
4) Which of the following statements is true for anodic protection? 1 point

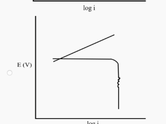
- applicable only for metals exhibiting active behaviour
- applied current density to the protected metal is more as compared to cathodic protection in order to achieve similar i_c
- more economical as compared to cathodic protection for active passive metal
- more economical as compared to cathodic protection for active metal

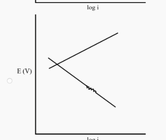
No, the answer is incorrect.
Score: 0
Accepted Answers:
more economical as compared to cathodic protection for active passive metal

5) Which of the following E vs log(i) plots illustrates the existence of metastable pits on the metal surface exposed to an aerated acidic electrolyte? 1 point



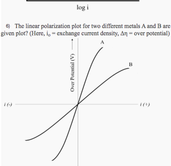






No, the answer is incorrect.
Score: 0
Accepted Answers:

6) The linear polarization plot for two different metals A and B are shown below. Which of the following statements is true for the given plot? (Here, i_c = exchange current density, $\Delta\eta$ = over potential) 1 point



- $i_c(A) < i_c(B)$
- $i_c(A) > i_c(B)$
- $i_c(A) = i_c(B)$
- at same Δi level, $\Delta\eta(A) = \Delta\eta(B)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$i_c(A) < i_c(B)$

7) Three metals (A, B and C) were dipped in H_2SO_4 solution and the exchange current densities were found to be 10^{-5}, 10^{-7} and 10^{-10} A/cm^2 for A, B and C, respectively. If the equilibrium is disturbed by some means, the quickness of re-establishment of equilibrium for three metals will be in the following order; 1 point

- A > B > C
- C > B > A
- B > A > C
- C > A > B

No, the answer is incorrect.
Score: 0
Accepted Answers:
A > B > C

8) Consider that a piece of iron is corroding in an electrolyte. The anodic and cathodic Tafel slopes are 0.1V/decade of current density. The value of corrosion current density (i_{corr} (μA/cm^2)) is; 1 point

(Given: $\left(\frac{dE}{di}\right) = 1000\ \Omega cm^2$)

- (56.3 to 61.6)
- (18.2 to 24.6)
- (34.4 to 41.5)
- (0.18 to 0.26)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(18.2 to 24.6)

9) The various steps during oxidation of a metal are 1 point

1. Nucleation of oxide on the surface and (2) diffusion
2. Oxide growth in metal and internal oxidation
3. Internal porosity and crack (micro and macro) formation
4. Adsorption of oxygen on the metal surface

Which of the followings shows the correct sequence of oxide formation on the metal surface?

- 4-1-2-3
- 1-4-2-3
- 4-2-1-3
- 1-3-4-2

No, the answer is incorrect.
Score: 0
Accepted Answers:
4-1-2-3

10) Which of the following Pilling Bedworth Ratios (R) shows the most protective oxide film? 1 point

- (0.05 to 0.15)
- (1.09 to 1.52)
- (2.37 to 2.43)
- (3.56 to 3.64)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(1.09 to 1.52)