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Q1. D)

GalvanizingTinning

i) A process of covering iron or steel with a thin coat of zinc to prevent it from rusting.

A process of covering steel with a thin coat of tin to prevent it from corrosion.

ii) Zinc protects the iron sacrificially, since it is more electropositive than iron and does not ~~posses~~ permit iron to pass into the outside solution.

Tin protects the base iron metal from corrosion due to its noble nature and higher corrosion resistance.

iii) In galvanized articles, zinc continues to protect the underlying iron by galvanic cell action, even if the coating of zinc is punctured or broken.

In tin coated articles, tin is non toxic and hence protects the underlying iron till the coat is perfect. Any break causes rapid corrosion.

iv) Galvanized containers ~~can~~^{cannot} be used for storing acidic foodstuffs since zinc reacts with food acid forming highly toxic and poisonous zinc compounds.

Tin coated containers and utensils can be used for food storing, since tin is non-toxic and protects the metal from corrosion and avoids any food poisoning.

Q1. B)

→

Impressed Current Cathodic Protection

In this method, a current is applied in the opposite direction to that of the corrosion current thereby nullifying its effects on the base metal i.e. converting the base metal to cathode from anode. The impressed current is obtained by using a D.C source such as a wet battery or a dry cell along with an insoluble anode such as platinum, stainless steel, graphite, etc. which is embedded underground to this, impressed current is applied.

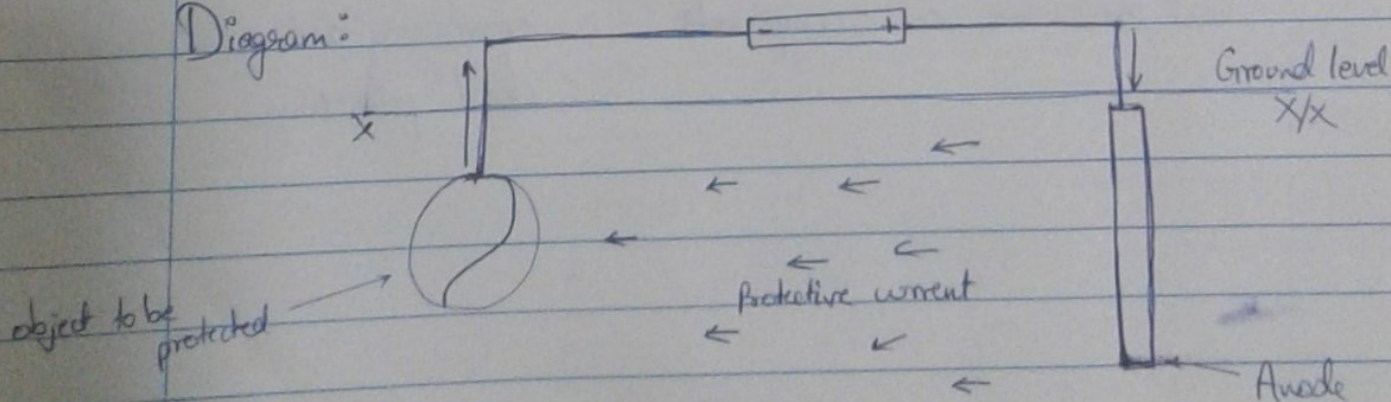
The whole assembly is connected to the metallic structure to be protected. The anode can be single for a small structure like water tank or there can be many series connected such anodes if the structure to be protected is big like long pipeline, oil rig platforms on the sea, etc. The insoluble anode is kept inside back-fill made of mostly gypsum which increases the electrical contact with the soil.

Advantages: This method can protect very large and long structures. Its maintainence is easy.

Disadvantages: The anode needs frequent replacement.

Applications: Protection from soil corrosion of underground pipelines, cables, protection from seawater corrosion of cable ship bulks, piers.

Diagram:



Solving

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Q1. E)

→ Given: $E^\circ_{Ag} = 0.7999 \text{ V}$, $E^\circ_{Cr} = -0.740 \text{ V}$

To find: E°_{cell}

Formula: $E^\circ_{cell} = E^\circ_{cathode} - E^\circ_{anode}$

Solution: $E^\circ_{cell} = E^\circ_{cathode} - E^\circ_{anode}$

$$= E^\circ_{Ag} - E^\circ_{Cr}$$

$$= 0.7999 - (-0.740)$$

$$\boxed{E^\circ_{cell} = 1.539 \text{ V}}$$

Conclusion: E°_{cell} is 1.539V