

A. Electrochemistry

1. What is electrode potential?
2. Calculate the standard cell potential for the reaction
$$\text{Cu} + 2\text{Ag}^+ \rightarrow \text{Cu}^{2+} + 2\text{Ag}$$
$$E_{\text{Cu}/\text{Cu}^{2+}}^{\circ} = 0.34\text{V}$$
$$E_{\text{Ag}/\text{Ag}^+}^{\circ} = 0.8\text{V}$$
3. Why copper does not dissolve in dil HCl but in dil HNO_3 ?
4. Explain galvanic cell working with diagram. Also write reactions involve in it.
5. A conc. cell was constructed by immersing two silver electrode in 0.05 M and 0.1 M AgNO_3 solution. Write cell representation, cell reactions and calculate the EMF of conc. cell.
6. What are reference electrodes? Explain Calomel Electrode with help of diagram.
7. What are secondary cells? Draw lead acid storage battery and write reactions involve in charging and discharging of battery.

B. Corrosion

1. Describe the following type of corrosion.
 - (a) Dry corrosion
 - (b) Wet corrosion.
2. What is metallic corrosion? Explain the electrochemical theory of corrosion of iron in moist medium.
3. Explain what type of corrosion occur when
 - (a) Screw and washer made of different metals
 - (b) Presence of NaOH in mild steel boiler under stress.
4. Mention the factors affecting rate of corrosion.
5. Differentiate the tinning and galvanization.
6. What is cathodic protection? Explain the sacrificial anode & impressed current technique for prevention of corrosion.
7. What are corrosion inhibitors? Name a few anodic and cathodic inhibitors and how they control corrosion, Explain.

C - Cement - / Portland cement & PoP

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1. What are constituents of Portland cement?
2. Draw labelled diagram of rotatory kiln used for the manufacture of Portland cement.
3. Give flow chart diagram to show the various steps involved during Portland cement manufacture by rotatory kiln technology.
4. Write reactions involved in formation of clinker, setting and hardening of cement.
5. Why ~~Gyp~~ Gypsum added in cement?
6. What happens when water added in Gypsum? What product is formed and write applications of product also.

D. Lubricants

1. What are lubricants? Give name of two solid lubricants.
2. Write short notes on (a) Flash point (b) fire point (c) Cloud point (d) Aniline point (e) Pour point.
3. Explain mechanism of fluid film and boundary lubrication.
4. What is viscosity Index? How viscosity Index of a lubricating oil improved?
5. Define Acid number. What do you mean by base value?
6. What ^{are} greases? Mention their some uses.