

- 3 a. Choose the correct answers for the following : (04 Marks)
- When a buried pipeline is protected from corrosion by connecting to magnesium block it is called:

A) Impressed voltage protection	B) Sacrificial cathodic protection
C) Sacrificial anodic protection	D) None of these.
 - During galvanic corrosion the more noble metal act as:

A) anode	B) cathode
C) anode as well as cathode	D) None of these
 - In water line corrosion, the maximum amount of corrosion take place:

A) along a line just above the level of water meniscus
B) along a line at the level of water meniscus
C) along a line just below the level of water meniscus
D) at the bottom of the vessel.
 - During differential aeration type corrosion, the corrosion:

A) occurs at more oxygenated part	B) occurs at less oxygenated part
C) occurs uniform throughout	D) none of these.
- b. What is metallic corrosion? Explain electrochemical theory of corrosion by taking iron as example. (06 Marks)
- c. Explain the corrosion control technique by cathodic protection. (06 Marks)
- d. Explain galvanization process. (04 Marks)

- 4 a. Choose the correct answers for the following : (04 Marks)
- In chromium plating electrolyte used in the bath solution:

A) $\text{H}_2\text{CrO}_4 + \text{H}_2\text{SO}_4$	B) $\text{K}_2\text{CrO}_4 + \text{H}_2\text{SO}_4$
C) $\text{HClO}_4 + \text{H}_2\text{CrO}_4$	D) None of these
 - Printed circuit boards are prepared by the process of:

A) Electroplating	B) Electro polishing
C) Electroless plating	D) Electroforming
 - The ability of the plating bath to develop uniform coating on the entire surface of the object is measured by its:

A) Current density	B) Decomposition potential
C) Plating power	D) Throwing power
 - Polarization effect can be minimized by using:

A) Large electrode surface	B) Highly conducting solution
C) Low electrolyte concentration	D) All of these
- b. Explain the following terms:
- Polarization
 - Decomposition potential. (06 Marks)
- c. Explain how the following plating variables affect the nature of electro deposit:
- Current density
 - pH
 - Complexing agent. (06 Marks)
- d. What is electroless plating? Explain electroless plating of copper. (04 Marks)

PART – B

- 5 a. Choose the correct answers for the following : (04 Marks)
- i) A knocking sound is produced in the internal combustion engine when the fuel:

A) burns slowly	B) burns fast
C) contains rain water	D) None of these
 - ii) For good performance, the hydrocarbon molecules in a diesel fuel should be:

A) Straight chained	B) Branched chain
C) Side chained	D) Aromatic
 - iii) Catalytic cracking of heavy oil is carried out to get better quality:

A) Kerosene	B) Diesel
C) Gasoline	D) Lubricating oil
 - iv) Suitability of diesel fuel is determined by:

A) octane number	B) propane number
C) cetane number	D) butane number.
- b. Define calorific value. Explain how calorific value of solid fuel is determined by bomb calorimeter. (07 Marks)
- c. 0.78g of coal containing 1.9% hydrogen, when burnt in a bomb calorimeter, increased the temperature of 2.7kg water from 27.2°C to 29.7°C. If the water equivalent of calorimeter is 1.2kg. Calculate gross and net calorific value (specific heat of water 4.187 kJ/kg/°C, latent heat of steam 2457 kJ/kg). (05 Marks)
- d. Explain the purification of silicon by zone refining process. (04 Marks)
- 6 a. Choose the correct answers for the following : (04 Marks)
- i) For water system the maximum number of degrees of freedom:

A) 0	B) 3
C) 2	D) 4
 - ii) When lead is progressively added to molten silver, the melting point of the resultant alloy is:

A) raised	B) lowered
C) unaltered	D) unpredictable
 - iii) The colorimetric analysis is based on:

A) Faraday's law	B) Beer-Lambert's law
C) Ohm's law	D) Kohlrauen's law
 - iv) In potentiometric titration platinum electrode act as:

A) reference electrode	B) standard electrode
C) reduction electrode	D) indicator electrode.
- b. Draw phase diagram of Fe-C system. Explain eutectic and eutectoid point. (06 Marks)
- c. Explain Pattinson's process of desilverization of lead. (04 Marks)
- d. Discuss the theory and instrumentation of potentiometric titration. (06 Marks)

- 7 a. Choose correct answers for the following : (04 Marks)
- A plastic which can be softened in heating and hardened on cooling is called:

A) thermoplastic	B) thermosetting
C) thermoelastic	D) thermite
 - Which of the following is an elastomer:

A) PVC	B) Bakelite
C) Nylon	D) Neoprene
 - Chloroprene is the repeating unit in:

A) Polystyrene	B) Neoprene
C) PVC	D) Polythene
 - The process of vulcanization makes rubber:

A) Soluble in water	B) Soft
C) Hard	D) More elastic.
- b. What is glass transition temperature? Explain any three factors that influence the glass transition temperature. (04 Marks)
- c. Explain the manufacture of plastic by compression moulding and injection moulding technique. (06 Marks)
- d. Give the synthesis of i) Teflon: ii) Neoprene: iii) Polyurethane. (06 Marks)
- 8 a. Choose the correct answers for the following : (04 Marks)
- Total alkalinity in water is the sum of:

A) OH^- and CO_3^{2-} ions	B) OH^- ions only
C) CO_3^{2-} ions only	D) OH^- , HCO_3^{2-} and CO_3^{2-} ions.
 - The indicator used in the determination of chloride content in water sample by argentometric method is:

A) $\text{K}_3[\text{Fe}(\text{CN})_6]$	B) K_2CrO_4
C) $\text{K}_2[\text{Fe}(\text{CN})_6]$	D) $\text{K}_2\text{CN}_2\text{O}_7$
 - Primary treatment of sewage is used to remove:

A) Suspended and floating solids	B) Soluble inorganic solids
C) Pathogenic bacteria	D) All of these
 - The reagent used in the estimation of sulphate by gravimetric method is:

A) Phenol-di-sulphonic acid	B) Barium chloride
C) 2-SPADANS	D) Barium sulphate.
- b. Discuss the determination of chloride in water by argentometric method. (06 Marks)
- c. How is alkalinity of water caused? Explain the determination of alkalinity by phenolphthalein indicator. (06 Marks)
- d. Define COD. Explain the sewage treatment of activated sludge process. (04 Marks)

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