Instructions: (1) All Questions are compulsory.

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

1. Attempt any NINE:

(a) Define:
   (i) Flux
   (ii) Gangue

(b) Differentiate between pig iron and cast iron (any 2 points).

(c) Define heat treatment of steel.

(d) Why gold does not get corroded in air?

(e) Write any two advantages of metal spraying.

(f) State the constituents of paints.

(g) Why galvanized containers are not used to store food stuffs?

(h) Define scales and sludges.

(i) Explain chlorination of water by using chlorine gas.

(j) Define sterilization and sedimentation.

(k) List any four constituents of cement.

(l) What is slaking of lime?
2. Attempt any FOUR :
   (a) Write the chemical reactions occurring during conversion of iron oxide to iron in reduction zone of blast furnace at various temperature ranges.
   (b) What is the effect of alloying elements Ni and Co on the properties of steel?
   (c) Differentiate between annealing-normalising.
   (d) Explain stepwise the mechanism of electrochemical corrosion with evolution of hydrogen, along with neat labelled diagram.
   (e) State and explain any two factors affecting rate of atmospheric corrosion.
   (f) Differentiate between Galvanising-Tining.

3. Attempt any FOUR :
   (a) State any adverse effects of using hard water in (1) paper industry (2) sugar industry.
   (b) Name types of impurities present in water. Explain sterilisation of water by using bleaching powder.
   (c) Define:
      (i) Hard water
      (ii) Soft water
      (iii) Degree of hardness
      (iv) Filtration
   (d) Draw the sketch of reverse osmosis cell and label the parts. Explain desalination of sea water by reverse osmosis.
   (e) Explain permuit method for removal of hardness of water with diagram.
   (f) How does setting and hardening of cement takes place?