H/E/TX

Reg. No:

VIT
Vellore Institute of Technology

Final Assessment Test – May 2024

Course: CHY1701 - Engineering Chemistry

Class NBR(s): 2667 / 2683 / 2684 / 2688 / 2691 Slot: B1+TB1

Time: Three Hours Max. Marks: 100

- KEEPING MOBILE PHONE/ELECTRONIC DEVICES EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

General Instructions:

1. Draw diagram wherever necessary.
2. Support your answer with appropriate chemical equations.

Answer any TEN Questions

(10 X 10 = 100 Marks)

1. What is sludge and scale? How does it occur in boiler? What are the consequences of sludge and scale? How can it be prevented? Discuss disadvantages of scale formation in the boiler.
2. Describe the water softening process that can provide demineralized water having less than 5 ppm hardness, that is beneficial to prevent boiler troubles.
3. Give an account of pitting and differential aeration corrosion with suitable example for each.
4. Explain the technique of depositing silica by chemical vapour deposition with neat sketch.
5. Explain H_2 - O_2 fuel cell with its merits and demerits and proton-exchange membrane fuel cell.
6. (a) How do you improve reduction of air pollution arise from internal combustion engine.

   (b) A sample of coal containing 2.5 % H2 when allowed to undergo combustion in Bomb Calorimeter, the following data were obtained.
   weight of coal burnt = 0.475 gm
   weight of water taken = 350 gm
   water equivalent of bomb calorimeter = 1000 gm
   rise in temperature = 1.24 °C
   cooling correction = 0.01°C
   fuse wire correction = 5 cal
   acid correction = 30 cal
   (Latent heat of steam = 587 cal/g)
   Given that latent heat of steam = 587 cal/g
   Calculate the Gross and Net Colorific Value of Coal.
7. Describe the moulding techniques adopted for production of car parts and mobile phone cases.
8. (a) Two water samples 'A' and 'B' are treated with 2-3 drop of EBT indictor in the presence of (2-3 mL) basic buffer. Sample 'A' imparts wine red colour, while sample 'B' imparts blue colour. Identify and justify the difference and quality of water (soft or hard).

   (b) 100 ml of a sample water consumed 30 ml of Std 0.01 NEDTA before boiling and 10 ml of the same EDTA after boiling. Calculate the degree of total hardness, permanent hardness and temporary hardness.