CY 3151 – ENGINEERING CHEMISTRY

(Common to : All Branches (Except B.E. Marine Engineering)

(Regulations 2021)

(Also Common to : PTCY3151 – Engineering Chemistry for B.E. (Part–Time) First Semester – Civil Engineering/Computer Science and Engineering/Electronics and Communication Engineering/Mechanical Engineering – Regulations 2023)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What do you understand by break point chlorination?

2. State the principle of RO process.

3. Bring out the difference between nanorod and nanowire.

4. What are carbon nano tubes? What are its types?

5. State the reduced phase rule.

6. Write a note on Octane number.

7. What is knocking?

8. List the advantages of biodiesel.

9. What are the advantages of supercapacitors? Where are they used?

10. Write the difference between primary and secondary battery.

PART B — (5 × 16 = 80 marks)

11. (a) Distinguish between

(i) priming and foaming (4)

(ii) internal treatment and external treatment (4)

(iii) phosphate conditioning and calgon conditioning (4)

(iv) scale and sludge. (4)

Or

(b) With a neat diagram, explain the working principle, mechanism, process steps, advantages and limitations of ion exchange demineralization process. (16)

12. (a) (i) Explain the CVD process in the preparation of nanotubes and its benefits. (8)

(ii) Discuss the application of nanomaterials in medicine with appropriate examples. (8)

Or

(b) (i) Explain the electro spinning process in the preparation of nano wires and its benefits. (8)

(ii) Discuss the use of nanomaterials in electronic with suitable examples. (8)

13. (a) (i) Construct a simple eutectic phase diagram and explain with an example. (10)

(ii) What are hybrid composites? What is their need? Give examples. (6)

Or

(b) (i) Explain the lead silver phase diagram using phase rule. (10)

(ii) Write a note on matrix and reinforcement. Give examples. (6)

14. (a) Explain the Bergius process for the manufacture of synthetic petrol. Discuss the importance of catalysts in the process. (16)

Or

(b) Discuss the Otto Hoffmann process for the manufacture of metallurgical coke. Explain the product recovery carried out in the process (16)

15. (a) Explain the working mechanism of Li ion battery. Write the electrode reaction during charging and discharging. Discuss the use of batteries and their working principles in electric vehicles. (16)

Or

(b) (i) With a neat diagram, discuss the mechanism of $H_2 - O_2$ fuel cell. (8)

(ii) How is the working of a microbial fuel cell different from other fuel cells. (8)