Reg. No. : | E | N | G | G | T | R | E | E | . | C | O | M |

Question Paper Code : 50950

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

First Semester

Civil Engineering

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)

Reg. No. : | E | N | G | G | T | R | E | E | . | C | O | M |

Question Paper Code : 20917

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

First Semester

Civil Engineering

CY 3151 – ENGINEERING CHEMISTRY

(Common to: All Branches (Except Marine Engineering))

(Also common to PTCY 3151 for BE (Part – Time) – (Except Electrical and Electronics Engineering) – Regulations 2023)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the causes for sludges and scales in the boilers?
2. Differentiate the zeolite process with demineralization technique.
3. Give the distinction between nano materials and bulk materials.
4. Give a brief description about the electrochemical deposition.
5. With an example, write about the one component system.
6. State the salient features of hybrid composites.
7. Write the importance of octane number in the relevant fuel.
8. Give a brief note on the spontaneous ignition temperature.
9. Highlight the important applications of solar cells.
10. Highlight the salient features of microbial fuel cell.

PART B — (5 × 16 = 80 marks)

11. (a) Explain the municipal water treatment in accordance with the break point chlorination.

Or

(b) Explain the treatments involved in boiler feed water by the important internal conditioning aspects.

12. (a) Discuss in a detailed manner about the properties and uses of nanoclusters and nanowires.

Or

(b) Discuss in a detailed manner about the chemical vapour deposition and electro spinning.

13. (a) Elaborate in systematic manner about the construction of a simple eutectic phase diagram.

Or

(b) Elaborate in a stepwise manner about the construction of metal matrix and polymer matrix.

14. (a) Summarize the manufacture of metallurgical coke by the Otto Hoffmann method.

Or

(b) Summarize in a specific manner on the Orsat method for the flue gas analysis.

15. (a) Elaborate in a suitable way about the recent developments in soar cell materials.

Or

(b) Explain in a specific manner on the light water nuclear power plant.