

08 AUG 2023

Reg. No.

Question Paper Code

12124

**B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023**

First Semester

**Civil Engineering**

(Common to All Branches except Computer Science and Business Systems)

**20BSCY101 - ENGINEERING CHEMISTRY**

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |  | <i>Marks,<br/>K-Level, CO</i> |
|--|-------------------------------|
| 1. Distinguish between hard and soft water.                            | 2,K2,CO1                      |
| 2. List any four applications of adsorption.                           | 2,K1,CO1                      |
| 3. Write the definition of standard electrode potential.               | 2,K1,CO2                      |
| 4. Mention the significance of the Pilling-Bedworth ratio.             | 2,K1,CO2                      |
| 5. Define: Octane number.  | 2,K1,CO3                      |
| 6. What is biodiesel?  | 2,K1,CO3                      |
| 7. What is the sub-critical mass and supercritical mass of $U^{235}$ ? | 2,K1,CO4                      |
| 8. What are super capacitors?  | 2,K1,CO4                      |
| 9. What is Co-Polymerization?  | 2,K1,CO5                      |
| 10. How nanoparticles are different from nanoclusters?                 | 2,K2,CO5                      |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) Explain the demineralization of water by the ion-exchange process. 13,K2,CO1  
How are exhausted cation and anion exchange resins regenerated?
- OR**
- b) What are the factors that influence the adsorption of gases on solids? 13,K2,CO1  
Discuss in detail.
12. a) Derive Nernst equation for single electrode potential and give its 13,K2,CO2  
significance.
- OR**
- b) What is electroless plating? Describe electroless plating of Nickel and 13,K2,CO2  
discuss its applications.

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*

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13. a) Explain flue gas analysis by ORSAT method with suitable diagram. 13,K2,CO3

**OR**

b) (i) Write notes on Gobar gas. 7,K2,CO3

(ii) Calculate Gross and Net calorific value of coal having the following compositions. Carbon-84%, Hydrogen-6%, Sulphur-3%, Nitrogen-2% and Ash-5%. 6,K2,CO3

14. a) What is a photovoltaic cell? Explain the construction and working of photovoltaic cell with a diagram. 13,K2,CO4

**OR**

b) Explain the construction and working principles of Lead-acid battery. 13,K2,CO4

15. a) Write the preparation, properties and uses of following polymers. 13,K2,CO5

(i) Nylon 6,6. (ii) Kevlar.

**OR**

b) Discuss the CVD and electro deposition techniques for the synthesis of nano particles. 13,K2,CO5

**PART - C (1 × 15 = 15 Marks)**

16. a) Describe the Otto – Hoffman method of coke manufacture and the recovery of various by-products. 15,K3,CO3

**OR**

b) Give an account of the Light water nuclear reactor with a neat diagram. 15,K3,CO4