

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

First Semester

Civil Engineering

(Common to All)

20BSCY101 - ENGINEERING CHEMISTRY

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

| | Marks | K- Level | CO |
|---|-------|-------------|-----|
| 1. Temporary hardness in water can be removed by: (a) Boiling (b) Adding calcium hydroxide (c) Filtration (d) Ion exchange method | 1 | K1 | CO1 |
| 2. Which type of adsorption involves weak van der Waals forces? (a) Chemisorption (b) Physisorption (c) Ion exchange (d) Absorption | 1 | K1 | CO1 |
| 3. For a cell reaction to be spontaneous, the value of the cell potential E_{cell} should be: (a) Positive (b) Negative (c) Zero (d) None of the above | 1 | K1 | CO2 |
| 4. In electrochemical corrosion, the site where oxidation takes place is known as: (a) Cathode (b) Anode (c) Electrolyte (d) Passivator | 1 | K1 | CO2 |
| 5. In the ultimate analysis of fuel which of the following is/are measured (a) Carbon (b) Nitrogen (c) Hydrogen (d) All the above | 1 | K1 | CO3 |
| 6. The efficiency of a fuel is typically measured by its: (a) Flash point (b) Density (c) Calorific value (d) Ignition temperature | 1 | K1 | CO3 |
| 7. An electrolyte used in Lithium ion battery is (a) KOH (b) NaCl (c) KCl (d) Polymer electrolyte | 1 | K1 | CO4 |
| 8. An electrolyte is (a) Contains only cations (b) Contains only anions (c) Metal (d) Ionic solution | 1 | K1 | CO4 |
| 9. Which of the following is dependent on size of nanomaterials (a) Color (b) Mass (c) Surface area (d) All the above | 1 | K1 | CO5 |
| 10. What is the size range of nanoparticles typically studied in nanochemistry? (a) 1-100 nm (b) 100-1000 nm (c) 1-1000 μ m (d) 1-1000 cm | 1 | K1 | CO5 |

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

| | | | |
|---|---|----|-----|
| 11. Why is the hardness of water expressed in terms of calcium carbonate equivalents? | 2 | K1 | CO1 |
| 12. What are catalytic poisons? | 2 | K1 | CO1 |
| 13. Differences between adsorption and absorption. | 2 | K2 | CO1 |
| 14. Write the advantages of electroless plating over electroplating. | 2 | K1 | CO2 |
| 15. Define single and standard electrode potential. | 2 | K1 | CO2 |
| 16. What are the characteristics of a good paint? | 2 | K1 | CO2 |
| 17. Why should leaded petrol not be used? | 2 | K1 | CO3 |
| 18. Define: HCV and LCV. | 2 | K1 | CO3 |
| 19. What are the drawbacks of wind energy? | 2 | K1 | CO4 |
| 20. What are fuel cells? Give an example? | 2 | K1 | CO4 |
| 21. Define Co-Polymerization. | 2 | K1 | CO5 |
| 22. What is nano-rod? | 2 | K1 | CO5 |

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23. a) What is desalination? With a neat diagram, describe the 'reverse osmosis' method for the desalination of brackish water. 11 K2 CO1
- OR**
- b) Explain the role adsorbent in pollution abatement. 11 K2 CO1
24. a) Derive Nernst equation for single electrode potential and give its significance. 11 K2 CO2
- OR**
- b) What is electroplating? Discuss the plating composition, mechanism of copper plating. 11 K2 CO2
25. a) Explain the proximate analysis of coal. Write its significance. 11 K2 CO3
- OR**
- b) Explain flue gas analysis by ORSAT method with suitable diagrams. 11 K2 CO3
26. a) What is a nuclear reactor? Describe the components of a light-water nuclear power plant with a suitable block diagram. 11 K2 CO4
- OR**
- b) Describe the construction of lead-acid battery with the suitable reactions. 11 K2 CO4
27. a) How can you prepare the following? Write its properties and uses. a) Nylon 6, 6
b) Teflon. 11 K2 CO5
- OR**
- b) Discuss the CVD and Laser ablation techniques for the synthesis of nanoparticles. 11 K2 CO5
28. a) (i) Distinguish between Physisorption and Chemisorption. 6 K2 CO1
(ii) Write notes on Gobar gas. 5 K2 CO3
- OR**
- b) (i) Write a short note on solar cells. 6 K2 CO4
(ii) Differentiate between addition and condensation polymerization. 5 K2 CO5