

Reg. No. :

Question Paper Code : 90436

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

First Semester

Civil Engineering

CY 8151 – ENGINEERING CHEMISTRY

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

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. A sample of water contains 136 ppm of CaSO_4 and 60 ppm of MgSO_4 . Calculate the hardness of the water sample.
2. What is meant by Calgon conditioning?
3. What are the limitations of Freundlich adsorption isotherm?
4. Define Auocatalysis with an example.
5. Write down the significances of alloys.
6. Calculate the degree of freedom for the system, $\text{CaCO}_3(\text{s})$ is in equilibrium with $\text{CaO}(\text{s})$ and $\text{CO}_2(\text{g})$.
7. Define octane number of a fuel.
8. What are high and low calorific value of a fuel?
9. Differentiate nuclear fusion and fission reactions.
10. What is meant by super capacitor?

PART B — (5 × 16 = 80 marks)

11. (a) (i) How Permanent hardness of a water sample is calculated by EDTA method? (8)
- (ii) Explain with reaction schematics, the zeolite process for treating hardwater. (8)

Or

- (b) (i) With a neat diagram, explain reverse osmosis process. (8)
- (ii) Write down the differences between scale and sludge formation in a Boiler. (8)

12. (a) (i) Derive an express for monolayer adsorption of gases on solids. (8)
- (ii) Write a short note on catalytic poisoning and promoter with examples. (8)

Or

- (b) (i) Derive the rate for enzyme catalyzed reaction (Michaelis-Menton equation). (8)
- (ii) Write down the factors affecting adsorption of gases on solid. (8)

13. (a) (i) With a neat diagram, explain one component water system. (8)
- (ii) Draw the thermal analysis and cooling curve for a simple eutectic system and explain it. (8)

Or

- (b) (i) Explain the phase diagram of Lead — Silver system and write its application on desilverization of Lead. (8)
- (ii) Write down different heat treatment processes of steel. (8)

14. (a) (i) How the metallurgical coke is manufactured by Otto Hoffman method? (8)
- (ii) Explain flue gas analysis by Orsat method. (8)

Or

- (b) (i) How synthetic petrol is prepared by Bergius process? (8)
- (ii) Explain the analysis of coal carried out by Proximate method? (8)

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15. (a) (i) With a neat diagram, explain the working of light water nuclear reactor.
- (ii) Mention any two differences between primary and secondary batteries.

Or

- (b) (i) Explain the charging and discharging process of Lead acid battery. (8)
- (ii) Write a short note on wind energy. (8)

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