Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40407

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

First Semester

Civil Engineering

CY 8151 – ENGINEERING CHEMISTRY

(Common to: Aeronautical Engineering/Aerospace Engineering/ Agriculture Engineering/Automobile Engineering/Biomedical Engineering/ Computer Science and Engineering/Computer and Communication Engineering/ Electrical and Electronics Engineering/Electronics and Communication Engineering/ Electronics and Instrumentation Engineering/Electronics and Telecommunication Engineering/Environmental Engineering/Geoinformatics Engineering/ Industrial Engineering/Industrial Engineering and Management/ Instrumentation and Control Engineering/Manufacturing Engineering/ Material Science and Engineering/Mechanical Engineering/Mechanical Engineering(Sandwich)/Mechanical and Automation Engineering/Mechatronics Engineering/Medical Electronics/Petrochemical Engineering/Production Engineering/Robotics and Automation/ Safety and Fire Engineering/Artificial Intelligence and Data Science/Bio Technology/ Biotechnology and Biochemical Engineering/Chemical Engineering/ Chemical and Electrochemical Engineering/Computer Science and Business System/Fashion Technology/Food Technology/Handloom and Textile Technology/Information Technology/Petrochemical Technology/Petroleum Engineering/Pharmaceutical Technology/Plastic Technology/Polymer Technology/Textile Chemistry/Textile Technology)

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why is water softened by zeolite process unfit for use in boilers?

2. How is exhausted ion exchange resins regenerated?

3. What is meant by chemisorption?

4. Catalysts are very important in industries. Justify.

5. State a basic difference between brass and bronze,

6. Write down the composition of lead-silver system.

7. List out the varieties of coal formed inside the earth.

8. Define cetane number of a diesel fuel.

9. Why do fission and fusion reactions produce large quantities of energy?

10. What is lead-acid accumulator?

PART B — ($5 \times 16 = 80$ marks)

11. (a) (i) A sample water on analysis has been found to contain the following in ppm. $Ca(HCO_3)_2 = 8.1$; $CaSO_4 = 13.6$; $MgCl_2 = 9.5$. Calculate total hardness of water. (8)

(ii) Outline a method to determine the total hardness of sample water. (8)

Or

(b) (i) Explain desalination of water by reverse osmosis method with a sketch. (8)

(ii) Briefly discuss the function of calgon conditioning. (8)

12. (a) Derive Langmuir adsorption isotherm. List out its significance. (16)

Or

(b) What are acid base catalysts? Discuss kinetics of enzyme catalysed reactions. (16)

13. (a) Give an elaborate account on heat treatment of steel. (16)

Or

(b) With the help of a phase rule diagram, explain water system in detail. (16)

14. (a) Describe the manufacture of synthesis of gasoline by Bergius process. (16)

Or

(b) Define HCV and NCV. Calculate the gross and net calorific values of coal having the following composition. C = 85%, H_2 = 8%, S = 1%, N_2 = 2% and rest being ash. Latent heat of steam = 587 cal/g. (16)

15. (a) Give an elaborate account of a nuclear power reactor. (16)

Or

(b) Explain the principle and advantages of $H_2 - O_2$ fuel cell with reactions. (16)

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