Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 90163

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

First Semester

Civil Engineering

CY 8151 : ENGINEERING CHEMISTRY

(Common to Medical Electronics/Aeronautical Engineering/Aerospace Engineering/ Agriculture Engineering/Automobile Engineering/Biomedical Engineering/Geoinformatics 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/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/Petrochemical Engineering/Production Engineering/ Robotics and Automation Engineering/Safety and Fire Engineering/Bio Technology/Chemical Engineering/Chemical and Electrochemical Engineering/ 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. What happens when water containing bicarbonates of Ca^{2+} and Mg^{2+} is boiled ?

2. Write the equations involved in the bleaching action of $CaOCl_2$.

3. What is an auto catalyst ? Give an example.

4. Give an example each for homogeneous and heterogeneous catalyzed reactions.

5. Define "Component".

6. What are the advantages of alloying ?

7. How is percentages fixed carbon of coal calculated ?

8. Give the classification of petroleum.

9. Write the disadvantages of fuel cell.

10. Give some applications of solar cell.

PART – B
(5×16=80 Marks)

11. a) A water sample is alkaline to both phenolphthalein as well as methyl orange. 100 ml of the water sample on titration with N/50 HCl required 4.7 ml of the acid to phenolphthalein end point. When a few drops of methyl orange are added to the same solution and the titration was further continued till the yellow color of the solution just turned red after the addition of another 10.5 ml of the acid solution. Elucidate on the type and extent of alkalinity present in the water sample.

(OR)

b) Compare zeolite process with lime-soda process in water treatment.

12. a) Discuss the general characteristics of catalytic reactions.

(OR)

b) Derive Michaelis-Menten equation of enzyme catalysis.

13. a) Describe the phase diagram of water system.

(OR)

b) What do you mean by heat treatment of alloys ? Discuss its advantages and the various processes.

14. a) Give a detailed procedure of determination of various elements present in coal (Ultimate analysis).

(OR)

b) Describe the Synthesis of metallurgical coke by Otto-Hoffmans by product oven method and explain how various by products are recovered.

15. a) i) What are fuel cells? Briefly describe about hydrogen-oxygen fuel cell. **(12)**
    ii) What are the advantages of Li Battery ? **(4)**

(OR)

b) Write anode, cathode and over all cell reactions of

   i) Lead acid storage cell and

   ii) Lithium battery. **(8)**
   (8)