Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 57014

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Second Semester

Civil Engineering

CY 6251 — ENGINEERING CHEMISTRY – II

(Common to all branches Except Marine Engineering, Bio Technology and Pharmaceutical Technology)

(Regulation 2013)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the chemical reaction involved in calgon conditioning.

2. Mention any two compounds that cause caustic embrittlement in boilers.

3. Define standard electrode potential.

4. What is dry corrosion? Give one example.

5. What are the drawbacks of nuclear energy?

6. Will the emf of battery vary with size? Give reason for your answer.

7. What do you understand by dimensional stability of a refractory material?

8. What are the components of a water proof cement?

9. What is power alcohol? Mention the advantage.

10. Define explosive range of a fuel.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the boiler troubles, 'scales and caustic embrittlement ' in detail.

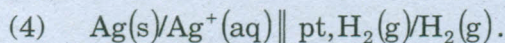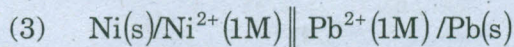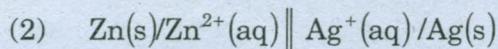   (ii) How is water softened by Ion exchange method? Explain in detail with a neat diagram.
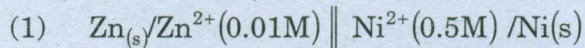
                                    Or

    (b) (i) What are zeolites? How do they function in removing the hardness of water?   (8)

        (ii) What is meant by internal conditioning of water? Explain :

            (1) Phosphate and

            (2) Carbonate conditioning with relevant equations.   (8)

12. (a) (i) Derive Nernst's equation and give its significance. (8)

(ii) What are paints? Give their constituents and functions with examples. (8)

Or

(b) (i) Give the cell reactions of the following cells. $(4 \times 2 = 8)$

(1) $Zn_{(s)}/Zn^{2+}(0.01M) \| Ni^{2+}(0.5M) /Ni(s)$

(2) $Zn(s)/Zn^{2+}(aq) \| Ag^{+}(aq)/Ag(s)$

(3) $Ni(s)/Ni^{2+}(1M) \| Pb^{2+}(1M) /Pb(s)$

(4) $Ag(s)/Ag^{+}(aq) \| pt, H_2(g)/H_2(g)$.

(ii) Explain differential aeration corrosion and galvanic corrosion with suitable illustrations.

13. (a) (i) What are lead accumulators? Explain the construction and functioning of a lead accumulator. (8)

(ii) Explain the method of conversion of nuclear energy into electrical energy in a nuclear reactor. (8)

Or

(b) (i) Write a detailed note on breeder reactors. (8)

(ii) What is a fuel cell? Explain the working of any one fuel cell. (8)

14. (a) (i) Describe the classification of abrasives with suitable examples. Explain Moh's scale of hardness. (8)

(ii) What is glass? Discuss the manufacture of glass by pot furnace process. (8)

Or

(b) (i) Explain the manufacture and important properties of alumina bricks and carborundum. (8)

(ii) Explain setting and hardening of cements with the reactions involved. (8)

15. (a) (i) Describe the ultimate analysis of coal.

(ii) Calculate the volume of air required for complete combustion of $1 \ m^3$ of gaseous fuel having the composition :

$CO = 46\%$, $CH_4 = 10\%$, $H_2 = 4\%$, $C_2H_2 = 2.0\%$, $N_2 = 1\%$ and the remaining being CO_2.

Or

(b) (i) Describe the manufacture of petrol by Bergius process.

(ii) Explain flue gas analysis by ORSAT method. Give suitable diagram.

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