Code No. 9358 / N

FACULTY OF ENGINEERING

B.E. I Year (New) (Main) Examination, June / July 2015

Subject: Engineering Chemistry

Time: 3 Hours   Max. Marks: 75

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART — A (25 Marks)

1 Represent Calomel electrode and write the electrodic reaction for reduction process and mention the S.R.P. value of the electrode.   3

2 Draw the conductometric titration plot of weak acid against strong base and explain the graph.   3

3 What is waterline corrosion? Explain.   2

4 Name three substances used for sterilization of water.   2

5 Define the term "functionality" of monomers. Explain its signifiCance with a suitable example,   2

6 Explain the types of composite materials.   3

7 Define octane number. How will you improve the anti-knocking value of fuel?   3

8 Classify rocket fuels.   2

9 Define phase and component.   2

10 Classify lubricants and give one example each..   3

PART — B (5x10 = 50 Marks)

11 a) For the cell reaction $Zn(s) + Fe^{2+} \rightarrow Zn^{+4}; FA(s)$. Calculate the reactive concentration of Zn^{2+} and Fe^{2+} at which thaEoVerall cell E.M.F. becomes zero.

     E -0.440 V an   = -0.760 V.   6

   b) Explain hydrogen -- loxygen.fuel cell.   4

12 a) Define metallic corrosion. Explain electrochemical theory of corrosion.   6

   b) What are the characteristics of a paint? Name the various constituents of paints.   4

13 a) Differentiate between homopolymer and co-polymer.   4

   b) What are conducting polymers? Discuss the applications of conducting polymers.   6

14 a) What are chemical fuels? How are they classified? Give suitable examples for each class.

   b) A gaseous fuel has the following composition by volume: $H_2 = 25\%$, methane = 30%, ethane = 11%, ethylene = 4.5%, butane = 2.5%, CO = 6.0%, CO_2 = 8%, O_2 = 2% and $N_2 = 2\%$. Calculate the air fuel ratio and volumetric analysis of dry products of combustion using 40% excess air.

15 a) Write the principles of Green Chemistry.   5

   b) Draw a neat diagram of water system and label the parts. Calculate the degree of freedom at triple point.   5

16 a) Derive Nernst equation.   4

   b) Differentiate between potentiometric titrations and pH metric titrations by taking a suitable example like HC! Vs NaOH.   6

17 a) How do you determine the permanent hardness of water by EDTA method? Explain.   5

   b) Explain the mechanism of extreme-pressure lubrication.   5