**Code: 9ABS103**

B.Tech I Year (R09) Supplementary Examinations June 2016
## ENGINEERING CHEMISTRY
(Common to all branches)

Time: 3 hours                                                                 Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1    Calculate temporary and permanent hardness of water sample collected at NTPC Vijayawada. The analysis of water is as follows: Ca $(HCO_3)_2$ = 150ppm, Mg $(HCO_3)_2$ = 125ppm, $CaSO_4$ = 95, $MgSO_4$ =12ppm, $MgCl_2$ = 9.5, NaCl = 2.5ppm, KCl = 0.5ppm, KOH = 2.5ppm

2    (a)  Explain rusting of iron with the help of electrochemical theory of corrosion.
     (b)  Write a note on impressed current cathodic protection.

3    Write a mechanism of polymerization of polyethylene and polyurethane.

4    (a)  Fatty oils are no longer used as lubricants. Why?
     (b)  Synthetic lubricants have added advantages over natural lubricants. Explain.

5    What are the fuel cells? Explain the principle involved in Hydrogen-Oxygen fuel cell. What are its applications?

6    (a)  Explain with valid reasons for the following statements with suitable example:
         (i) Vapour pressure contribute to the composition in a two component system.
         (ii) Eutectic point and triple point are the same.
     (b)  Identify the number of phases and components involved in each of the following systems:
         (i) Decomposition of $CaCO_3$.
         (ii) Decomposition of $PCl_5$.

7    (a)  What is petroleum? How it is classified?
     (b)  Calculate the grass and net calorific value of a coal sample from the following data obtained from bomb calorimeter.
         Weight of coal 0.73 g, weight of water in the calorimeter 1500 g, water equivalent of calorimeter 470 g, initial temp 25 $^0$C and final temperature is 28 $^0$C, percentage of hydrogen in coal 2.5% and latent heat of steam is 587 cal/g.

8    (a)  Describe the different types of refractories with suitable examples.
     (b)  What is Refractory-Under-Load (RUL) test? How is it carried out? What is the use of this test?

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