Hall Ticket Number:

Code No.: 1114N

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. I Year I-Semester (New) Examinations, December - 2015

Engineering Chemistry-I

Time: **3** hours Max. Marks: **50**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** questions from **Part-B***

Part-A (15 Marks)

1. Reverse osmosis is preferred over conventional softening methods. Why? [1]
2. Write the structure of Kevlar. [1]
3. What are intrinsic polymers? [1]
4. State first law of thermodynamics. [1]
5. What is the composition of CNG? [1]
6. Compute the hardness of 200ml of a water sample containing 11.1 mg of $CaCl_2$ and 18mg of $MgSO_4$. [2]
7. What is Co-polymerization? Explain with an example. [2]
8. What are the constituents of composites? [2]
9. Entropy of the universe is increasing continuously. Comment. [2]
10. Sulphur in coal increases its calorific value but its presence is undesirable. Justify. [2]

Part-B (5 × 7 = 35 Marks)

11. a) Discuss the formation of scales of sludges in boilers. Mention any two ill effects and two preventive measures of the same. [4]
    b) A Water sample required 22 ml of 0.05 N HCl with phenolphthalein indicator and another 11ml of same acid with methyl orange indicator. Calculate the different types and amounts of alkalies present in the water sample. [3]
12. a) What are the draw backs of raw rubber? How its properties can be improved? Explain the chemistry involved in it. [4]
    b) Explain the preparation and uses of Bakelite. [3]
13. a) Explain the mechanism of conduction in doped and un doped polyacetylene. [4]
    b) Discuss the classification of composite based on matrix and dispersed medium. [3]
14. a) Prove that efficiency of a heat engine is always less than unity. [4]
    b) Predict at what temperature an endothermic reaction with enthalpy change 22.1 K.Cals and entropy change 10 Cals/K is spontaneous. [3]
15. a) Show the relationship between structure and knocking characteristics of hydrocarbons of gasoline. Suggest methods for improving its anti-knock characteristics. [3]
    b) Calculate gross and net calorific value of a coal sample having the following composition: C = 80%, H = 7%, O = 3%, S = 3.5%, N = 2.1% and ash = 4.4%. [4]
16. a) Explain break point chlorination. How is it useful for water treatment? [4]
    b) Discuss the preparation and uses of silicone rubbers. [3]
17. Answer any ***two*** of the following: [2 × 3.5 = 7]
    a) Explain the applications of reinforced composites.
    b) Gibbs-Helmholtz equation-derivation and two applications.
    c) Significance of ultimate analysis.