Code: 15A51101 **R15**

B.Tech I Year I Semester (R15) Regular Examinations December/January 2015/2016

ENGINEERING CHEMISTRY

(Common to ECE, ME, EIE and IT)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Write the causes and control measures of priming and foaming.

(b) A water sample is alkaline to both phenolphthalein as well as methyl orange. 20 mL of water sample on titration required 4.5 mL of the acid to phenolphthalein end point. When a few drops of methyl orange are added to the same solution and the titration further continued, the yellow colour of the solution just turned orange after addition of another 11.7 mL of the acid solution. Elucidate the type and extent of alkalinity present in the water sample.

(c) Is Nylon 6.6 is bio-degradable or non-biodegradable polymer? Give its synthesis.

(d) Mention two examples, each for thermoplastic and thermosetting polymers and write any three differences between them.

(e) Why the galvanized iron articles are not suitable for storing a food items and which type of coating is better for the food container made up of iron metal? Justify.

(f) A lorry load carrying acid was tousled in an accident and its stuffing spilled on the road. At the side of the road, iron drain covers began melting and effervescing as the acid ran over them. An expert was entitled to see if the acid actually leaked into the nearby river.

(i) The word melting is incorrectly used in the report. Suggest a better name that should have been used.

(ii) Explain with chemical equations, why drain covers began effervescing as the acid rain over them.

(g) Write a brief account on characteristics of a good fuel.

(h) What is octane number? What is its utility in assessing quality of a fuel?

(i) Write a brief note on classification of cement.

(j) Briefly describe about the characteristics of a good refractory material.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) Calculate the amount of lime (84% pure) and soda (92% pure) required for treatment of 30,000 liters of water, whose chemical analysis results the following constituents per liter $Ca(HCO_3)_2$ = 40.5 mg; $Mg(HCO_3)_2$ = 36.5 mg; $MgSO_4$ = 30.0 mg; $CaSO_4$ = 34.0 mg; $CaCl_2$ = 27.75 mg; and NaCl = 10.00 mg.

(b) What is caustic embrittlement? Explain the reasons for weaker parts of the boiler become brittle.

OR

3 Describe the ion-exchange process including the various types of resins used with a neat sketch.

UNIT – II

4 (a) Discuss various types of conducting polymers with examples.

(b) Explain the method of preparation of Bakelite and its applications.

OR

5 (a) Give any two examples of natural rubbers and describe its processing and compounding.

(b) Give an example for synthetic rubber and write its synthetic route.

UNIT – III

6 (a) Define fuel cell and explain the construction and working of H_2-O_2 fuel cell.

(b) Explain in detail the working principle of Li-ion secondary batteries.

OR

7 (a) Compare Nickel Metal hydride and NiCad batteries.

(b) Write a note on lithium primary batteries.

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UNIT – IV

8 (a) Describe the method of determination of calorific value of gaseous fuels by Junkers calorimeter.

(b) A sample of coal was found to contain C = 80%, H = 5%, O = 1%, N = 2% and remaining being ash. Calculate the amount of minimum air required for the complete combustion of 1 kg of coal.

OR

9 Brief about the Bergius process and Fischer Troph's synthesis for the manufacture of synthetic petrol.

UNIT – V

10 Explain following in details of lubricants:

(a) Functions.

(b) Mechanisms.

(c) Classifications.

(d) Properties.

OR

11 Brief account on Fullerenes and Carbon nanotubes.

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