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Seat No.	

F.E. (All Branches) (Semester-I & II) (Revised Course) Examination, May - 2017

ENGINEERING CHEMISTRY

Sub. Code : 59183

Day and Date : Tuesday, 02-05-2017 **Total Marks : 100**

Time : 10.00 a.m. to 1.00 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Assume suitable data wherever necessary.**
3) **Draw neat labeled diagram wherever necessary.**
4) **Figures to the right indicate full marks.**

SECTION-I

Q1) a) A sample of water on analysis was found to contain the following impurities;

Impurities	Mass of impurities in ppm.	Mol.Wt.
$Ca(HCO_3)_2$	48.6	162
$Mg(HCO_3)_2$	24.1	146
$CaCl_2$	26.3	111
$MgCl_2$	9.5	95

Calculate temporary, permanent and total hardness of sample mg/lit. **[8]**

b) Solve any TWO of the following. **[10]**

i) What are the advantages and disadvantages of Glass electrode?

ii) Explain construction and working of ion exchange process for purification of water.

iii) Write the composition, properties and applications of GRP.

Q2) a) Explain the construction and working of Single beam spectrophotometer. **[6]**

b) Solve any TWO of the following. **[10]**

i) What is hardness of water? Explain the temporary and permanent hardness.

ii) Give preparation, properties and applications of Novolac.

iii) What are components of composite materials? Explain its various functions.

P.T.O.

Q3) Solve any FOUR of the following. [16]

a) Give the applications of chromatography.

b) Distinguish between Thermoplastic and Thermosetting plastics.

c) Explain chloride content in water.

d) State and derive an equation for Beer's-Lambert's law.

e) What are nanomaterials? Write the properies of nanomaterials.

f) What types of impurities are present in natural water?

SECTION-II

Q4) a) The following data were obtained when the coal was tested for calorific value in bomb Calorimeter.

i) Mass of coal sample = 1.012 gm.

ii) Acid correction = 52.7 cal.

iii) Initial temperature of water = 27.4°C.

iv) Weight of water and water equivalent of calorimeter = 4241 gm.

v) Cooling correction = 0.063°C.

vi) Final temperature of water = 30.8°C.

vii) Fuse wire correction = 9.3 cal.

If coal contains 5.9% H; calculate the higher and lower calorific values of the coal in Joule. **[8]**

b) Attempt any two questions. **[10]**

i) Describe oxygen absorption mechanism in wet corrosion with suitable diagram and reactions.

ii) Define Chemical fuel. Give details classification of chemical fuel with examples.

iii) Explain in brief the classification of plain carbon steel.

Q5) a) Give composition, properties and uses of any one of aluminum - based alloys. **[6]**

b) Solve any two of the following. **[10]**

i) What are Fuel Cells? Explain the Classification of Fuel cells based on electrolyte used.

ii) Explain electroplating process with suitable diagrams to prevent corrosion.

iii) Discuss the material selection and design in controlling corrosion.

Q6) Answer of the following four questions. **[16]**

a) Explain the factors related to metals or metallic material influencing on the rate of Corrosion.

b) Compare between liquid fuel and gaseous fuel.

c) State properties and uses of brass.

d) Give advantages and disadvantages of metal spraying in controlling of corrosion.

e) Explain the importance of green chemistry.

f) Write informative note on types of calorific values.

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