1-p3-upq-Con No. File F.E. (Sem-I) All branch (R) 19/12/09

Con. 3682-09. App. Chemistry SP–8435

(2 Hours) [Total Marks : 75

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** from remaining **six** questions.
(3) **All** questions carry **equal** marks.
(4) Assume **suitable data**, if **necessary**.
(5) At·Wts ⇒ H = 1, C = 12, O = 8, S = 32, Cl = 35·5, Na = 23, Mg = 24, Ca = 40, N = 14.

1. Attempt any **five** :— 15

(a) Distinguish between thermoplastic and thermosetting polymers.

(b) Calculate temporary and total hardness of a water sample containg :

$Mg(HCO_3)_2$ = 7·3 mg/l, $Ca(HCO_3)_2$ = 16·2 mg/l, $MgCl_2$ = 9·5 mg/l $CaSO_4$ = 13·6 mg/l.

(c) 1·25 gram of an oil was saponified with 50 ml 0·1 N potassium hydroxide solution. After refluxing, the mixutre required 7·5 ml 0·1 N hydrochloric acid for neutrilisation. Find saponificatin value of the oil.

(d) What is triple point ? With reference to water-system explain it.

(e) What are fullerenes ? State their uses.

(f) Distinguish the allotropes of Iron.

(g) Distinguish between conventional and non-conventional energy sources.

(h) State the limitations of Phase Rule.

2. (a) Calculate the amount of lime and soda needed to soften 50,000 litres of water containing the following impurities per litre of water :— 7
$CaCl_2$ = 222 mg, $Mg(HCO_3)_2$ = 296 mg,
$Ca(HCO_3)_2$ = 324 mg, H_2SO_4 = 196 mg and organic matter = 130 mg.

(b) Define the term lubricants and lubrication-Mention the various types of mechanism involved in the lubricatin of Machines. Discuss boundry-film lubrication in detail. 8

3. (a) Write a note on synthesis, properties and uses of the following :— 8
(i) Polyethylene (ii) Phenol formaldehyde.

(b) Explain the Ion-Exchange process of softening of hard water. Waht are its advantages and disadvantages ? 7

4. (a) What are Nanocones ? State the applications of nonomaterials. 5

(b) Write a note on Haeckelites. 5

(c) Write a note on Photovoltaic Cell. 5

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5. (a) What is solar energy ? Explain the working of solar heating system using plate collectors. 7

(b) What are special steels ? Explain the specific effects of the following metals on the properties of steels :— 8

(i) Chromium (ii) Cobalt (iii) Molybdenum (iv) Tungeston.

6. (a) Name the different (various) methods to control water pollution. Explain Activated sludge method in detail. 8

(b) Name the methods for Fabrication of plastics. With the help of labelled diagram describe Transfer moulding and Injection moulding. 7

7. (a) Write the Advantages and disadvantages of Lime-Soda process. 5

(b) Write a note on conducting polymers. 5

(c) Name and describe the disadvantages (Harmfull effects) if hard water is fed to boilers. 5