

B. TECH.
(SEM II) THEORY EXAMINATION 2017-18
ENGINEERING CHEMISTRY

Time: 3 Hours**Total Marks: 70****Note:** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

- a. What is meant by Permanent hardness?
- b. Define cloud point & pour point of a lubricant.
- c. Write two gaseous fuels.
- d. What is meant by Pseudo first order reaction?
- e. Define coefficient of viscosity
- f. What do you mean by hardening of cement?
- g. Write name of salts responsible for temporary hardness.

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

- a. Discuss the formation of scale & sludge in boiler. Write their disadvantages and methods of its removal & preventions.
- b. Describe pitting and stress Corrosion.
- c. Give various methods for the determination of molecular weight of polymer. Explain any one method in detail.
- d. What is energy of Activation? Write Arrhenius equation
- e. What is meant by calorific value of fuel? What is the difference between gross calorific value and net calorific value?

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

- (a) Discuss the zeolite process for the treatment of water and write the advantages of zeolite process over soda lime process.
- (b) Classify fuels and their advantages.

4. Attempt any *one* part of the following: 7 x 1 = 7

- (a) State mechanism of lubricant and their properties.
- (b) Give a brief account of corrosion and its mechanism. Explain the reason: The rusting of iron is quicker in saline water than in ordinary water.

5. Attempt any *one* part of the following: 7 x 1 = 7

- (a) Classify polymers on the basis of structure, synthesis and molecular force involved.
- (b) Explain the specific conductivity and equivalent conductivity. Describe the determination method of conductivity.

6. Attempt any *one* part of the following: 7 x 1 = 7

- (a) Define chemical kinetics? Derive the equation for a first order reaction.

- (b) What is cement? Also explain the manufacturing process of Portland cement.

7. Attempt any *one* part of the following:

7 x 1 = 7

- (a) Explain the Lime soda process for the softening of water.
The hardness of 1,000 litres of a water sample was completely removed by passing it through a zeolite softener. The softener then required 30 litres of NaCl solution containing 1.5 mg/l of NaCl solution. Calculate the hardness of the sample of water.
- (b) i. Calculate the potential of following electrochemical cell at 25°C :
 $\text{Cu(s)}|\text{Cu}^{2+}(\text{aq})(0.60\text{M})||\text{H}^+(0.01\text{M})|\text{H}_2(0.96\text{atm});\text{Pt}$
Given: $E^0_{\text{Cathode}} = 0.00\text{ V}$, $E^0_{\text{Anode}} = 0.30\text{ V}$.
- ii. Differentiate between condensation and addition polymerization.