

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 162304

Date: 03/05/2017

Subject Name: Reaction Engineering & Rheology

Time: 10:30 AM to 01:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a) Define Chemical Kinetics. With suitable examples, classify Chemical Reactions. 07
- (b) 1. The pyrolysis of Ethane proceeds with an activation energy of about 75000 Cal. How much faster is the decomposition at 700 deg.C than at 550 deg.C?
2. Differentiate order v/s. molecularity 07
- Q.2 (a) At 500 K the rate of a bimolecular reaction is ten times the rate at 400 K. Find the activation energy for this reaction (a) from Arrhenius Law (b) from Collision theory. 07
- (b) Discuss Maxwell model 07
- OR**
- (b) Discuss Arrhenius Law. What is the significance of Activation energy. 07
- Q.3 (a) Explain kinetics of free radical chain polymerisation 07
- (b) Discuss kinetics of Anionic polymerization 07
- OR**
- Q.3 (a) Discuss rate of chemical reaction. Also discuss factors affecting rate of reaction 07
- (b) Differentiate between Elementary and Non Elementary reactions 07
- Q.4 (a) Explain die swell and melt fracture effect in polymer melt flow 07
- (b) Discuss in detail about Non Newtonian fluids. Give suitable examples. 07
- OR**
- Q.4 (a) Discuss Capillary rheometer 07
- (b) [a] On doubling the concentration of reactant, the rate of reaction triples. Find out the reaction order. 07
- [b] Define: Rheology, shear thickening, Apparent Viscosity, homogeneous reactions
- Q.5 (a) Discuss Boltzmann Principle 07
- (b) What is Power Law? Discuss in detail. 07
- OR**
- Q.5 (a) 1. The activation energy of a chemical reaction is 17982 cal/mol in the absence of a catalyst and 11980 cal/mol with a catalyst. By how many times will the rate of the reaction will grow in the presence of a catalyst, if a reaction proceeds at 25 deg.C?
2. Discuss WLF equation 07
- (b) What is Weissenberg effect? Discuss in detail. 07
