

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER- IV (New) EXAMINATION – WINTER 2019****Subject Code: 2141306****Date: 07/12/2019****Subject Name: Elements of Chemical Engg****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

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

		MARKS
Q.1*	(a) Differentiate between elementary and non-elementary reaction.	03
	(b) Explain Single and multiple reactions with one example.	04
	(c) Define (i) Rate constant (ii) PFR (iii) Molecularity (iv) Order of reaction (v) Collision (vi) Activation energy (vii) Rate of reaction	07
Q.2	(a) Differentiate between (i) Homogeneous Reaction (ii) Heterogeneous Reaction.	03
	(b) Define rate of reaction and give the relation between rate of reaction and temperature.	04
	(c) Explain Temperature dependency from Arrhenius's law.	07
	<b>OR</b>	
	(c) Explain Temperature dependency from collision theory.	07
Q.3	(a) What are the ways to control product distribution in parallel reaction?	03
	(b) Draw a neat sketch with application of (i) Semi batch reactor (ii) Mix flow reactor.	04
	(c) At 27°C, a reaction has a rate constant of $0.010\text{s}^{-1}$ . At What temp, would the reaction be twice as fast? $E = 50\text{ KJ/mol}$ . (Assume, Concentration of reactant and E is unchanged.)	07
	<b>OR</b>	
Q.3	(a) Write a Short note on batch reactor.	03
	(b) Write about the advantages and disadvantages of continuous reactor.	04
	(c) Milk is pasteurized if it is heated to 63 °C for 30 min, but if it is heated to 74°C it only needs 15 s for the same result. Find the activation energy of this sterilization process.	07
Q.4	(a) Enlist the classification of reactions.	03
	(b) Explain the second order reaction with example.	04
	(c) Derive a performance Equation for CSTR.	07
	<b>OR</b>	
Q.4	(a) Write down only the temperature dependency equation from collision theory for like and unlike molecules.	03
	(b) Explain experimental methods for F – curve	04
	(c) Derive a material balance Equation for ideal batch reactor.	07
Q.5	(a) Enlist & explain the ways to transfer heat.	03
	(b) Explain experimental methods for C – Curve.	04
	(c) List out the methods of RTD measurement.	07
	<b>OR</b>	
Q.5	(a) Give the difference between ideal flow and non ideal flow.	03
	(b) State and explain thermodynamics law with example.	04
	(c) Explain the procedure to convert F curve to E curve obtained from step Input.	07