Reg. No.



## Manipal Institute of Technology, Manipal

(A Constituent Institute of MAHE)

## VII SEMESTER B.TECH (CHEMICAL ENGINEERING) END SEMESTER EXAMINATIONS, FEB 2022

SUBJECT: (PE V) CHEMICAL REACTOR THEORY [CHE 4061]

Time: 75 min

MAX. MARKS: 20

## **Instructions to Candidates:**

✤ Answer all questions.

✤ Missing data may be suitable assumed.

For an elementary liquid phase reaction $A \leftrightarrow B$ . Make a plot of equilibrium conversion as a fraction of temperature. Determine the adiabatic equilibrium temperature when pure A is fed to the reactor at temperature of 300 K. Data: $\Delta H^{9}_{fa} = -40000 cal/mol\Delta H^{9}_{fb} = -60000 cal/mol.C_{pA} = C_{pB} = 50 cal/ molK.k = 100000 at 298 K.031B.Explain how the resistances are obtained for slurry reactor kinetics031c.Find an interim rate expression for the following catalytic reaction without inhibition whensurface reaction is controlling.A \rightarrow D.032A.Calculate the time required for complete burning of particles of graphite (size: R_o = 5mm,\rho_B = 2.2 g/cc) in an 8% oxygen stream at 900°C and 1 atm. Assume high gas velocity. Rateconstant k'' = 20 cm/s042B.Derive the equation employed to solve the question 2A032C.Derive the BET expression for determining the surface area of a particle.03$			
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<b>2C.</b> Derive the BET expression for determining the surface area of a particle. <b>03</b>	2B	Derive the equation employed to solve the question 2A	03
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