# V SEMESTER B.TECH. (CHEMICAL ENGINEERING) END SEMESTER EXAMINATIONS, DEC 2016

## SUBJECT: TRANSPORT PHENOMENA [CHE 3103]

### 29/12/2016

#### **REVISED CREDIT SYSTEM**

Time: 3 Hours

MAX. MARKS: 100

#### Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Missing data may be suitably assumed.



<b>4B.</b>	A cast iron pipe of 0.1016m inside diameter and 0.1143m outside diameter is insulated with 0.01905m of layer of glass wool, the inside surface of the pipe is at 204.5°C and the glass wool surface temperature is $32^{\circ}$ C. Determine the steady state heat transfer per meter of the pipe, the thermal conductivity of the material of the pipe is 51.9 w/m.°C and that of the glass wool is 0.0554 w/m.°C.	5M
5A.	Consider a catalytic reactor in which dimerization reaction $2A \rightarrow A_2$ , is carried out, assuming that each catalyst particle is surrounded by stagnant gas film through 'A' has to diffuse in order to arrive at the catalytic surface, the above reaction takes place instantaneously and the product $A_2$ diffuse back out through the gas film into the main gas stream, assume the gas film is isothermal. Derive the concentration profile in the gas film and the molar flux through the film.	14M
5B	State and describe a) Newton's law of viscosity, b) Fourier's Law of heat conduction c) Fick's law of diffusion.	6M