R09

Code No: C5102

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I - Semester Examinations, April/May-2012
ADVANCED TRANSPORT PHENOMENA
(CHEMICAL ENGINEERING)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks
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1. Derive the equation of change for incompressible Non – Newtonian flow.

2. Define Mass flux, Momentum flux and energy flux for Multi component mixtures and also give their equations.

3. Derive the equations for "Steady two - dimensional potential flow". Assume ideal fluid and flow is irrotational.

4. Gas A is absorbed by a stationary liquid solvent S, the latter containing solute B. species A reacts with B in an instantaneous irreversible reaction according to the equation $aA+bB \rightarrow$ Products. Assume Fick's second law is valid. Obtain expressions for concentration profiles.

5. Derive time – smoothed equations of change for incompressible fluids.

6. Derive the velocity distribution equation when the "flow near a wall suddenly set in Motion".

7. Obtain the expression for steady laminar flow near an oscillating plate.

8. Write short notes on the following
   a) Thermal Boundary layer and Potential flow
   b) Macroscopic Mass and energy balance equations.

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