

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 $aA+bB \rightarrow \text{Products}$. 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.
