**Conceptual Review of Course**

1. What is shear stress ?
2. How would you calculate shear stess in following scenario :
3. Fluid flowing through a circular pipe
4. Fluid flowing over a plate in a thin film scenario
5. Fluid flowing over a submerged object (in case of creeping flow and in case of fast flow)
6. How is the situation between thin film and boundary layer over a plate different ?
7. What is viscosity ? Is Newton’s law of Viscosity a law ?
8. What is the significance of dimensionless number Reynolds number in fluid flow ? What is the definition of Re. ?
9. Write the expression for Reynolds number in following simple scenario
10. Fluid flowing in a pipe
11. Fluid approaching a sphere
12. What are the empirical approaches available to calculate shear forces or drag forces in commonly encountered fluid flow situation?
13. What is the origin of equation of motion?
14. What assumptions are made to obtain following special equations used commonly from the generalized equation of motion?
15. Navier Stoke’s Equation
16. Stoke’s Flow
17. Euler Equation
18. What is the principle behind the design of following instruments? How did we obtain the equations used in design of these instruments?
19. Barometer
20. Manometer
21. Viscometers – Couette & Searle
22. Capillary Viscometer
23. Venturimeter
24. Orificemeter
25. What are the two reference frames used for fluid flow ? Why do we have two reference frames ?
26. What is potential flow ?
27. What are stream functions ? Why are stream functions useful ?

**Writing Equations**

1. Flow rate across a surface is written in terms of
2. Surface integral
3. Volume integral
4. Write the general form of equation for :
5. Differential volume element in Cartesian co-ordinate
6. Differential volume element in cylindrical co-ordinate
7. Differential surface element in cartesian co-ordinate
8. Differential surface element in cylindrical co-ordinates
9. Write an equation with proper integral and limits to calculate volumetric and mass flow rate in following scenario
10. Fluid flowing through a pipe where velocity is one dimensional Vz. Vz is a function of both r and θ
11. Fluid flowing through a pipe with one dimensional constant velocity Vz.
12. Fluid flowing through a channel of width W and Height H and Length L. The fluid is flowing along the length of the channel with velocity V which is a function of width and height dimension.
13. Write equations for calculation of total shear forces in following scenario
14. Fluid flowing over a solid cylinder with the direction of flow along the length of cylinder and velocity varies only along the radial direction.
15. Fluid flowing through a pipe with velocity only dependent on r
16. How would these equations change if you have velocity dependent on multiple directions ? Such as both r and θ