Module VI:

1. Write down the equations to be solved for the calculation of steady, isothermal, non-reacting turbulent flow using (a) mixing length model, (b) one-equation model and (c) the k-εmodel.

2. Make a flow chart for the computation of the flow in each of the above cases.

3. Differentiate between the gridding requirements for the k-$\varepsilon$and the k-ω models of turbulence closure.

4. Derive the energy equation in cylindrical coordinates.

5. Write down the species conservation equation in cylindrical coordinates.

6. Derive the time-averaged forms of the energy and species conservation equations in Cartesian coordinates.

7. Write down the governing equations for the computation of anunsteady turbulent reacting flow involving an elementary homogeneous chemical reaction of the form A+B $\rightarrow$ C + D using an Arrhenius form of the expression for the reaction rate constant. Suggest suitable initial and boundary conditions.

8. Make a flow chart for the above problem.