ME5001
(TURBO MACHINERY)

1. (a) What is turbine?
   (b) What is application of turbo machinery?
   (c) Write about classification of turbo machine.
   (d) Derive energy equation for relative velocities (one-dimensional analysis) for turbo machinery.
   (e) Derive Euler's equation of motion for one dimensional flow?

2. (a)What is the momentum equation.

   (c)Write about reaction turbine?
   (b)What is impulse turbine?
   (d)Write short note on –Euler turbine equation.
   (e) Write short note on –degree of reaction.

3. (a) Write about different types of impulse turbine.
   (b) What is staging?
   (c) Write about stage efficiency.
   (d) A velocity compounded impulse turbine has two rows of moving blades with a fixed row of guides between them.the steam leaves the nozzles at 900m/s ,in a direction at $18^{o}$to the plane of the rotation, the blade speed is 150 m/s, and the blade outlet angles are first moving 24^{o}, fixed $26^{0}$and second moving 30^{0}. The friction factor is 0.9 for all rows .draw the velocity diagram to as largea scale as possible and from it ,determine the total change in velocity of whirl and the tangential thrust on the rotor if the steam supply is 4500kg/hr.

   (e) Write short note on –Governing of steam turbines.

4.(a)What is governing of turbine?
   (b)What is vortex flow? Write its types
   (c)Write about nozzle efficiency.

   (d) A single row impulse turbine develops 132.4KW at a blade speed of 175m/s using 2kg of steam per second steam leaves the nozzle at 400m/s velocity co-efficient of the blade is 0.9, steam leaves the blade axially. Draw velocity triangle for the turbine and determine various angles.

   (e) Drive an expression for optimizing blade efficiency in an impulse turbine.