



- 6 a. In a single stage impulse turbine the nozzle discharges the fluid on to the blades at an angle of  $65^\circ$  to the axial direction and the fluid leaves the blades with an absolute velocity of 300 M/S at an angle of  $30^\circ$  to the axial direction. If the blades have equal inlet and outlet angles and there is no axial thrust. Estimate the blade angle and power produced per kg/s of the fluid. (12 Marks)
- b. Draw the velocity triangles of a single stage turbine and mark the velocities. (08 Marks)
- 7 a. Describe the principle of operation of a ram jet with the help of a neat sketch. (06 Marks)
- b. What are the advantages and disadvantages of ram jet? (06 Marks)
- c. What is the thrust of an ideal ram jet with a fully expanded nozzle for the data given in Fig.Q7(c)?

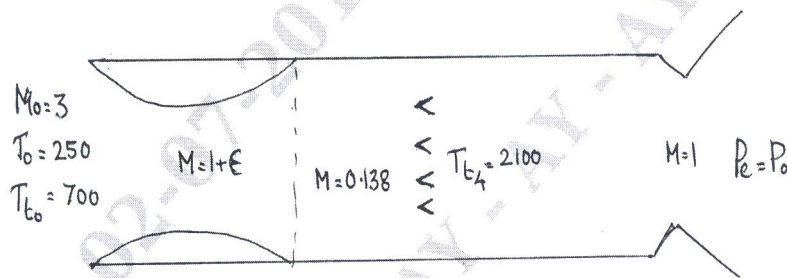


Fig.Q7(c)

(08 Marks)

- 8 a. Explain ion-rocket propulsion with a neat sketch. (08 Marks)
- b. What is the principle of rocket propulsion and write the equation for thrust and power required to produce exhaust jet? (06 Marks)
- c. Write short notes on:
- Requirements of liquid propellant in a rocket
  - Performance differences of the air breathing engine and the rocket engine. (06 Marks)

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