

SECTION-B

2. Explain the effect of inter-cooling in a multistage reciprocating compressor.
3. A centrifugal compressor delivers 50 kg of air per minute at a pressure of 2 bar and 97°C. The intake pressure and temperature of the air is 1 bar and 15°C. If no heat is lost to the surrounding, find: a) index of compression and b) power required, if the compression is isothermal. Take $R=287 \text{ J/Kg K}$.
4. Explain the function of impeller and diffuser in centrifugal compressor.
5. Derive an expression for air standard efficiency of ideal brayton cycle in terms of pressure ratio.
6. Explain the working of ram jet and pulse jet.

SECTION-C

7. A two stage air compressor compresses air from 1 bar and 20°C to 42 bar. If the law of compression is $p v^{1.35} = \text{constant}$ and the intercooling is complete to 20°C, find per kg of air: a) The work done in compressing and b) The mass of water necessary for abstracting the heat in the intercooler, if the temperature rise of cooling water is 25°C. Take $R = 287 \text{ J/Kg K}$ and $c_p = 1 \text{ KJ/Kg K}$.
8. A turbojet engine draws air at the rate of 1 kg/s while flying at a speed of 900 kmph. The velocity of gases at the exit of the nozzle is 620 m/s. The engine uses fuel at the rate of 0.0125 kg/s of calorific value 45000 KJ/Kg. Find :
 - a. Fuel-air ratio
 - b. Fuel consumption in kg/hr
 - c. Thrust, Thrust power and Thrust specific fuel consumption
 - d. Propulsive power and propulsive efficiency
 - e. Thermal and overall efficiency of turbojet.
9. Write a short note on the following :
 - a. Clearance in compressor
 - b. Free air delivered (F.A.D) and displacement
 - c. Compressor performance