(b) In a steam condenser, the average temperature is 34ºC. The vacuum is 680 mm Hg when the barometer reads 762 mm Hg. The water enters at 25ºC and leaves at 32ºC. Determine the condenser efficiency. Also determine vacuum efficiency. **10**

7. (a) Define volumetric efficiency of reciprocating air compressor and derive an expression for the same. **15**

(b) Discuss the advantages of multistage compression. **5**

8. The percentage weight analysis of a fuel supplied to in I.C. Engine is as follows : C = 85%, H_2 = 15%. The air fuel ratio is 13.5 : 1. If all the carbon is burnt either to CO or CO_2 and if there is no free oxygen in exhaust gases, Calculate :

(a) Volumetric analysis of dry products of combustion

(b) Heat lost by incomplete combustion expressed as percentage of gross calorific value. **20**

No. of Printed Pages : 04 **Roll No. .....**

435

B. Tech. EXAMINATION, May 2018

(Fourth Semester)

(Old Scheme) (Re-appear Only)

(ME)

ME210

ENERGY CONVERSION

Time : 3 *Hours*] [*Maximum Marks :* 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt any *Five* questions. All questions carry equal marks. Use of Mollier diagram and steam tables is allowed.

1. Explain different type losses in steam boilers with the help of heat balance sheet. **20**

2. (a) What do you understand by artificial draft ? Explain the different means of producting artificial draft. **10**

(b) What do you understand by stage efficiency, overall efficiency, and reheat factor ? **10**

3. The enthalpy drop in the nozzle of an impuse turbine was 45 kJ/kg. The nozzle is inclined at 14º to be the wheel tangent. The average diameter of the wheel is 0.3 m. The wheel runs at 10,000 rpm. Determine the blade inlet angle for shock less entry. If the blade exit angle is equal to the inlet angle, determine the work done/kg and also the axial thrust for a flow of 1 kg/sec. **20**

4. Steam at a pressure of 7 bar and 180ºC is discharged through a convergent divergent nozzle at 1 bar. The mass flow rate of steam is estimated to 2 kg/s. The pressure at the nozzle is 4 bar and steam enters the nozzle with velocity of 75 m/s. Expansion up to nozzle throat is isentropic and the frictional resistance equivalent to 60 kJ/kg of steam reheats the steam in the divergent section. Make calculations for :

(a) Suitable areas for the throat and exit

(b) Overall efficiency of nozzle based on enthalpy drop between state of steam and back pressure. **20**

5. Explain Rankine cycle with superheat, reheat and regeneration. **20**

6. (a) Discuss the role of condenser in steam power plants. Compare between jet and surface condensers. **10**