SC- 9

Seat No.	

Total No. of Pages :2

F. E. (All Branches) & (Semester-I&II) Examination, December - 2019
BASIC MECHANICAL ENGINEERING
Sub. Code : 59186

Day and Date : Monday, 9 - 12 - 2019 **Total Marks : 100**
Time : 2.30 p.m to 5.30 p.m.

Instructions :
1) **Attempt any 3 questions from each section.**
2) **Figures to right indicate full marks.**
3) **Assume Suitable data wherever required and state it clearly.**

SECTION-I

Q1) a) State statements of second law of thermodynamics with example. **[6]**

b) Following data is obtained from an air compressor, Pressure at inlet is 100* 10^3 N/m^2, pressure at outlet is 500* 10^3 N/m^2, speccific volume at inlet is 0.6m^3/kg and at outlet is 0.15 m_3/kg. When air is absorbed the internal energy of air is 50KJ/Kg and when it is delivered its internal energy is 125KJ/Kg The velocity of air at inlet is 8m/s and at outlet 4m/s. Inlet is 6m above the surface and it delivers at 2m, rate of air flow through compressor is 5kg/s, The heat rejected by compressor is 45KW. Determine necessary power required. **[10]**

Q2) a) Describe working of four stroke CI engine with neat sketch. **[8]**

b) Sketch otto cycle with P-V and T-S diagram. Derive its expression for its air standard efficiency. **[8]**

Q3) a) Explain construction and working of vapour compression refrigeration system. **[8]**

b) Enumerate properties of good refrigerant. **[8]**

Q4) a) Explain with neat sketch Window Air Conditioner. **[8]**

b) Differentiate between SI engine and CI engine **[6]**

c) Differentiate Macroscopic and Microscopic view in thermodynamics. **[4]**

P.T.O.

SECTION - II

Q5) a) Explain with neat sketch construction, working, advantages and disadvantages of hydroelectric power plant. **[8]**

b) Explain construction and working of Biogas plant. **[4]**

c) Differentiate renewable and non-renewable energy sources. **[4]**

Q6) a) Explain with neat sketch working of francis turbine. **[8]**

b) Two pulleys having diameter 2m and 1.5m separated by distance of 5m, Maximum tension in belt is 3KN, Coefficient of friction is 0.3. Calculate power transmitted by open belt when smaller pulley rotates at 200rpm also calculate length of belt. **[8]**

Q7) a) Explain basic steps involved in casting process. **[8]**

b) Explain metal removing process and its applications. **[8]**

Q8) Write short note on the following. **[18]**

a) Soldering and Brazing.

b) Solar refrigeration.

c) Centrifugal pump.