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SE - 9

Total No. of Pages : 2

**F.E. (All Branches) (Semester I & II) Examination, December - 2018**  
**BASIC MECHANICAL ENGINEERING**

**Sub. Code : 59186**

**Day and Date : Friday, 07 - 12 - 2018**

**Total Marks : 100**

**Time : 02.30 p.m. to 05.30 p.m.**

- Instructions :**
- 1) Attempt any three questions from each section.
  - 2) Figures to the right indicate full marks.

**SECTION - I**

- Q1) a)** Differentiate between Macroscopic and Microscopic view in thermodynamics study. [4]
- b)** Air flows steadily at the rate of 25Kg/ min through an air compressor. At entrance section velocity of 7 m/s, the pressure is 1.5 bar and the specific volume is 0.85m<sup>3</sup>/kg. The corresponding values at the exit section are 5 m/s, 7.5 bar and 0.175m<sup>3</sup>/Kg respectively. The internal energy of air increases by 90KJ/Kg across the compressor. Cooling water in the compressor jackets absorbs [10]
- i) Heat from the air at the rate 3700 KJ/min.
  - ii) Compute the rate of shaft work input to the air in Kw.  
Find the ratio of input pipe diameter to the outlet pipe.
- c)** Explain the concept of different types system. [4]
- Q2) a)** A nozzle receives air at a velocity of 60m/s. The enthalpy of incoming air is 3100 KJ/Kg and that of the outgoing air is 2800 KJ/Kg. Determine the velocity of exit air assuming no heat and work loss. Also find out the specific volume of outgoing air if the discharge area of nozzle is 20cm<sup>2</sup>, end rate of discharge as 3 Kg/sec. [8]
- b)** Define heat and work. State and explain different forms of work. [8]

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- Q3) a)** What is meant by stoichiometric combustion? Give reasons for incomplete combustion and how to overcome. [8]
- b) Distinguish between SI and CI engines. [8]
- Q4) a)** Define following terms [8]
- i) Relative Humidity
  - ii) Dry Bulb Temperature
  - iii) Wet Bulb Temperature
  - iv) Dew Point Temperature
- b) Explain with neat sketch Window Air Conditioner. [8]

### SECTION - II

- Q5) a)** Explain with neat sketch construction and working of Hydro-Electric Power Plant. [8]
- b) Differentiate between Renewable and Non-Renewable energy sources. [4]
- c) Draw neat sketch of Bio-Gas Plant. [4]
- Q6) a)** Classify Pumps and explain Centrifugal Pump with neat sketch. [8]
- b) Derive expression for length of Cross Belt Drive. [8]
- Q7) a)** What are the different metal joining processes? Explain any two processes with neat sketch. [8]
- b) Explain metal removing processes and its applications. [8]
- Q8) Write short notes on :** [18]
- a) Sand Casting
  - b) Oldham Coupling
  - c) Photovoltaic Cell

