00664

B.TECH. (AEROSPACE ENGINEERING)
BTAE

Term-End Examination

June, 2014

BAS-013 : PROPULSION - I

Time : 3 hours *Maximum Marks : 70*

Note : *All questions carry **equal** marks. Answer **any seven** questions. Use of scientific calculator is **permitted**. Assume data suitably.*

1. Derive an expression for the Thermal efficiency of an Otto cycle. **10**

2. Explain working principle of simple Turbo-prop engine used in aircraft. **10**

3. Explain the various stages of combustion in S.I. engine with the help of P.Q diagram. **10**

4. Calculate the rate of heat loss of a red brick wall of length 5 m, height 4 m and thickness 0.25 m. The temperature of the inner surface is 110°C and that of outer surface is 40°C. The thermal conductivity of red brick, K = 0.70 W/mK. Calculate also the temperature at the interior point of the wall, 20 cm distant from the inner wall. **10**

5. Discuss the functions of Lubricating system. **10**

6. Explain the functioning of steam cooling system in an automobile engine. **10**

7. Write short notes on **any two** of following : **10**
   (a) Convection and Conduction
   (b) Turbocharging
   (c) Knocking and Detonation

8. In an air-standard Diesel cycle, the compression ratio is 16 and at the beginning of isentropic compression, the temperature is 15°C and the pressure is 0.1 M pascal. Heat is added until the temperature at the end of the constant pressure process is 148°C. **10**
   Calculate :
   (a) Heat supplied
   (b) Cycle efficiency

9. Define heat convection. Derive following expression of radial heat conduction through cylindrical system. **10**

$$Q = \frac{2\pi kL(T_i - T_o)}{L_n\left(\frac{r_o}{r_i}\right)}$$

Where, k = Thermal conductivity of the material
r_i, r_o = Inside and outside radius of cylinder
L = Length of cylinder
T_i, T_o = Inside and outside surface temperature of the cylinder