

**B.TECH. (AEROSPACE ENGINEERING)**  
**BTAE**

**Term-End Examination**

**December, 2013**

**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 diesel engine. 10
2. Explain working principle of pulse jet engine used in aircraft. 10
3. Explain Hydrodynamic and Hydrostatic lubrication. 10
4. Write short notes on *any two* of the following : 10
  - (a) Brake specific fuel consumption.
  - (b) Convection and Radiation.
  - (c) Supercharging.
5. Using valve timing diagram, illustrate functioning of spark ignition engine. 10
6. Explain the working of a simple carburetor. Write the expression of fuel - air ratio for simple carburetor. 10

7. An engine working on otto cycle is supplied with air at 0.1MPa, 35°C. The compression ratio is 8. Heat supplied is 2100kJ/kg. Calculate the maximum pressure and temperature of the cycle and cycle efficiency. [for air,  $C_p = 1.005$ ,  $C_v = 0.718$ ,  $R = 0.287\text{kJ/kJK}$ ]. 10

8. A gray surface is maintained at a temperature of 827°C. If the max - spectral emissive power at that temperature is  $1.37 \times 10^{10}\text{W/m}^2$  determine the emissivity of the body and the wavelength corresponding to the maximum spectral intensity of radiation. 10

9. What is meant by heat conduction ? Derive an expression for heat conduction through a plane 10

wall. 
$$Q = \frac{KA(T_1 - T_2)}{L},$$

where, K is thermal conductivity of wall

A = Surface area of wall

$T_1, T_2$  = Temperature at the inner and outer side of wall ( $T_1 > T_2$ )

L = Wall thickness.

---