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**BAS-013**

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

**Term-End Examination**

**December, 2015**

**BAS-013 : PROPULSION - I**

*Time : 3 hours*

*Maximum Marks : 70*

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*Note : Section I is compulsory. Attempt any nine questions from Section II. Each question carries equal marks. Use of scientific calculator is permitted.*

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**SECTION I**

1. (a) State whether the following are *True* or *False* :  $1 \times 3 = 3$
- (i) For the same compression ratio, efficiency of Otto cycle is more than Dual and Diesel cycle.
  - (ii) The important functions of lubricating system are lubrication and cooling.
  - (iii) In heat transfer by conduction, the thermal resistance increases with increase in thermal conductivity of material.

(b) Fill in the blanks of the following : 1×4=4

- (i) Intake valve in a 4-stroke petrol engine closes after BDC to get advantage of \_\_\_\_\_ effect.
- (ii) Ramjet engines need \_\_\_\_\_ to start their operation.
- (iii) Carburetor is used to \_\_\_\_\_ the fuel and \_\_\_\_\_ it with air.
- (iv) Part of indicated power, which is lost due to friction, is called \_\_\_\_\_ .

## SECTION II

Attempt any *nine* questions.

2. Draw P-v and T-s diagram and derive an expression for efficiency of Dual cycle. 7
3. In an air standard Otto cycle, the temperature at the end of compression stroke is 700 K and maximum cycle temperature is 2500 K. If engine delivers 780 kJ/kg of net work, find the thermal efficiency and compression ratio of the engine. Draw P-v and T-s diagram and take  $C_v = 0.720$  kJ/kg K. 7
4. Discuss the working of turboprop engine, also draw its T-s diagram. 7
5. Explain the mechanism of detonation or knocking in S.I. engine. How is the knocking prevented? 7
6. A 4-stroke petrol engine delivers 40 kW with Mechanical efficiency of 85%. The fuel consumption of engine is 0.4 kg per-kW-hr and the fuel-air ratio is 14 : 1. The heating value of fuel is 42000 kJ/kg. Find the, 7
  - (a) indicated power,
  - (b) brake thermal efficiency, and
  - (c) fuel consumption per hour.

7. Explain supercharging and its effect on power and efficiency. Also list the different types of superchargers. 7
  8. Derive the expression of heat transfer through a composite wall consisting of two parallel slabs. 7
  9. Explain the heat transfer by radiation and discuss Planck's distribution law. 7
  10. Derive the expression for determination of venturi and fuel orifice size. 7
  11. Describe in detail Air Cooling System. 7
  12. Explain the different methods to measure brake horse power. 7
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