

00382

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

Term-End Examination

December, 2017

BAS-013 : PROPULSION - I

Time : 3 hours

Maximum Marks : 70

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- Note :*
- (i) Attempt any seven questions.*
 - (ii) All questions carry equal marks.*
 - (iii) Use of scientific calculator is permitted.*
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- 1. Distinguish between otto cycle and diesel cycle. 10
Explain the working principle of diesel cycle with the help of neat and labelled diagrams.

- 2. Distinguish between a turboprop and turbojet 10
engine. Explain the working principle of turbojet engine with the help of neat and labelled diagrams.

- 3. (a) Distinguish between 2-stroke and 4-stroke 8
engine. Explain the combustion process of 4-stroke engine with the help of sketches.
- (b) What is indicator diagram ? 2

4. A two-stroke engine delivers 5000 kW while using 1500 kW to overcome frictional losses. It consumes 2400 kg of fuel per hour at an air-fuel ratio of 18 : 1. The heating value of fuel is 43000 kJ/kg. Find the 10
- (a) indicated power
 - (b) mechanical efficiency
 - (c) air consumption per hour
 - (d) indicated thermal efficiency and
 - (e) brake thermal efficiency
5. (a) Define IHP, BHP and SHP. 3
- (b) Distinguish between variable speed and constant speed engine performance test. Explain the variable speed test in detail. 7
6. Compression ratio of an air standard Diesel cycle is 15. Pressure and temperature at inlet to isentropic compression are 25°C and 0.1MPa, respectively. Heat is added at constant pressure till the temperature reaches 1600°C. Calculate 10
- (a) cut-off ratio
 - (b) heat supplied per kg of air
 - (c) cycle efficiency and
 - (d) net work.
- Assume C_V and C_P as 1.005 kJ/kg K° and 0.72 kJ/kg K° and $\gamma = 0.4$.
7. (a) What is carburation ? Explain the construction and working of a simple carburettor with the help of a neat sketch. 7
- (b) List air fuel ratio requirements. 3

8. (a) Explain the need of supercharging in case of aircraft. Explain briefly various types of superchargers. 7
- (b) Explain Planck's distributive law. 3
9. Write notes on the following : 5+5=10
- (a) Types of cooling system.
- (b) Pressure and dry-sump lubrication system.
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