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BAS-013

01321

B.TECH. IN AEROSPACE ENGINEERING (BTAE)

Term-End Examination

June, 2011

BAS-013 : PROPULSION - I

Time : 3 hours *Maximum Marks : 70*

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

1. (a) Derive an expression for air standard efficiency of Otto cycle. **5+5=10**

(b) Bore and stroke of an engine working on Otto cycle are 20 cm and 30 cm respectively. If clearance volume is $0.001025 m^3$, calculate air standard efficiency.

2. Write short notes on ***any two*** of the following : **5x2=10**

(a) Turboprop propulsion

(b) Knocking

(c) Steam cooling of IC engine.

3. Give reasons for **any two** of the following : **5x2=10**

(a) Increase in cut-off ratio reduces air standard efficiency of Diesel cycle.

(b) 2 - stroke engines have lower thermal efficiency than 4 - stroke engines.

(c) Torque and mean effective pressure donot depend strongly on speed of an engine but bhp depends on speed.

4. Each cylinder of a 4 - cylinder 4 - stroke engine has a bore and stroke of 100 mm and 150 mm respectively. The venturi diameter at throat is 25 mm. If engine runs at 2000 rpm and volumetric efficiency is 70%, determine suction pressure at throat. Take air density as 1.2 kg/m^3 and neglect compressibility of air. Take mass discharge coefficient as 0.8. **10**

5. An engine is designed to deliver 120 bhp with mechanical efficiency of 80%. Due to some lubrication change, frictional horse power reduces by 5 unit and out put remains same. If indicated thermal efficiency is same, calculate **10**

(a) New mechanical efficiency

(b) New brake.

Specific fuel consumption, if original brake Specific fuel consumption is 200 gm/bhp-hr.

6. Explain one-dimensional heat conduction through a neat sketch. What is utility of electrical analogy of heat conduction ? **10**

7. What are various methods for measurement of fhp ? Explain each method. **10**

8. What are adverse effects of altitude on performance of an aircraft engine ? How are these effects nullified ? **10**

9. (a) Explain the law governing heat transfer by radiation. **5+5=10**

   (b) Calculate emmisive power of a black body maintained at :

   (i) 0°C and (ii) 6000°C