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BAS-013

00641

B.TECH. IN AEROSPACE ENGINEERING (BTAE)

Term-End Examination

December, 2010

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. Explain functions of different carburetor elements using sketch of a simple carburetor. **10**

2. What are salient properties of engine lubricants ? Why are additives needed in lubricants ? **10**

3. What is convective heat transfer? Explain free convection heat transfer on a vertical flat plate when surface temperature is lower than the surrounding. **10**

4. Calculate the critical radius of insulation (Thermal conductivity = 0.1 W/m/K) when it is applied on a pipe of 5mm diameter exposed to room at 20°C. Assume convective heat transfer coefficient as $2W/m^2/K$. Calculate heat loss if pipe is maintained at 200°C and **10**

(a) no insulation is applied
(b) critical radius of insulation is applied.

5. Fuel supply in a 4-cylinder 4-stroke engine with 60mm bore and 120mm stroke, at full throttle and constant speed is 0.08 kg/min. Brake power with all cylinders working is 15.5 kW. Brakepowers, when cylinder number 1, 2, 3 and 4 are cut-off, are 10.5 kW, 10.2 kW, 10.4 kW and 10.3 kW respectively. If calorific value of fuel is 45 MJ/kg, calculate : **10**

(a) indicated power for each engine
(b) indicated thermal efficiency
(c) brake thermal efficiency
(d) mechanical efficiency.

6. Explain functions of a CI engine using valve timing diagram. **10**

7. Explain various types of IC engine. What are basis for classification of IC engines ? **10**

8. Derive expression for air standard efficiency of a diesel cycle. **10**

9. Compare turboprop and bypass jet propulsion for aircraft application. **10**