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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ANE) (Sem.-4)
AIRCRAFT PROPULSION – I
Subject Code : ANE-208
M.Code : 60516

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**1. Answer briefly :**

- a) Define thermal conductivity.
- b) Define forced convection.
- c) Define activity factor.
- d) Define B.H.P.
- e) Define slip factor.
- f) Define polytropic efficiency.
- g) Define thrust augmentation.
- h) Define installed thrust.
- i) Define T.D.C.
- j) Define thermal efficiency.

SECTION-B

2. An insulated wall is to be constructed to brick 20 cm thick, and plaster 2.5 cms thick with Rockwool insulator in between. The outer surfaces of bricks and plaster are at temperature 600°C & 50°C respectively. Calculate the thickness of insulation ; Heat loss per square meter shall not exceed 600 W. The conductivities of brick, rock-wool and plaster are 0.32, 0.045 and 0.7 w/m-k respectively.
3. Derive the expression of ideal efficiency for the propeller with the help of momentum theory.
4. Describe lubricating system for an I.C. engine with the help of neat diagrams.
5. Derive an expression of work and efficiency for an ideal Brayton cycle.
6. Describe working of a can type combustion chamber with the help of a neat diagram.

SECTION-C

7. Derive the expressions for work done and pressure rise across a centrifugal compressor using velocity triangles.
8. A vertical pipe 5 cm diameter carrying hot water is exposed to ambient air at 15°C. If the outer surface of the pipe is 65°C, find the heat loss from one metre height of the pipe per hour. Properties of air at $\left(\frac{65+15}{2}\right) = 40^\circ\text{C}$ are given below :
 $\rho = 1.128 \text{ kg/m}^3$, $\mu = 19.1 \times 10^{-6} \text{ kg/m-s}$, $\nu = 16.96 \times 10^{-6} \text{ m}^2/\text{sec}$, $C_p = 1007 \text{ J/kg - } k$,
 $K = 0.027 \text{ W/m-k}$.
9. A four-cylinder four-stroke petrol engine develops 14.7 kW at 1000 rpm. Mean effective pressure is 5.5 bar. Calculate bore and stroke of the engine, if the length of stroke is 1.5 times the bore.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.