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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (2011 onwards) (Sem.-4)
APPLIED THERMODYNAMICS-II

Subject Code : BTME-404

Paper ID : [A1214]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION 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 has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

SECTION-A

I. Write briefly :

- i. Define Volumetric efficiency of a reciprocating air compressor.
- ii. What is Stalling?
- iii. What is Swept? Volume in reciprocating air compressor?
- iv. Define the angle of attack.
- v. What is slip factor?
- vi. Draw the T-S Diagram of the open gas power cycle.
- vii. Define Propulsion Efficiency.
- viii. What is Choking?
- ix. What is degree of reaction?
- x. Draw with neat sketch Turboprop Engine.

SECTION-B

2. What is the classification of gas turbines? Differentiate between closed and open cycle gas turbines, with neat sketches of gas flow and P-V diagram.

[MCode - 59132]

3. A centrifugal air compressor delivers 20 kg sec. of air with a total head pressure ratio of 4:1. The speed of the compressor is 12,000 r.p.m. Inlet total temperature is 150°C, slip factor 0.9, power inlet factor 1.04 and the total head isentropic efficiency as 80%. Calculate the overall diameter of the impeller.
4. Discuss how the clearance affects the performance of multistage reciprocating compressors.
5. Explain the factor influencing the selection of number of blades used in the impeller of a centrifugal compressor.
6. Prove that with 50% reaction blading, axial flow compressors have symmetrical blading

SECTION-C

7. Explain the phenomenon of "Stalling", "Surging" and "Choking" in centrifugal compressors.
8. What is the principle of rocket propulsion and what are the different types of rocket engines?
9. Determine the size of the cylinder for double acting air compressor of 50 indicated horse power, in which air is drawn at 1 kgf/cm² and 15°C and compressed according to the law $pV^{1.2} = C$ to 6 kgf/cm² the compressor runs at 100 rpm with average piston speed of 152.5 m/min. Neglect clearance.