

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME-2011 Batch) (Sem.-4th)

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**1. Answer briefly :**

- (a) What are the advantages of multi-stage compression?
- (b) State at least four applications of compressed air.
- (c) List the positive displacement type rotary compressors.
- (d) Write the steady flow energy equation & explain various terms?
- (e) Explain the terms pre-whirl & slip factor.
- (f) Explain the term surging used in centrifugal compressors.
- (g) What is stalling in case of axial flow compressor?
- (h) List the different components of axial flow compressor.
- (i) What is semi-closed gas turbine ?
- (j) Name the two solid propellants used in rockets.

SECTION-B

2. Show that the optimum intermediate pressure of a two-stage compressor for minimum work is the geometric mean of the suction & discharge pressures.

3. Define degree of reaction as applied to axial flow compressor such that the blades are symmetrical for 50% reaction.
4. Explain the function of impeller and diffuser in a centrifugal compressor.
5. Discuss the methods of improving the work ratio & thermal efficiency by employing multi-stage intercooling and reheating.
6. Discuss advantages and disadvantages of Jet engine over other propulsion system.

SECTION-C

7. A single cylinder double acting reciprocating compressor compresses 3 kg/min of air. From 1 bar, 300 k to 6 bar. The compression is such that the maximum pressure at the end of compression is 15 bar. Calculate the power input, the volumetric efficiency, the dimensions, when the compressor runs at 300 r.p.m. & expansion is equal to 1.3 & stroke/bore ratio is 1.2.
8. In an oil gas turbine installation, ambient pressure is 1 bar & temperature is 300 K. The air is compressed to a pressure of 4 bar. The oil fuel has a calorific value of 42000 KJ/kg is burnt in the combustion chamber. The temperature of air to 550°C. If the air flows at the rate of 10 kg/s, find the power of the installation. Also find air fuel ratio.
9. (a) Explain the working difference between propeller driven turbo-prop.
(b) Explain the advantages of dual turbine system.

