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Total No. of Pages : 02

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B.Tech.(ME) (Sem.–4)

APPLIED THERMODYNAMICS–II

Subject Code : BTME-404

M.Code : 59132

Date of Examination: 20-11-2023

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) What are the uses of compressed gases in Industry?

b) Differentiate between the working principle of positive displacement and rotary compressor.

c) Define degree of reaction used in centrifugal compressors.

d) What are the effects of clearance on the performance of reciprocating compressor?

e) Define the term "thrust" of jet propulsion system.

f) Discuss the slip factor of centrifugal compressor.

g) What do you mean by propulsive power and propulsive efficiency?

h) Why is the thermal efficiency of gas turbine high at very high altitude?

i) State merits and demerits of closed cycle gas turbine over open cycle.

j) List the advantages of multistage compression.

SECTION-B

2. Define volumetric efficiency of compressor and state what are the factors on which it depends.

3. What do you understand by Jet propulsion system? Discuss the advantages and disadvantages of Jet propulsion system.

4. Explain in detail the working of Lysholm type compressor.

5. Drive the relation for polytropic efficiency of axial flow compressor with the help of T-S diagram.

6. Discuss in detail the closed cycle gas turbine and field of application of gas turbine.

SECTION-C

7. Air is sucked into centrifugal compressor at static values of 1 bar and 300 K with inlet velocity of 60 m/s. The compressor operates with total head pressure ratio 4 and isentropic efficiency 75 %. If the compressor delivers 20 kg/min of free air, determine:

   a) Total head temperature of air at exit from compressor.

   b) Brake power required to drive the compressor. The motor attached to the compressor has mechanical efficiency of 90 %.

8. a) Explain with diagram the working principle of ramjet engine.

   b) Discuss the influence of reheating and regeneration on the performance of a gas turbine cycle.

9. Write **a short note on any two of the following :**

   a) Compare reciprocating and rotary air compressor.

   b) Stalling in centrifugal compressor.

   c) Field of application of axial flow compressor.

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.