Roll No. | | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech.(Marine Engineering) (2013 Batch)
B.Tech.(ME) (2011 Onwards)
(Sem.–3)
APPLIED THERMODYNAMICS–I
Subject Code : BTME-304
Paper ID : [A1141]

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. Write short notes on :

a) What are the combustion problems in Boilers and IC engines?

b) Explain what is meant by the degree of reaction in steam turbine?

c) Explain the function of super heater in a boiler?

d) Explain heat rejection ratio.

e) What are the limitations of Carnot Cycle?

f) Explain the significance of critical pressure ratio.

g) What is binary vapour cycle?

h) What are the different types of condensers?

i) What is meant by saturation temperature and saturation pressure?

j) What is a pure substance?

SECTION B

2. What is Discharge? Explain and derive the condition and equation for maximum discharge through a nozzle.

3. Explain the working of Stirling boiler with help of a diagram.

4. What is reheat factor? Explain why its magnitude always greater than unity?

5. Explain Dalton's law of partial pressures applied to the condenser problem.

6. Steam approaches a nozzle with velocity of 250 m/Sec, pressure of 3.5 bar and dryness fraction of 0.85. If the isotropic expansion in the nozzle proceeds till the pressure of the exit is 2 bar. Determine the change in enthalpy and dryness fraction of steam using the Mollier's diagram. Also calculate the exit velocity from the nozzle and area of exit nozzle for flow of 0.75 Kg/s.

SECTION C

7. Write short notes on any four :

   a) Blade efficiency

   b) Function of cooling towers

   c) Steam accumulators

   d) Simple impulse turbine

   e) Regenerative cycle

8. a) Derive the equation of work per kg of air compressed by reciprocating air compressor with and without clearance.

   b) Explain the methods of governing a steam turbine. Describe any one method of governing steam turbines.

9. a) Explain description of boiler mounting and accessories. List and explain them all.

   b) What is combined heat-regenerative cycle?