Roll No. ....

Total No. of Questions : 09]   [Total No. of Pages : 02

B.Tech. (Sem. - 3rd)

APPLIED THERMODYNAMICS - I

SUBJECT CODE : ME - 209

Paper ID : [A0805]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours   Maximum Marks : 60

Instruction to Candidates:

1) Section - A is **Compulsory**.

2) Attempt any **Four** questions from Section - B

3) Attempt any **Two** questions from Section - C

Section - A

Q1)   (10 × 2 = 20)

a) What do you understand by pre-ignition in spark ignition engines?

b) What is critical point?

c) What is the difference between mountings and accessories?

d) List the methods for improving efficiency of Ramkine cycle.

e) Name various types of nozzles.

f) Define degree of reaction.

g) List various methods of governing steam turbines.

h) Discuss the merits of surface condenser.

i) What is the use of compressed air in industry.

j) What is the effect of clearance in working of a reciprocating air compressor.

J-970   *P.T.O.*

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Section - B

(4 × 5 = 20)

Q2) Discuss the problem of combustion in compression ignition engines clearly bringing out the importance of delay period.

Q3) Draw a labelled sketch of Lancashire boiler.

Q4) Explain the physical concept of critical pressure ratio.

Q5) What is bleeding ? How does it effect the cycle efficiency.

Q6) Define the term weak (lean) mixture, rich mixture and stochiometric (chemically correct) mixture.

Section - C

(2 × 10 = 20)

Q7) Determine the enthalpy, volume, internal energy of super heated steam at 15 bar pressure and 220°C. The volume of water may be neglected and takes specific heat of super heat equal to 2.2 kJ/kg k.

Q8) Steam is supplied to a three-stage turbine at 40 bar and 400°C and the exhaust to the condenser takes place at 50 millibar, with a wetness fraction of 12% . The work developed in the three stages: high stage : intermediate stage:low stage: :1: 1:2. The condition line may be assumed as straight line determine.

(a) Condition at entry to each stage.

(b) Stage efficiency.

(c) Reheat factor.

(d) Internal efficiency of turbine.

Q9) The pressure under the air baffle of a surface condenser is 5.2 cm of Hg. Temperature of the mixture leaving the cooler section is 25°C. Assuming available cooling water at 15.5° C and external cooler might lower the temperature to 20°C explain the effect of this on the quantity of vapour accompanying air to the pump section.

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