R18

Code No: 154CD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, November/December - 2020
THERMAL ENGINEERING – I
(Mechanical Engineering)

Time: 2 hours **Max. Marks: 75**

Answer any Five Questions
All Questions Carry Equal Marks

1.a) Construct p-v and T-s diagrams for air standard Otto cycle and mark various energy interactions.
b) Construct ideal and actual valve timing diagram of a 4-s SI engine. [8+7]

2. Construct the schematic diagram of simple carburetor and explain its working principle. [15]

3. Explain about combustion. Explain different stages of combustion in S.I. Engine along with p-θ diagram. [15]

4. Identify the term knocking? What are different methods to control the knocking in S.I. Engine? Explain. [15]

5. A four stroke petrol engine with a compression ratio of 6.5 to 1 and total piston displacement of 5.2×10^{-3} m^3 develops 100 kW brake power and consumes 33 kg of petrol per hour of calorific value 44300 kJ/kg at 3000 rpm. Find: a) Brake mean effective pressure, b) Brake thermal efficiency. [7+8]

6. Discuss and derive the expression for the volumetric efficiency of a reciprocating air compressor in terms of clearance ratio, pressure ratio and index of the compression. [15]

7.a) Construct velocity triangles of Axial flow compressor
b) Identify the term slip factor and power input factor with respect to the centrifugal compressor. Explain them. [3+12]

8.a) Classify gas turbines with diagrams.
b) Discuss and derive the air standard efficiency of Brayton cycle. [9+6]

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