TED (15/19) - 4024
(REVISION-2015/19)

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Reg.No……
Signature…….

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, APRIL - 2024

THERMAL ENGINEERING

[Note – Use of steam tables and Mollier chart is Permitted**]**

(Maximum Marks:100) (Time: 3 Hours)

PART - A

(Maximum Mark : 10)

Marks

I. Answer **all** the questions in one or two sentences. Each question carries 2 marks.

1. Define a closed system with an example.
2. Give any two examples of intrinsic property
3. Define compression ratio.
4. Define Brake power.
5. List any two types of heat exchangers. (5 x 2 = 10)

PART - B

(Maximum Mark: 30)

II Answer ***any five*** questions from the following. Each question carries 6 marks.

1. State Zeroth law and the first law of thermodynamics.
2. Define Boyle's law and Charle's law of gases.
3. Draw the valve timing diagram of a four-stroke diesel engine.
4. Compare the characteristics of petrol engines and diesel engines.
5. Explain the heat balance sheet.
6. Define mechanical efficiency, brake thermal efficiency, and indicated thermal efficiency of IC engines.
7. List the applications of compressed air. (5 x 6 = 30)

PART – C

(Maximum Mark: 60)

(Answer ***one full*** question from each unit. Each full question carries 15 marks.)

UNIT - I

III a) Explain specific heats of gases and the relation between them. (7)

b) A vessel of 0.03m^3 capacity contains gas at 350 KN/m^2 pressure and 35°C temperature. Determine the mass of the gas in the vessel. If the pressure is increased to 1.05 x 10^6N/m^2 keeping the volume constant, find the temperature of the gas. Take R = 290J/Kg K for the gas. (8)

OR

IV a) Derive an expression for work done in an isothermal process. (7)

b) The density of a gas at 0°C temperature and 1.013 bar pressure is 1.384 kg/m^3. Calculate Gas constant and the molecular weight of the gas. Find the specific volume of the gas at 13 bar and 35°C. (8)

UNIT – II

V a) State the assumptions made in air standard cycles. (7)

b) Differentiate between two-stroke and four-stroke engines. (8)

OR

VI a) Explain the Carnot cycle with the help of a P-V diagram. (7)

b) Explain the working of a two-stroke petrol engine with the help of a figure. (8)

UNIT – III

VII a) Explain the Morse test for determining the Indicated power of multicylinder Engines. (7)

b) A four-cylinder four-stroke engine runs on 1300 rpm. The stroke is 0.12m and the bore diameter is 0.1m. The mean effective pressure on each cylinder is 500 KPa. Mechanical Efficiency is 60 percent. Calculate Brake power and Indicated power. (8)

OR

VIII a) Explain the working of a double-acting steam engine. (7)

b) List the types of steam nozzles, their functions, and applications. (8)

UNIT – IV

IX a) Explain the concept of a black body and state Stefan Boltzmann's law. (7)

b) Explain the working of a single-stage reciprocating air compressor with the help of figure. (8)

OR

X a) Explain the different modes of heat transfer with suitable examples. (7)

b) List the advantages and disadvantages of multistage compression. (8)

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