TED (21) - 4021
(REVISION-2021)

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Reg.No………………
Signature…………….

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

THERMAL ENGINEERING

[Maximum Marks:75]   [Time: 3 Hours]

Instructions: 1. Use of steam table and mollier chart is allowed.
2. Scientific calculator (up to 100 MS) is allowed.

PART - A

I.   **Answer all the following questions in one word or one sentence. Each question carries 'one' marks.**

(9 x 1 = 9 Marks)

Module Outcome Cognitive level

1	The unit of temperature measured at absolute scale is ……..	M1.02	R
2	System's internal energy added with the product of volume and pressure is known as ………	M1.02	R
3	What is compression ratio of an IC engine?	M2.02	R
4	Heat addition in Otto cycle is carried out in which process.	M2.01	R
5	The ratio of the indicated thermal efficiency to the air standard efficiency of an IC engine is known as …….	M2.02	R
6	Critical temperature value of steam is ……..	M3.01	R
7	The ratio of the mass of dry vapor (steam) to the combined mass of dry vapor (steam) and the mas of liquid in the mixture is called	M3.02	R
8	What is NTU of heat exchanger?	M4.05	R
9	If the temperature potential is 80K and total thermal resistance is 0.01825 K/W. Find the rate of heat transfer Q.	M4.02	A

PART - B

II.   Answer *any eight* questions from the following. Each question carries 'Three' marks.

(8 x 3 = 24 Marks)

Module Outcome   Cognitive level

1	What is thermodynamic system, give its classification?	M1.02	R
2	What is quasistatic process?	M1.04	R
3	Define Avogadro's law.	M1.03	R
4	What is Mayors relation, mention about each term?	M1.03	R
5	Draw the PV diagram of diesel cycle and mark different processes.	M2.01	R
6	Explain heat balance sheet, give an account of approximate distribution of heat loss of an IC engine.	M2.06	U
7	Draw the PV diagram of steam formation.	M3.01	R
8	With the help of neat diagram explain the function of air preheater used in boiler.	M3.05	U
9	Calculate the radiant flux density from a black body at 400ºC?	M4.01	A
10	Define the terms in connection with thermal radiation a) Reflectivity b) absorptivity & c) transmissivity	M4.03	R

PART - C

Answer all the questions from the following. Each question carries 'seven' marks.

(6 x 7 = 42 Marks)

Module Outcome   Cognitive level

III.	What is isothermal process, derive the expression to find the work done of an isothermal process.	M1.04	U
	OR		
IV.	Explain second law of thermodynamics.	M1.03	U
V.	Draw the valve timing diagram of 4 stroke diesel engine and mark all processes.	M2.04	R
	OR		
VI.	In an ideal engine operating on the Carnot cycle, the ratio of isentropic compression is 6 and isothermal expansion is 1.5. If the maximum pressure and temperature are limited to 20 bar and 700K, make calculations for the following parameters. (a) Temperature and pressure at main points of the cycle. (b) Change in entropy during isothermal expansion.	M2.03	A
VII.	With neat diagram explain the working of a two stoke petrol engine.	M2.02	U
	OR		
VIII.	Explain about Morse test on an IC engine.	M2.06	U

IX.	Explain the difference between fire tube and water tube boilers.	M3.05	U
	OR		
X.	Draw the Mollier diagram and show the different types of lines.	M3.03	U
XI.	With neat sketch explain the working of Cochran boiler.	M3.05	U
	OR		
XII.	A tank contains 100kg of liquid water and 5 kg of water vapour under saturation conditions at 20ºC. If the specific volume of saturated vapour at that temperature is taken as 57.78m^3/kg, calculate the volume of tank and moisture content of the mixture.	M3.03	A
XIII.	With neat line diagram explain about construction and working of single stage reciprocating compressor.	M4.07	U
	OR		
XIV.	Two metal bars of the same cross section and 500mm and 600mm long and have thermal conductivities 80W/mK and 50 W/mK respectively. One end of the bar is joined together by welding. The outer end of the first bar is at 100ºC while the other end of the second bar is at 20ºC. Calculate the steady state of heat loss per unit are of the wall.	M4.02	A

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