

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE, APRIL - 2026**

**THERMAL ENGINEERING**

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

[Maximum marks: 75]

[Time: 3 Hours]

**PART A**

**I. Answer all the following questions in one word or one sentence. Each question carries 1 mark.  
(9 x 1 = 9 Marks)**

		Module outcome	Cognitive level
1	Define intrinsic property with an example.	M1.02	R
2	Distinguish state function and path function.	M1.02	R
3	Draw the P-V diagram of an Otto cycle.	M2.01	U
4	The ratio of total cylinder volume to clearance volume of an IC engine is called.....	M2.02	R
5	In Diesel cycle, heat addition takes place at.....	M2.01	R
6	Write one example for impulse and reaction turbine.	M3.06	R
7	Expand the term LMTD.	M4.05	R
8	In a parallel flow heat exchanger, the two fluid streams hot and cold travel in.....	M4.05	R
9	The compression process for uncooled rotary compressor is.....	M4.07	R

**PART B**

**II. Answer any eight questions from the following. Each question carries 3 marks.**

**(8 x 3 = 24 Marks)**

		Module outcome	Cognitive level
1	What is quasistatic process? Point out its salient aspects.	M1.04	R
2	Explain the Zeroth law of thermodynamics.	M1.03	R
3	Find the efficiency of a Carnot engine working between 400K and 300K.	M2.01	U
4	Compare SI engine with CI engine.	M2.02	R
5	Draw Valve timing diagram for a 4-stroke petrol engine and label the strokes.	M2.04	R
6	Write an expression for Indicated power of IC engine and explain the terms.	M2.03	R

7	Briefly explain the principle of impulse steam turbine with reaction steam turbine.	M3.06	U
8	Give an account on the concept of black body.	M4.03	R
9	State Fourier's law of heat transfer by conduction.	M4.01	R
10	Write the working principle of vane type compressor.	M4.07	U

### PART C

**Answer all questions. Each question carries seven marks.**

**(6 x 7 = 42 Marks)**

		Module outcome	Cognitive level
III	State and explain the first and second law of thermodynamics. Also write the limitations of first law of thermodynamics.  <b>OR</b>	M1.03	R
IV	Briefly explain about: a) Boyles law                      b) Charles law      c) Avogadro's law d) Entropy & Enthalpy      e) Reversible & irreversible process	M1.05	U
V	Find the change of enthalpy, internal energy and the flow work of 6 kg of a gas when its temperature increases from 117 <sup>0</sup> C to 167 <sup>0</sup> C due to heating. Assume $C_v = 0.7179$ kJ/kg and $\gamma = 1.4$ .  <b>OR</b>	M1.05	A
VI	Draw P-V diagram and T-S diagram of the following processes. a) Isochoric                      b) Isobaric                      c) Polytrophic	M1.05	U
VII	Compare 4 Stroke diesel engine with 4 stroke petrol engine.  <b>OR</b>	M2.04	U
VIII	The following observations were noted for a four cylinder four stroke engine. Diameter of the engine cylinder = 100 mm Stroke = 120 mm Speed = 1650 rpm Fuel consumption = 12kg / hr Calorific value of fuel = 46200 kJ/kg Difference in tension on either side of the brake pulley = 400N Brake drum circumference = 3300 mm Mechanical efficiency = 80% Calculate, 1. Brake thermal efficiency 2. Indicated thermal efficiency.	M2.06	A
IX	With the help of a neat diagram explain the working of an impulse steam turbine.	M3.06	U

	<b>OR</b>		
X	Explain the working of Babcock and Wilcox boiler with a neat sketch.	M3.05	U
XI	Give an account of any two boiler mountings and accessories.	M3.05	R
	<b>OR</b>		
XII	Differentiate between fire tube and water tube boilers.	M3.05	U
XIII	Illustrate the working axial flow air compressor with a neat sketch.	M4.06	U
	<b>OR</b>		
XIV	Explain the following: a) Planks law of thermal radiation. b) Stefan- Boltzmann law of total radiation.	M4.06	U

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