

**PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)**

II B.Tech II Semester Regular/Supplementary Examinations, May-2024

**APPLIED THERMODYNAMICS
(ME)**

Time: 3 hours

Max. Marks: 70

**Answer ONE Question from each Unit
All Questions Carry Equal Marks**

Q. No.	Questions		BTL	CO	Marks
UNIT – I					
1.	a)	Explain the Exhaust Gas Blowdown phenomena occurs in IC engines with a neat sketch.	K2	CO1	6M
	b)	Construct the actual valve timing diagrams for a 4-stroke Diesel Engine with all necessary details.	K3	CO1	8M
OR					
2.	a)	Mention two essential reasons for using lubricants in IC engines? Write a short note about different methods of lubrication used in IC engines?	K1	CO1	6M
	b)	Explain the working of 4-Stroke SI engine and corresponding thermodynamic processes i.e., Otto cycle with a neat sketch.	K2	CO1	8M
UNIT – II					
3.	a)	Write a short note on the effect of intake temperature and compression ratio on Detonation or Knocking in SI engines?	K1	CO2	4M
	b)	A four stroke diesel engine has a piston diameter of 250 mm and stroke length of 400 mm. The mean effective pressure is 4 bar and the speed of the engine is 500rpm. The diameter of the brake drum is 1000 mm and the effective brake load is 400 N. Find IP, BP & FP?	K3	CO2	10M
OR					
4.	a)	Explain different stage of combustion in SI engine with necessary diagrams.	K2	CO2	8M
	b)	What is delay period? and What are the factors affect the delay period?	K3	CO2	6M

UNIT – III					
5.	a)	Distinguish between Reciprocating and Rotary compressors.	K3	CO3	6M
	b)	Derive the expression for Compression work (W_c) of a reciprocating compressor without clearance volume.	K3	CO3	8M
OR					
6.	a)	Explain the operating principle of a centrifugal compressor with neat sketch.	K2	CO3	8M
	b)	Classify the different types of compressors.	K2	CO3	6M
UNIT – IV					
7.	a)	Steam enters the turbine of a steam power plant, operating on Rankine cycle, at 10 bar, 300°C. The condenser pressure is 0.1 bar. Steam leaving the turbine is 90% dry. Calculate the adiabatic efficiency of the turbine and also the Rankine cycle efficiency by neglecting pump work.	K3	CO4	10M
	b)	Explain the Degree of Undercooling in Steam Nozzles with neat sketch.	K2	CO4	4M
OR					
8.	a)	Derive the expression for vacuum efficiency and condenser efficiency.	K3	CO4	8M
	b)	Classify the different types of nozzles and write a short note on each type of nozzle.	K2	CO4	6M
UNIT – V					
9.	a)	State the applications of Rocket engines.	K1	CO5	4M
	b)	Derive the expression for Propulsive efficiency.	K3	CO5	10M
OR					
10.	a)	Explain the working principle of Liquid Propellant Rocket engine with schematic diagram.	K2	CO5	9M
	b)	State the advantages and disadvantages of Rocket engines.	K1	CO5	5M