Course Code: 1940316   Roll No: MLRS- R19

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

II B.Tech II Sem Regular End Examination, August 2021
THERMAL ENGINEERING – I
(MECH)

Time: 3 Hours.   **Max. Marks: 70**

Note: 1. Answer any FIVE questions.
      2. Each question carries 14 marks and may have a, b as sub questions.

1		Illustrate the constructional details of an I.C engines? Explain briefly about the important components and its materials?	14M	CO1	L2
2	a)	Explain the need and importance of cooling in an I.C. Engine with suitable diagrams	7M	CO1	L2
	b)	Draw the valve timing diagrams of ideal and actual four stroke S.I engine and Discuss the salient features?	7M	CO1	L1
3	a)	Explain different stages of combustion in S.I. Engine along with p-θ diagram.	7M	CO2	L2
	b)	What is pre-ignition? Discuss its ill effects on performance.	7M	CO2	L2
4	a)	What is delay period and what are the factors that affect the delay period in C.I. Engine combustion.	7M	CO2	L3
	b)	The following date was recorded during testing of a four stroke cycle gas engine. Area of indicator diagram = 900 mm^2; Length of indicator diagram = 70 mm; spring scale = 0.3 bar/mm; Diameter of piston = 200 mm; Length of stroke = 250 mm; Speed = 300 rpm. Determine i) Indicated mean effective pressure ii) Indicated power	7M	CO3	L3
5	a)	What is the use of heat balance sheet of an engine? Mention the various items to be determined to complete the heat balance sheet.	7M	CO3	L2
	b)	Derive an expression for the optimum inter cooler pressure for two stage reciprocating air compressor with perfect inter cooling.	7M	CO3	L3
6	a)	Explain the working principle of Roots blower with suitable diagrams.	7M	CO4	L2
	b)	Define the term slip factor and power input factor with respect to the centrifugal compressor. Explain them.	7M	CO4	L1

| 7 | a) | What is the type of compressor applicable for aircraft application? Explain its working principle. | 7M | CO5 | L1 |
| | b) | Describe with neat sketches the working of simple open cycle gas turbine. | 7M | CO5 | L2 |

| 8 | a) | Explain the working of semi closed gas turbine cycle. | 7M | CO5 | L2 |
| | b) | The air enters the compressor of a open cycle constant pressure gas turbine at a pressure of 1 bar and temperature of 20^0C. The pressure of the air after compression is 4 bar. The isentropic efficiencies of compressor and turbine are 80% and 85% respectively. The air fuel ratio used is 90:1.If flow rate of air is 3 kg/s, find: (i) Power developed (ii))Thermal Efficiency of the cycle. | 7M | CO5 | L3 |

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