Code No.: ME403PC | R20 | H.T.No. | | | 8 | R | | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–II–Semester End Examinations (Supply) - February- 2023
THERMAL ENGINEERING-I
(MECH)

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1.	a)	Draw the ideal and actual indicator diagrams of a two-stroke SI engine.	[2M]
	b)	List out the various fuel injection systems of CI engine.	[2M]
	c)	What is physical ignition delay?	[2M]
	d)	List out the different stages of combustion in S.I Engine.	[2M]
	e)	What is heat balance sheet?	[2M]
	f)	Define specific fuel consumption.	[2M]
	g)	What is the difference between rotary and reciprocating compressor?	[2M]
	h)	What is degree of reaction?	[2M]
	i)	Draw the T-s plot of a Brayton cycle.	[2M]
	j)	Define the term "work ratio".	[2M]

PART-B **(50 Marks)**

2. Explain the working of a four stroke CI engine and indicate the processes on PV and TS plots [10M]

OR

3. Discuss the difference between theoretical and actual valve timing diagram of a diesel engine. [10M]

4. Bring out clearly the process of combustion in CI engines and also explain the various stages of combustion. [10M]

OR

5. Explain with figures the various types of combustion chambers used in SI engines [10M]

6. Derive the expression for work per kg of air compressed in a single cylinder reciprocating air compressor neglecting clearance volume. [10M]

OR

7. List the different methods used for finding friction power and indicated power of an engine Explain in detail. L1

8. Explain working principle of Vane type compressor with neat sketch. [10M]

OR

9. Explain the working principle of Roots blower with neat sketch [10M]

10. Draw P-V diagram for multi stage reciprocating compressor without intercooler, derive expression work done by the same case study and prove $P_2 = \sqrt{(P_1 \times P_3)}$ where P_1 Initial pressure P_2 Intermediate pressure and P_3 final pressure [10M]

OR

11. The gas turbine cycle operating between the temperature limits of 1200K and 300K respectively. The entire expansion is carried out single stage turbine. The isentropic efficiency of each compressor is 0.85 and isentropic efficiency of turbine is 0.9. consider perfect intercooling between the two compressors. Find the overall pressure ratio for the maximum network output. Take γ=1.4 [10M]

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