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

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–II–Semester End Examinations (Regular) - June- 2022
THERMAL ENGINEERING-I
(MECH)

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

Note: 1. Answer *any FIVE questions. Each question carries 14 marks.*
2. All questions carry equal marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

5X14=70

1.	a)	Explain the wet sump lubrication system with neat sketch.	[7M]
	b)	With the help of a neat sketch explain the working of fuel supply system of SI engine.	[7M]
2.	a)	Explain the effect of various engine variables on SI engine knock	[7M]
	b)	Explain with figures the various types of combustion chambers used in CI engines	[7M]
3.	a)	A single cylinder engine running at 1800 rpm develops a torque of 8 Nm. The indicated power of the engine is 1.8 kW. Find the loss due to friction power as the percentage of brake power	[7M]
	b)	A single stage single acting reciprocating air compressor takes in 17 m^3/min at suction conditions of 100 KPa and 250° C. The delivery pressure is 700 KPa. The clearance volume is 6% of swept volume. The compression and expansion follows the law $PV^{1.3} = C$. The speed of the compressor is 600 rpm. Stroke to bore ratio is 1. Find the power required to drive the compressor and cylinder dimensions.	[7M]
4.	a)	Discuss the working principle and mechanical details of a root blower.	[7M]
	b)	An axial flow compressor draws air at 200° C and delivers it at 500° C. Assuming 50% reaction, calculate the velocity of flow, if blade velocity is 100 m/s, work factor is 0.85. Take C_p=1kJ/kg.K. Assume $\alpha=10^0$, and $\beta=40^0$, Find the number of stages.	[7M]
5.	a)	Explain the method inter reheating employed to increase the specific output and thermal efficiency of Gas Turbine plant.	[7M]
	b)	In a gas turbine plant, air is drawn at 1 bar, 150° C and the pressure ratio is 6. The expansion takes place in two turbines. The efficiency of compressor is 0.82, high pressure turbine is 0.85 and low pressure turbine is 0.84. The maximum cycle temperature is 625° C. Calculate i) Pressure and temperature of gases entering the low pressure turbine. Ii) Net power developed iii) Work ratio iv) Thermal efficiency. v) Work output of high-pressure turbine is equal to compressor work.	[7M]
6.	a)	Explain the working of a four stroke CI engine and indicate the processes on PV and TS plots.	[7M]
	b)	Explain the battery ignition system with a schematic diagram.	[7M]
7.	a)	What is meant by ignition delay in CI engines and explain it with p-Θ diagram	[7M]
	b)	Explain with figures the various types of combustion chambers used in SI engines.	[7M]
8.	a)	List the different methods used for finding friction power and indicated power of an engine and Explain in detail any one method.	[7M]
	b)	A four-stroke, four-cylinder gasoline engine has a bore of 60 mm and a stroke of 100 mm. on test it develops a torque of 66.5 Nm when running at 3000 rpm. If the clearance volume in each cylinder is 60 cc the relative efficiency with respect to brake thermal efficiency is 0.5 and the calorific value of the fuel is 42 MJ/kg, determine the fuel consumption in kg/h and the brake mean effective pressure.	[7M]

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