

NANDHA ENGINEERING COLLEGE (Autonomous), ERODE – 638 052
B.E/B.TechDEGREE END SEMESTER EXAMINATIONS –NOV, 2019

<i>Remembering</i>	<i>K1</i>	<i>Applying</i>	<i>K3</i>	<i>Evaluating</i>	<i>K5</i>
<i>Understanding</i>	<i>K2</i>	<i>Analysing</i>	<i>K4</i>	<i>Creating</i>	<i>K6</i>

Semester III(CHEMICAL)

17MEC07- HEAT POWER ENGINEERING

Max. Marks: 100

Time: 3 Hours

PART - A (10 x 2 = 20 MARKS)

ANSWER ALL QUESTIONS

S.No	Questions	Marks	KL	CO
A1.	State second laws of thermodynamics.	2	2	1
A2.	Name the different types of thermodynamic systems with an example.	2	2	1
A3.	Write the formula to calculate the efficiency in Rankine cycle.	2	3	2
A4.	Calculate the efficiency of Otto cycle if heat supplied is given as 450kJ/ kg and rejects heat to 195.9 kJ/ kg.	2	3	2
A5.	List out the different types of calorimeters.	2	2	3
A6.	Write the application of Steam Trap	2	3	3
A7.	Name some of the boilers which are commonly used in chemical industry.	2	1	4
A8.	How the efficiency of the boiler will be calculated?	2	2	4
A9.	Recall the application of Steam Ejectors.	2	2	5
A10.	List out the various equipments used for the production of Vacuum.	2	1	5

PART- B(5 x 4 = 20 MARKS)

ANSWER ANY FIVE QUESTIONS

B1.	Define state, path function, intensive and extensive property.	4	1	1
B2.	Write the symbol and units of work,energy, internal energy, enthalpy and specific heat.	4	2	1
B3.	Distinguish between IC engine and Steam power plant.	4	2	2
B4.	Explain the concept of steam distribution system.	4	2	3
B5.	Write the short note on performance and efficiency of boiler.	4	4	4
B6.	Explain with neat sketch of water tube boiler.	4	2	4
B7.	Sketch out the steam ejector and write its applications.	4	2	5
B8.	Write the working principle of Gas turbine and Steam turbine.	4	2	5

PART - C (5 x 12 = 60 MARKS)

ANSWER ANY FIVEQUESTIONS

C1.	Explain with a neat diagram of First law of thermodynamics for flow process.	12	2	1
-----	--	----	---	---

C2.	A diesel engine operates with a compression ratio of 15. The pressure and temperature at the beginning of the compression stroke are 100 kPa and 300 K. Heat is transferred at the rate of 500kJ/kg of the working fluid per cycle. Determine			
	i) Pressure and Temperature at each stage of cycle			
	ii) Work done per kg air.			
	iii) The thermal efficiency.			
	iv) The mean effective pressure.	12	3	2
C3.	How could the efficiency of Rankine cycle can be improved by Reheat and Regenerative cycle?	12	4	2
C4.	Explain energy conservation opportunities in Steam systems.	12	3	3
C5.	Explain with the neat diagram, construction and working of any one type of fire tube boiler.	12	2	4
C6.	Explain with a neat diagram, construction and working of fluidized bed boiler.	12	2	4
C7.	Explain the construction and working principle of gas turbines.	12	2	5
C8.	Write a short note on			
	i) Vacuum pumps.			
	ii) Impulse Turbines.			
	iii) Instrumental method of vacuum measurement.	12	2	5