Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (OLD) EXAMINATION – SUMMER 2019

Subject Code: 181904 Date: 20/05/2019

Subject Name:Thermal Engineering

Time: 10:30 AM TO 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Define nozzle and describe effects of friction on performance of the steam nozzle with h-s diagram.	**07**
	(b)	What is necessity of steam compounding in impulse turbine? Explain velocity compounding with neat sketch.	**07**
Q.2	**(a)**	Give detailed classification of steam turbine.	**07**
	(b)	The total tangential force on one stage of Parson's turbine is 1100 N. When the blade speed is 100 m/s, the mass flow rate is 5.5 kg/sec. The blade outlet angle is 20 °. Determine the steam velocity at outlet from the blades.	**07**
		OR	
	(b)	Explain nozzle control governing of steam turbine with figure.	**07**
Q.3	**(a)**	Give classification of gas turbine and explain working of closed cycle gas turbine with figure.	**07**
	(b)	Write a short note on combined gas and steam power plant.	**07**
		OR	
Q.3	**(a)**	Explain different methods to improve thermal efficiency of a gas turbine plant.	**07**
	(b)	A gas turbine operates on Brayton cycle. The temperature range is 1050 K and 288 K. Find pressure ratio for maximum power output. Also determine thermal efficiency, work ratio and power output, if the mass flow rate of air is 20 kg/sec. Take Cp= 1.005 kJ/kg K and γ=1.4 for compression and expansion process.	**07**
Q.4	**(a)**	Give difference between jet engine and rocket engine.	**07**
	(b)	Explain working principle of Plain Labyrinth gland.	**07**
		OR	
Q.4	**(a)**	Explain working of Pulse jet engine with figure and give its merits.	**07**
	(b)	Write short note on binary vapour cycle.	**07**
Q.5	**(a)**	Derive equation for maximum mass flow rate of steam through nozzle.	**07**
	(b)	Explain annular combustion chamber of gas turbine.	**07**
		OR	
Q.5	**(a)**	Derive equation of Degree of Reaction for reaction turbine.	**07**
	(b)	Derive equation of general relationship between area, velocity and pressure in nozzle flow.	**07**

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