Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(NEW) – EXAMINATION – SUMMER 2019

Subject Code:2160102 Date:14/05/2019

Subject Name:Fundamentals of Jet Propulsion

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.**

			MARKS
Q.1	**(a)**	Define thermal efficiency, propulsive efficiency and overall efficiency of a jet engine.	**03**
	(b)	Derive thrust equation for turbojet engines.	**04**
	(c)	Derive Mach Area relation for nozzle.	**07**
Q.2	**(a)**	Explain the effect of turbine temperature on performance of jet engine.	**03**
	(b)	Explain the effect of compressor pressure ratio on performance of jet engine.	**04**
	(c)	Compare performance of turbojet, turbofan and turboprop engines.	**07**
		OR	
	(c)	Write a note on Thrust augmentation techniques.	**07**
Q.3	**(a)**	What is the need of inlets in a jet engine?	**03**
	(b)	Draw and explain supersonic inlets in jet engines.	**04**
	(c)	Derive maximum mass flow condition for a variable area duct.	**07**
		OR	
Q.3	**(a)**	Derive thrust equation for a rocket engine.	**03**
	(b)	Write a note on liquid propellant rockets.	**04**
	(c)	Discuss effect of back pressure in convergent divergent nozzle.	**07**
Q.4	**(a)**	Explain the types of combustion chamber in brief.	**03**
	(b)	Explain the need of a good combustion chamber.	**04**
	(c)	Briefly explain the factors affecting the design and performance of the gas turbine engine combustion chamber.	**07**
		OR	
Q.4	**(a)**	What do you mean by choking? When it occurs?	**03**
	(b)	Prove that Brayton cycle with regeneration improves cycle efficiency.	**04**
	(c)	Explain the types of combustion chamber in detail.	**07**
Q.5	**(a)**	Derive expression for specific thrust, specific impulse and specific fuel consumption.	**03**
	(b)	Write a note on pulse jet engine.	**04**
	(c)	Explain in detail diffuser operations of a ramjet engine.	**07**
		OR	
Q.5	**(a)**	Why turbine is required in a jet engine.	**03**
	(b)	Why ramjet engine does not require rotating components?	**04**
	(c)	Draw and explain importance of Brayton cycle modifications compared to basic cycle.	**07**

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