Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(NEW) EXAMINATION – WINTER 2022

Subject Code:3160102 Date:13-12-2022

Subject Name:Fundamentals of Jet Propulsion

Time:02:30 PM TO 05:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Define thrust, Propulsive efficiency, thermal efficiency of Jet Engine.	**03**
	(b)	Explain the Working principle of turbojet engine.	**04**
	(c)	Explain in brief turboprop engine and turbofan engine.	**07**
Q.2	**(a)**	Give the Comparison of Jet Engine and Reciprocating Engine.	**03**
	(b)	Write a short note on needs of combustion chamber.	**04**
	(c)	Derive Mach Area relation for nozzles.	**07**
		OR	
	(c)	Derive Mach Area relation for variable duct and state its importance.	**07**
Q.3	**(a)**	Explain the can type combustion chamber with neat sketch.	**03**
	(b)	What do you mean by choking? When it occurs?	**04**
	(c)	Derive thrust equation for a rocket engine.	**07**
		OR	
Q.3	**(a)**	Explain the need of thrust augmentation.	**03**
	(b)	Explain need for subsonic inlet.	**04**
	(c)	Write the short note on factors affecting the performance of combustion Chamber.	**07**
Q.4	**(a)**	State the advantages and Disadvantages of Ramjet Engine.	**03**
	(b)	Why ramjet engine does not require rotating components?	**04**
	(c)	Explain in detail diffuser operations of a ramjet engine.	**07**
		OR	
Q.4	**(a)**	Discuss scramjet engine.	**03**
	(b)	Draw and explain supersonic inlets in jet engines.	**04**
	(c)	Explain Brayton cycle with reheating, intercooling and regeneration with neat sketch.	**07**
Q.5	**(a)**	Derive expression for specific thrust, specific impulse and specific fuel consumption.	**03**
	(b)	Write a short note on turbo pump feed system for the rocket engine.	**04**
	(c)	Explain the parameters affecting the performance of rocket.	**07**
		OR	
Q.5	**(a)**	Draw the neat sketch of Pulse Jet Engine.	**03**
	(b)	Discuss in brief about Future Fuels and Energy Sources required in Sustainable Aviation.	**04**
	(c)	Explain Solid propellant and liquid propellant rockets with figure.	**07**

****