Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – WINTER 2023

Subject Code:3161910 Date:02-12-2023

Subject Name:Applied Thermodynamics

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 Avogadro's law, equation of state, Indicated Power.	**03**
	(b)	Define Mach Number and state its significance in compressible fluid flow.	**04**
	(c)	Derive the Vander walls equation.	**07**
Q.2	**(a)**	What are the different regions of compressible flow?	**03**
	(b)	Define Mach cone, Mach angle, zone of action and zone of silence.	**04**
	(c)	Explain Fundamental equations for compressible flow.	**07**
		OR	
	(c)	Differentiate between centrifugal and axial flow air compressor.	**07**
Q.3	**(a)**	What is Psychometry? Define sensible heat factor.	**03**
	(b)	Explain Dalton's law of partial pressure. How evaporation happens in atmosphere?	**04**
	(c)	Explain chemical and dehumidification with neat sketch.	**07**
		OR	
Q.3	**(a)**	Discuss briefly secondary refrigerants.	**03**
	(b)	Explain properties of moist air.	**04**
	(c)	Explain the cooling and dehumidification with neat sketch.	**07**
Q.4	**(a)**	Define. Brake power, Friction Power, Brake specific fuel consumption.	**03**
	(b)	Write short note on "Heat Balance Sheet".	**04**
	(c)	What is variable compression Ratio (VCR) engine? Explain methods of obtaining VCR and performance of VCR engine.	**07**
		OR	
Q.4	**(a)**	Write down Bharat stages of emission norms.	**03**
	(b)	Define EURO and INDIAN (Bharat) norms.	**04**
	(c)	What is catalytic converter? Describe with neat sketch the catalytic converter for exhaust emission control for SI engine.	**07**
Q.5	**(a)**	Define the phenomenon of surging and choking in centrifugal compressor.	**03**

	(b)	State the important use of compressed air for engineering purposes.	**04**
	(c)	With a suitable sketch explain the working principle of an axial flow compressor. What is meant by a stage and explain the stage velocity triangles.	**07**

OR

Q.5	**(a)**	What is centrifugal compressor and what are it advantages?	**03**
	(b)	What are the various losses occurring in a centrifugal compressor?	**04**
	(c)	Explain with a neat sketch the construction and working of a single stage single acting reciprocating air compressor.	**07**

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