Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (OLD) - EXAMINATION – SUMMER 2018

Subject Code: 141903 **Date: 19/05/2018**

Subject Name: Engineering Thermodynamics

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)**	Explain in brief the classical and statistical approach of thermodynamics.	**07**
	(b)	Explain the different thermodynamic systems with neat sketch.	**07**
Q.2	**(a)**	Define enthalpy and show that it is the property of the system in case of ideal gases.	**07**
	(b)	Explain Joule's experiment with neat sketch and state 1st law of thermodynamics.	**07**
		OR	
	(b)	Prove the equivalence of Clausius and Kelvin-Plank statement.	**07**
Q.3	**(a)**	State the general SFEE and derive for single inlet and single exit fluid with necessary assumptions for diffuser. Also write the function of diffuser.	**07**
	(b)	Discuss perpetual motion machine of the first and second kind.	**07**
		OR	
Q.3	**(a)**	State and prove Carnot's theorem.	**07**
	(b)	Show the equivalence of Clausius and Kelvin-Plank statements of 2nd law of thermodynamics.	**07**
Q.4	**(a)**	Using Maxwell relations derive the Clausius-Clapeyron equation.	**07**
	(b)	Explain "Clausius inequality"	**07**
		OR	
Q.4	**(a)**	Define available and non-available energy. Derive an expression for availability of a non-flow process.	**07**
	(b)	Discuss Rankine cycle with the help of schematic T-S and h-S diagrams.	**07**
Q.5	**(a)**	Explain Brayton cycle with the help of p-v and T-S diagrams.	**07**
	(b)	Explain the construction and working of Junker's gas calorimeter with neat sketch.	**07**
		OR	
Q.5	**(a)**	Derive an expression for the thermal efficiency of the dual cycle.	**07**
	(b)	What is the difference between Otto cycle and Diesel cycle? Explain why the higher efficiency of the Otto cycle compared to Diesel cycle for the same compression ratio is not a result of practical importance.	**07**

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