Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: X 11902 **Date: 21/01/2013**

Subject Name: Engineering Thermodynamics

Time: 10.30 am - 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 open, closed and isolated system along with examples.	**07**
	(b)	Explain limitations of first law of thermodynamics.	**07**
Q.2	**(a)**	An air standard Otto cycle is required to operate between the temperature limits of 300K and 1800K. Estimate the optimum compression ratio and the corresponding thermal efficiency.	**07**
	(b)	Write short note on third law of thermodynamics.	**07**
		OR	
	(b)	Derive steady flow energy equation applied to nozzle.	**07**
Q.3	**(a)**	Explain variables affecting efficiency of Rankine cycle.	**07**
	(b)	Write short note on thermodynamic temperature scale.	**07**
		OR	
Q.3	**(a)**	Explain adiabatic flame temperature.	**07**
	(b)	Compare Otto cycle and diesel cycle for the same compression ratio.	**07**
Q.4	**(a)**	Explain in brief the concept of available energy and unavailable energy.	**07**
	(b)	Write short note on joule-Thomson co-efficient.	**07**
		OR	
Q.4	**(a)**	Using Maxwell relations derive the Clausius clapeyron equation.	**07**
	(b)	Derive relation for air standard efficiency of Otto cycle.	**07**
Q.5	**(a)**	Enlist methods to determine the calorific value of solid and liquid fuels and explain any one of them with neat sketch.	**07**
	(b)	Derive Vander wall's equation.	**07**
		OR	
Q.5	**(a)**	Explain Adiabatic compressibility.	**07**
	(b)	Explain the principle of increase of entropy.	**07**

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