Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV • EXAMINATION – SUMMER • 2014

Subject Code: 142501 **Date: 16-06-2014**

Subject Name: Heat Power Engineering

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)**	Define following terms: state, path, process, isolated system, intensive property, quasi-static process, perfect gas.	**07**
	(b)	Derive the general steady flow energy equation. Making suitable assumptions reduce the same for boiler, turbine and condenser.	**07**
Q.2	**(a)**	Explain Kelvin-Plank and Clausius statements of second law and show that violation of Kelvin-Plank statement leads to violation of Clausius statement.	**07**
	(b)	Explain the following power producing cycles with indicating the types of processes on p-v and T-S diagram.1. Ericsson 2. Auto 3. Carnot	**07**
		OR	
	(b)	What are advantages of multi stage compression in compressor? Explain working of two stage reciprocating compressor with inter cooling.	**07**
Q.3	**(a)**	Explain Clausius inequality and give third law of thermodynamics	**07**
	(b)	Explain Diesel cycle and Jule cycle with p-v and T-S diagram.	**07**
		OR	
Q.3	**(a)**	Explain working of steam nozzle and super saturation phenomena in steam nozzle	**07**
	(b)	Describe giving neat sketch the cycle of operation of a simple constant pressure open cycle Gas Turbine.	**07**
Q.4	**(a)**	Classify steam turbines. Explain reaction type steam turbine with neat sketch.	**07**
	(b)	What is meant by compounding of steam turbine? Explain the Velocity Compounding in detail.	**07**
		OR	
Q.4	**(a)**	What is meant by the term Jet Propulsion? Describe briefly the working of a Turbo-Jet Engine.	**07**
	(b)	Explain the following as referred to air compressor: (i) Isothermal efficiency, (ii) Volumetric efficiency, (iii) Free Air Delivered and (iv) NTP Condition	**07**
Q.5	**(a)**	Draw flow diagram for vapour compression refrigeration cycle and briefly explain function of each component of cycle.	**07**
	(b)	Define the following terms: (i) Dry bulb temperature, (ii) Wet bulb temperature, (ii)Specific Humidity, (iv)Relative Humidity, (v) Degree of saturation, (vi) Dew point temperature and (vii)Psychrometry.	**07**
		OR	
Q.5	**(a)**	What are the different modes of heat transfer? Explain Fourier's and newton's law.	**07**
	(b)	Write the application of heat transfer in the area of production engineering. Explain briefly Logarithmic mean temperature difference (LMTD).	**07**

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