C.U.SHAH UNIVERSITY Summer Examination-2018

Subject Name: Thermodynamics

	Subject Code: 4TE03TDY1			Branch: B.Tech (Mechanical)		
	Semest	er: 3	Date: 28/03/2018	Time: 02:30 To 05:30	Marks: 70	
	(2) (3)	Use of F Instructi Draw ne	Programmable calculator & any ons written on main answer bo at diagrams and figures (if nec suitable data if needed.		cohibited.	
Q-1		Attem	pt the following questions:		(14)	
Atte Q-2		What Why i Write Define Which What What Define Define Define What four qu Attem Distin Explai A rev 1200 a from h	and 300 K respectively. The wheat engine. The pump operate	ble for steam power plant? cess. mutual by get converted? ER)? by "?	a heat pump extracts heat	
Q-3	6	reserv	oir at 1400 K.	at 300 K, calculate the heat sup	(14	

- (a) Derive the equation W = m (h1 h2) for rotary compressor. (04)
- (b) Define Helmholtz function.
- (c) Explain perpetual motion machine of the first kind PPM 1. (04)



(04)

Q-4	(a) (b)	Attempt all questions Explain the Rankine cycle on P-V and T-S diagram. Derive an expression for availability, irreversibility and effectiveness of heating or cooling process in heat exchanger.	(14) (07) (07)
Q-5	(a) (b) (c)	Attempt all questions Explain the effect of the following on the efficiency of Rankine cycle. (i) Superheating steam, (ii) Turbine inlet Pressure, (iii) condenser pressure. Explain with figure Kelvin – plank statement of second law of thermo dynamics. Prove that ΔE = Constant for isolated system.	(14) (06) (06) (02)
Q-6	(a) (b) (c)	Attempt all questions Explain Construction and working of Bomb calorimeter with neat sketch. In an Otto cycle the temperature at the beginning and end of the isentropic compression are 423 K and 690 K respectively. Determine the air standard efficiency and compression ratio. Write comparison of first and second laws of thermodynamics.	(14) (07) (04) (03)
Q-7	(a) (b) (c)	Attempt all questions A fuel has the following composition by mass: Carbon= 85%, Hydrogen= 12.75% and Oxygen= 22.5%. Determine the stoichiometric air required per kg of fuel and the mass of products of combustion per kg of fuel. Explain adiabatic mixing of perfect gases. Define (i) HCV (ii) LCV	(14) (06) (06) (02)
Q-8	(a) (b)	Attempt all questions Explain briefly Brayton cycle. Derive expression for optimum pressure ratio. Write a short note on Adiabatic flame temperature.	(14) (08) (06)

(b) Write a short note on Adiabatic flame temperature.

