



MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY,
JAMSHORO.

ID.No./Seat No. 09EL121

FIRST TERM SECOND YEAR (3RD TERM) B.E.(ELECTRICAL) REGULAR
EXAMINATION 2010 OF 09-BATCH

APPLIED THERMODYNAMICS

Dated: 15-05-2010

Time Allowed: 03 Hours.

Max: Marks-80.

NOTE: ATTEMPT ANY FIVE QUESTIONS.

<u>Q.No.</u>		<u>Marks</u>
01. (a)	Define ENERGY and its types. Discuss all about mutual conversion of heat energy and Mechanical energy/work done.	[10]
(b)	Determine the both types of specific heats of a perfect gas occupies a volume of 85 m^3 at 1500°C and at a constant pressure of 1 bar. The gas is first heated at constant volume and then at constant pressure. Take $m=1 \text{ kg}$ and $\gamma=1.4$.	[06]
02. (a)	Give the various types of THERMODYNAMIC PROCESSES with expressions/formulas of Workdone and Heat.	[08]
(b)	1 m^3 of a perfect gas at 30 bar and 450°C expands adiabatically until its pressure is 12 bars. It is then compressed isothermally to its original volume. Find the final temperature and pressure of the gas. Also determine the change in internal energy takes $c_p=0.996 \text{ kJ/kg K}$; and $c_v=0.703 \text{ kJ/kg K}$.	[08]
03. (a)	Derive any one equation from the following:	[10]
(i)	General Expression for Change of Entropy of a Perfect Gas	
(ii)	Change of Entropy during Polytropic Process.	
(b)	A CARNOT cycle works with isentropic compression ratio of five and isothermal expansion ratio of two. The volume of air at the beginning of the isothermal expansion is 0.3 m^3 . If the maximum temperature and pressure is limited to 550 K and 21 kg/cm^2 . Determine: i) minimum temperature in the cycle. ii) change of entropy during the isothermal expansion. Take ratio specific heats is 1.4.	[06]
04.	Explain the design/sequence of processes for the "DUAL COMBUSTION CYCLE", by help of P-V and T-S diagrams. Also derive its efficiency in terms of volumetric ratios.	[16]
05.	Define principle of operation with classification of followings.	[16]
(i)	BOILER.	
(ii)	TURBINE.	

Cont'd on P/-2...

06. Describe/Derive/Solve, any two from following: [16]
- (a) "ROTARY COMPRESSOR" and its types.
- (b) The expression for work done by "A SINGLE STAGE SINGLE ACTING RECIPROCATING AIR COMPRESSOR WITHOUT CLEARANCE VOLUME."
- (c) A single stage single acting reciprocating air compressor without clearance is required to compress 60 cubic meters of air from 1 kg/cm^2 to 8 kg/cm^2 at 22°C . Find work done by the compression if the compression of air is (i) Isothermal (ii) Adiabatic with Adiabatic index as 1.4 and (iii) Polytropic with polytropic index as 1.25.
07. (a) Differentiate between REFRIGERATION and AIR CONDITIONING. Explain the working of vapor compression refrigeration system by sketching its schematic diagram. [08]
- (b) Discuss the Working Mechanism of I.C. ENGINES with sequence of operations in a Cycle, as well as classify it. [08]
08. (a) Define Steam. Also describe the Temperature Vs. Total Heat Graph during Steam Formation. [08]
- (b) Write short notes on any Two from following [08]
- (i) Steam Engine.
- (ii) Steam Nozzle.
- (iii) Steam Condenser.

THE END
