NAME…… ROLLNO……..

2008 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

II B.TECH SUPPLIMENTARY EXAMINATIONS
THERMODYNAMICS-I
(CHEMICAL ENGINEERING)

AUG/SEP 2008

TIME-3 HOUR
MARK-80

ANSWER ANY FIVE QUESTIONS.ALL QUESTIONS CARRY EQUAL MARKS

1. (a) Is it possible that W 6= 0, even if dV=0? Given an example.

(b) A car of 1100 kg mass is moving with a speed of 80 km/h on a road, which is 120 m above the sea level. Calculate the kinetic energy and potential energy of the car.

2. (a) What is the necessity of classifying properties into intensive or extensive properties?

(b) Classify the following into intensive or extensive properties with reasons, Total energy, Temperature, Specific heat, Volume, Specific Volume.

3. (a) What is non ideal gas? How it is different from ideal gas? Compare PV data for ideal and non ideal gas.

(b) Define generalized compressibility factor Z.

4. (a) Discuss steam turbine in brief.

(b) Justify the statement that it is reasonable to ignore changes in KE and PE in evaluating the performance of a steam turbine.

5. A reversible engine operating between a reservoir at 590K and the ambient at mosphere at 303K drives a refrigerator operating between 250K and the ambient atmosphere. Determine the ratio of energy rejected by both the devices to the ambient atmosphere to the energy absorbed by the engine from the reservoir at 590K.

6. One gram mol of nitrogen behaving as an ideal gas undergoes an irreversible isothermal compression from 1 to 10 atm at 1270C in a piston cylinder assembly. The heat removed from the gas as a result of compression process is absorbed by heat sink maintained at a temperature of 270C. The irreversible process is 83% efficient as compared to reversible process. Calculate S of the gas, S of the reservoir and Stotal .

7. Make a brief comparison of various methods for the liquefaction of gases.

8. (a) Suppose one kmol of an ideal gas (? = 1.4) is allowed to undergo an adiabatic expansion from 1MPa and 960 K to 301 K. Determine the work that can be obtained from the gas.

(b) State the energy minimum principle.