LAGOS CITY POLYTECHNIC, IKEJA
SCHOOL OF ENGINEERING AND APPLIED SCIENCE
DEPARTMENT OF ELECT/ELECT COMPUTER ENGINEERING
2015/2016 SEMESTER EXAMINATION

COURSE TITLE: INTRO TO THERMODYNAMICSNO OF QUESTION : 6
COURSE CODE: MEC 108   TIME ALLOWED: 2 HRS
FOR WHOM: ND YR II   CE, EE   P/T   INSTRUCTIONS:
ANSWER ANY FOUR

QUESTIONS

1. (a) Mention five components of internal combustion
   (b) State the carnot efficiency
   (c) Differentiate between refrigerator and refrigeration
   (d) State three common refrigerants   (e) What is psychrometry?

2. (a) What is thermodynamics?   (b) Mention two classes of thermodynamics
   (c) A vessel of volume $4m^3$ contains 20kg of a gas at $500kN/m^2$ and 60^oC. Find
   (i) The volume which the gas would occupy at standard temperature and pressure
   (ii) The value of the gas constant (R)

3. (a) In the compression stroke of an internal combustion engine, the heat rejected to the cooling water is 40KJ/kg and the work input is 80KJ/kg. Calculate the change in specific internal energy of the working fluid stating whether it is a gain or a loss.
   (b) In a certain steam plant the turbine develops 100kw. The heat supplied to the steam in the boiler is 2500KJ/kg. The heat rejected by the steam to the cooling water in the condenser is 2000KJ/kg, and the feed-pump work required to pump the condensate back into the boiler is 10kw. Calculate the steam flow rate.

4. (a) What is thermodynamics Equilibrium?
   (b) Differentiate between heat and work
   (c) A certain gas heated at constant pressure, expands from 47^oC to 67^oC. Determine the work done during the expansion if the orginal volume was 16 litres and the pressure was 80 x $10^3N/m^2$.

5. (a) What is heat engine?
   (b) Sketch heat engine and show heat and work
   (c) In a cylinder of air motor the compressed air has a specific energy of 540KJ/kg at the beginning of the expansion and a specific internal energy of 240KJ/kg after expansion. Calculate the heat flow to or from the cylinder when the workdone by the air during the expansion is 120KJ/kg.

6. (a) State boyles law and Charles law
   (b) A ballon is filled with $1000cm^3$ of helium, the pressure and temperature of both helium and the surrounding atmosphere being $108KN/m^2$ and 30^oC. Calculate its lifting force if the gas constants for air and helium are respectively 0.287kj/kgk and 2.079kj/kgk and if g = 9.81m/s2. What will happen to thus lifting such as