Federal University of Technology, Minna.
Department of Industrial and Technology Education

Session: 2021/2022 First Semester Examination
Course Title: Thermodynamics.
Course Code: ITE 517
Time Allowed: 2 Hours
Instruction: Attempt any other four (4) Questions

1. A gas at a pressure of 700KN/m^2, volume of 2.5dm^3 and temperature of 1100°C expands isothermally to a pressure of 270KN/m^2 according to the law $PV^{1.3}$ = constant. Determine: (i) the final volume (ii) the final temperature (iii) work done (iv) change in internal energy.

2a. List and explain the three major thermodynamics properties of the working fluid in a system

2b. Explain the followings as it relates to thermodynamics

   (i) Internal energy   (ii) Enthalpy   (iii) Entropy

3a. Define a system and illustrate with a diagram of system/boundary

3b. 0.675kg of gas at 1.4MN/m^2 pressure and 280°C is expanded to 4 times the original volume according to the law $PV^{1.3}$ = constant. Determine (i) the original and final volume of the gas (ii) the final pressure of the gas (iii) the final temperature of the gas. Take R = 0.287KJ/KgK

4a. List and explain the three types of a system

4b. Explain the following processes associated with thermodynamics

   (i) Adiabatic   (ii) Isothermal   (iii) Isobaric   (iv) Isochori

5a. The second law of thermodynamics can be stated in several equivalent ways. State the three ways in which this law can be stated

5b. A gas whose original pressure and temperature were 300KN/m^2 and 25°C respectively, is compressed according to the law $PV^{1.4}$ = constant until it becomes temperature 180°C. Determine the new pressure of the gas

6a. Distinguish between reversibility change and irreversibility change

6b. State the five (5) advantages and five (5) disadvantages of CI engines over SI engines