UNIVERSITY COLLEGE TATI
TATI

UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET
COURSE CODE   : BET1133
COURSE   : THERMODYNAMIC AND FLUID
SEMESTER/SESSION: 2 – 2024/2025
DURATION   : 3 HOURS

Instructions:

1. This booklet contains **4** questions. Answer **all** questions.

2. All answers should be written in answer booklet.

3. Write legibly and draw sketches wherever required.

4. If in doubt, rise up your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 3 PRINTED PAGES INCLUDING COVER PAGE

THERMODYNAMIC AND FLUID (BET1133)

QUESTION 1

a)   Explain in detail each term below:

    i.   Zeroth law of thermodynamic and its application   (3 marks)

    ii.   First law of thermodynamic and its application   (3 marks)

    iii.   Second law of thermodynamic and its application   (3 marks)

b)   Equilibrium deals with thermodynamic system, define equilibrium and explain each of the term below:

    i.   Thermal equilibrium   (2 marks)
    ii.   Mechanical equilibrium   (3 marks)
    iii.   Chemical equilibrium   (3 marks)

c)   A manometer is used to measure the pressure in a tank. The fluid used has a specific gravity of 0.85, and the manometer column height is 55 cm. if the local atmospheric pressure is 96 kPa, determine the absolute pressure within the tank.

(8 marks)

QUESTION 2

a)   Interpret three (3) mechanisms of heat transfer and give an example of an application for each of it.   (10 marks)

b)   Basic concept of heat transfer is to predict the energy transfer between material bodies. State the difference between Heat Transfer and Thermodynamics.   (7 marks)

c)   Determine the atmospheric pressure at a location where the barometric reading is 740 mm Hg and gravitational acceleration is g = 9.81 m/s2. assume the temperature of mercury to be 10 °C, at which its density is 13,570 kg/m3.   (8 marks)

QUESTION 3

a)   Explain and give example for each below;

    i.   Archimedes principle   (5 marks)

    ii.   Hydrometer principle   (5 marks)

b)   Explain in detail about Pascal's Law.   (7 marks)

c)   The hydraulic lift has a large cross section and a small cross section. Large cross-sectional area is 20 times the small cross-sectional area. If the small cross section is given an input force of 25 N, then determine the output force.   (8 marks)

QUESTION 4

a)   Explain and give example for each below;

    i.   Laminar flow   (4 marks)

    ii.   Turbulence flow   (4 marks)

b)   Explain in detail three (3) major assumptions used in the derivation of the Bernoulli Equation.

                                                            (7 marks)

c)   Water is flowing through a pipe having diameter 0.35 m and 0.2 m at the upper end and bottom end having a pressure of 15 Pa and 25 Pa respectively. Using Bernoulli's equation, determine the difference in the datum head, if the rate of flow through the pipe is 350 lit/sec.   (10 marks)

....*END OF QUESTION*......................................