

Higher Institute for Engineering and Technology, El-Manzala
Electronics Engineering Department



Course Title: Thermodynamics and Heat Transfer	Semester: Second
Code: MEC121	Level: First
Course Coordinator: Dr. Sherihan Abdel-Ghafour	Academic Year: 2022-2023

Sheet (1)

Basic Concepts and Definitions

- 1) A force of 10 N acts on a body to produce an acceleration of 15 cm/s^2 along a smooth horizontal surface. **What** is the mass of the body? **(Ans. 66.67 kg)**
- 2) A cylindrical tank filled with a fluid has a diameter of 1m and a length of 1.5m. It weighs 6,000N, where the gravitational acceleration is 9.82 m/s^2 . **Determine** the volume occupied, the density and the specific volume of the fluid. **(Ans. 1.18 m^3 , 517.8 kg/m^3)**
- 3) A gauge **عداد لقياس الضغط** fitted to a condenser indicates 700mm Hg vacuum when the atmospheric pressure records 760mm Hg. **Calculate** the absolute pressure in this condenser in kPa and bar. **(Ans. 8 kPa and 0.08 bar)**
- 4) Centigrade and Fahrenheit thermometers are both immersed **أنغمس** in a fluid. The readings recorded on both thermometers are the same. Determine the fluid temperature in K and R. **(Ans. 233 K and 420 R)**
- 5) A 45,000 kg aircraft travels at 1,000 km/h at 3,000 m. The local gravitational acceleration at this altitude is 9.81 m/s^2 . Determine the kinetic and potential energies of the aircraft. **(Ans. 1,740 MJ and 1,320 MJ)**
- 6) A building window loses 1.2 J/s of heat during a 24 h period. Determine the heat loss during this time in kJ. **(Ans. 103.7 kJ)**
- 7) Steam at 6 MPa pressure and 400°C has a specific volume of $0.047 \text{ m}^3/\text{kg}$ and a specific enthalpy of 3,174 kJ/kg. Determine the internal energy per kilogram of steam. **(Ans. 2,892 kJ)**