

CANKAYA UNIVERSITY
FACULTY OF ENGINEERING AND ARCHITECTURE
MECHANICAL ENGINEERING DEPARTMENT

ME 211 THERMODYNAMICS I
Fall 2015
CHAPTER 2 EXAMPLES

CANKAYA UNIVERSITY
FACULTY OF ENGINEERING AND ARCHITECTURE
MECHANICAL ENGINEERING DEPARTMENT

ME 211 THERMODYNAMICS I
Fall 2015
CHAPTER 2 EXAMPLES

19) A major force opposing the motion of a vehicle is the rolling resistance of the tires, F_r given by

$$F_r = f W$$

where f is a constant called the rolling resistance coefficient and W is the vehicle weight. Determine the power, in kW, required to overcome rolling resistance for a truck weighing 375.5 kN that is moving at 90 km/h. Let $f=0.0085$.

20) For a process taking place in a closed system containing gas, the volume and pressure relationship is $pV^{1.4} = \text{constant}$. The process starts with initial conditions, $p_1 = 1.5 \text{ bar}$, $V_1 = 0.03 \text{ m}^3$ and ends with final volume, $V_2 = 0.05 \text{ m}^3$. Determine the work done by the gas.

21) An electric motor that is connected to a supply voltage of 100 V draws 10 amp current. The output shaft of the motor has a rotational speed of 800 rpm and develops a torque of 11 N. m. For steady state operation of the motor, determine the rate of heat transfer.

