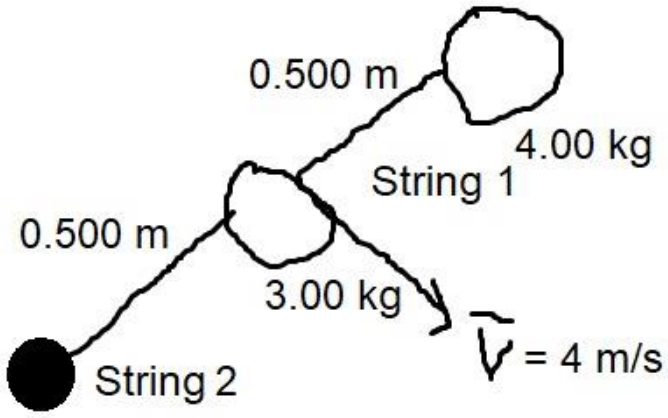
NTU UEE 2020

PHYSICS (ESSAY)

INSTRUCTIONS

1. This paper consists of 4 questions and comprises 2 pages.
2. Write down your answers in the provided answer sheet.
3. Answers will be graded for content and appropriate presentation.

❖ **Question 1 (10 marks)**



Consider the system moving in a circular motion with the black dot as the center such that the strings and the masses are always collinear. If the tangential velocity of the 3.00 kg mass is 4 m/s, find the tension in String 1!

❖ **Question 2 (10 marks)**

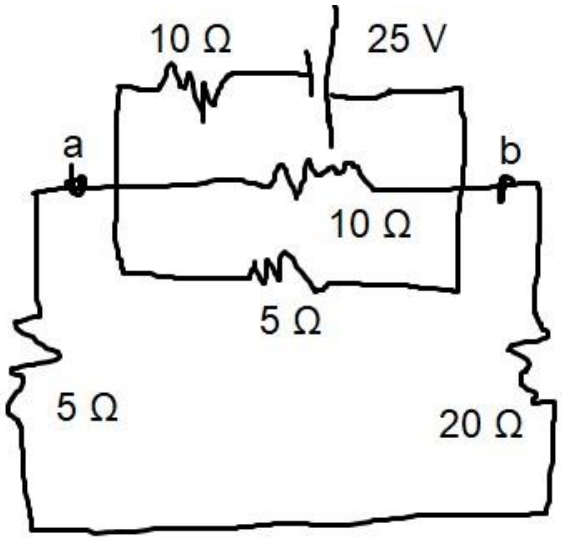
A 2.6 mol of gas is expanding from $V_1 = 3.5\ m^3$, $T_1 = 290\ K$ into $V_2 = 7\ m^3$, $T_2 = 290\ K$. Find :

(a) The work done by the gas

(b) The amount of heat added into the gas

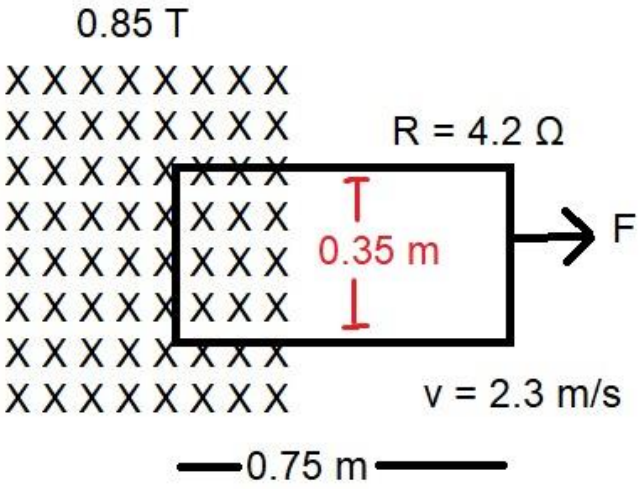
(c) The change of internal energy of the gas

❖ **Question 3 (10 marks)**



Consider the circuit above. Find the potential difference between points a and b!

❖ **Question 4 (10 marks)**



A part of a single rectangular loop is situated inside a magnetic field of 0.85 T as shown above. The loop is pulled to the right with a constant speed of 2.3 m/s. If the total resistance of the loop is 4.20 Ω,

(a) Calculate the induced EMF

(b) Calculate the current induced in the loop

(c) Calculate the force F needed to pull the loop in constant speed.

- END OF PAPER -