ST JOSEPH OF NAZARETH HIGH SCHOOL
S.6 PRE-MOCK EXAMINATIONS 2017
PRACTICAL PHYSICS PAPER (P510/3)
Time allowed: 3hours 15 minutes

Instructions:
Attempt question 1 and one other question

1. **In this experiment, you will determine the acceleration due to gravity g , by two methods.**

Method I

(a) Tie the pendulum bob at the end of the long piece of thread provided.
(b) Suspend the pendulum bob as shown in figure 1.0 by clamping the end of the thread using two small pieces of wooden blocks, such that length l = 0.900 m.

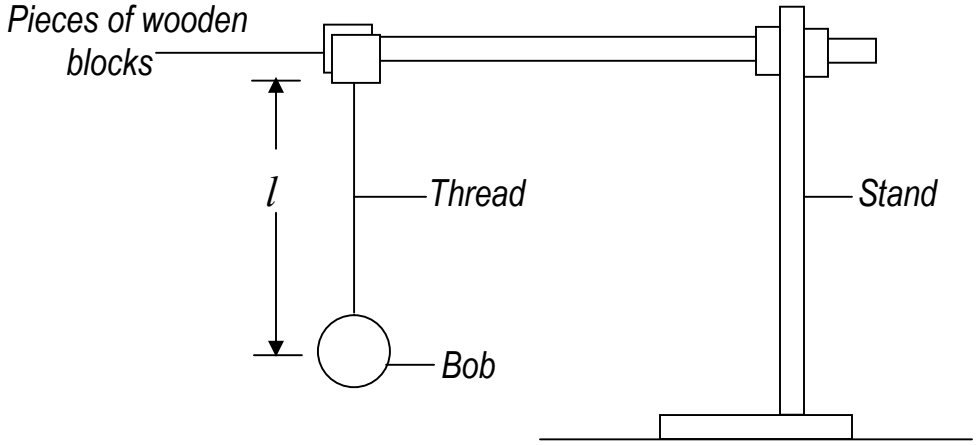

Figure 1.0

(c) Displace the bob slightly and release it to oscillate.
(d) Measure and record the time t for 20 oscillations.
(e) Calculate the period T.
(f) Find the acceleration g , due to gravity from $g = \frac{4\pi^2 l}{T^2}$.
(g) Dismantle the apparatus.

Method II

(a) Clamp the metre rule horizontally so that the scale faces you.
(b) Make a loop at the end of a long piece of thread.
(c) Slide the metre rule through the loop and tighten the loop.
(d)Tie the free end of the thread on the metre rule such that the length of the thread between the two loops is 1.00 m.

(e) Tie the pendulum bob at the end of the short piece of thread.
(f) Suspend the pendulum bob from the midpoint of the looping thread such that the length x is 0.200 m as shown in figure 1.1

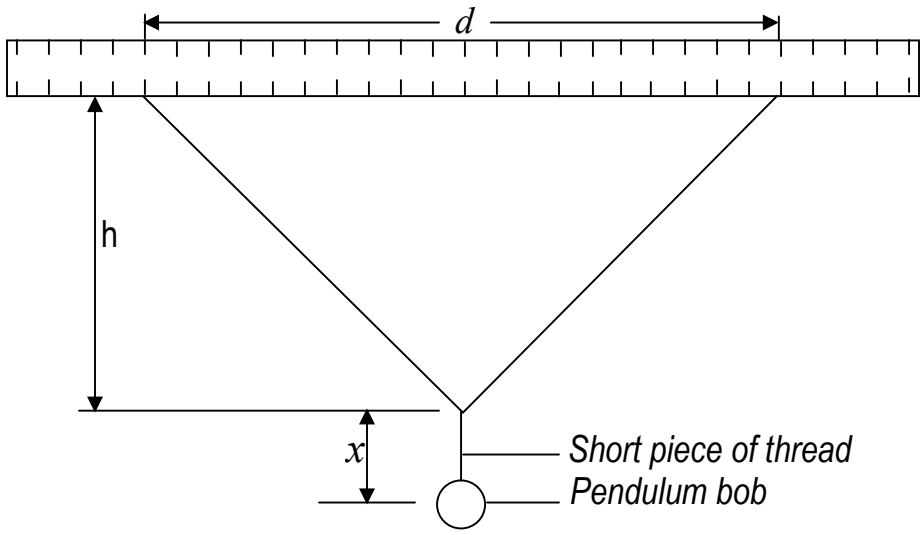

Figure 1.1

(g) Adjust the two loops to the 0.400 m and 0.600 m marks on the metre rule.
(h) Read the distance d , between the two marks.
(i) Measure and record the height h, in metres.
(j) Displace the bob slightly towards you and release it to oscillate.
(k) Measure and record the time t for 20 oscillations.
(l) Determine the period T.
(m) Adjust the distance d to 0.300 m by moving each loop towards the end of the metre rule.
(n) Repeat procedures (i) to (l) for values of $d =$ 0.400, 0.500, 0.600, and 0.700 m.
(o) Tabulate your results including values of T^2.
(p) Plot a graph of T^2 against h.
(q) Find the slope w , of the graph.
(r) Calculate the acceleration g ,due to gravity from

$$g = \frac{4\pi^2}{w}.$$

2. In this experiment, you will determine the focal length of a convex lens using two methods.

Method I

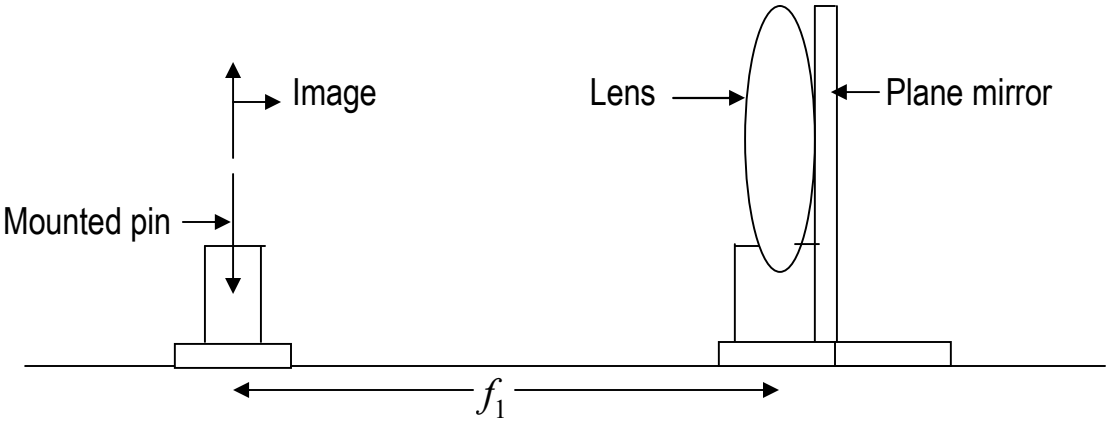

Figure 2.0

(a) Arrange the mounted pin, converging lens and the plane mirror as shown in figure 2.0.
(b) Adjust the position of the pin until its image appears to coincide with it.
(c) Measure and record distance f_1, between the lens and the pin.

Method II

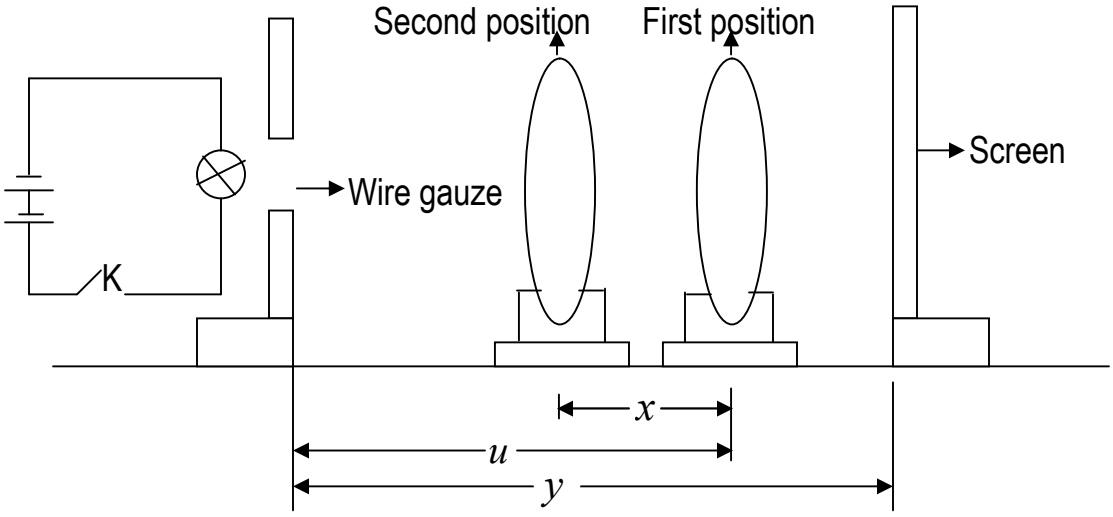

Figure 2.1

(a) Connect the torch bulb in series with dry cells and switch k.
(b) Set up the arrangement shown in figure 2.1
(c) Adjust the position of the lens such that distance $u =$ 40.0 cm.
(d) Adjust the position of the screen until a clear image of the gauze is obtained on it.
(e) Measure and record distance y, between the two screens.

(f) Without changing the position of the screens, displace the lens so that another clear image of the wire gauze is formed on the screen.
(g) Measure and record distance x between the two positions of the lens.
(h) Repeat procedures (c) to (g) for values of $u =$ 50.0, 60.0, 65.0, 70.0 and 80.0 cm.
(i) Tabulate your results including values of x^2 and $\frac{x^2}{y}$.
(j) Plot a graph of $\frac{x^2}{y}$ against y.
(k) Read and record the intercepts c_1 on the vertical axis and c_2 on the horizontal axis.
(l) Calculate f_2 from the expression:

$$f_2 = \tfrac{1}{8}(c_2 - c_1).$$

3. In this experiment, you will determine the resistivity ρ, of the material of the wire labeled W

(a) Measure and record the diameter d of the wire W.

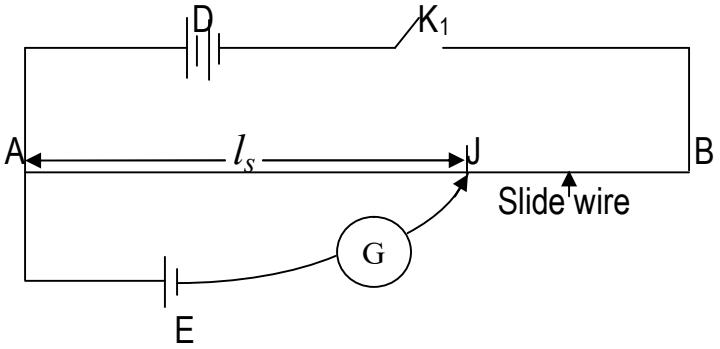

Figure 3.0

(b) Connect the circuit shown in figure 3.0.
(c) Close switch K_1.
(d) Move the sliding contact J, along the slide wire AB until a point is reached where the galvanometer G shows no deflection.
(e) Measure and record the balance length l_s (in metres).
(f) Open switch K_1.
(g) Disconnect the cell E.

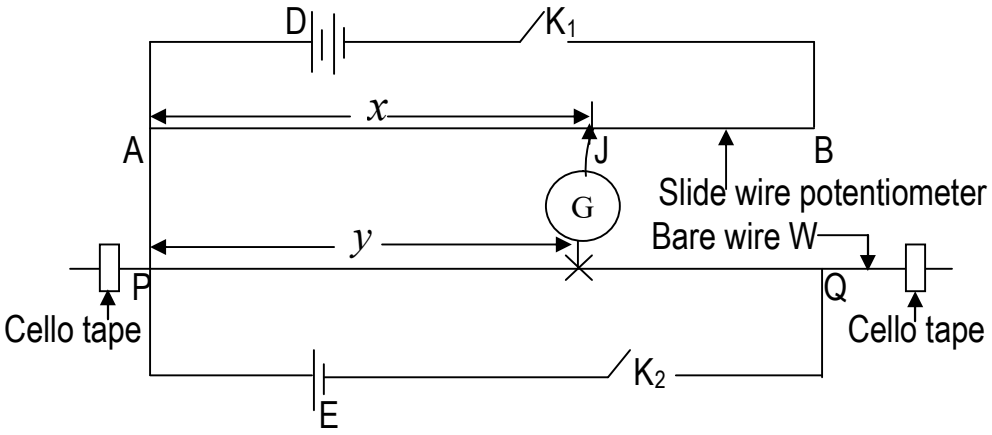

Figure 3.1

(h) Connect the circuit shown in figure 3.1 starting with y = 0.200 m.

(i) Close switches K_1 and K_2 and move the sliding contact J, along AB until a point is reached at which the galvanometer G shows no deflection.

(j) Measure and record the balance length x.

(k) Open switches K_1 and K_2.

(l) Repeat procedures (h) to (k) for values of y = 0.300, 0.400, 0.500, 0.600 and 0.700 m.

(m) Tabulate your results.

(n) Disconnect the circuit in figure 3.1 and connect the circuit in figure 3.2.

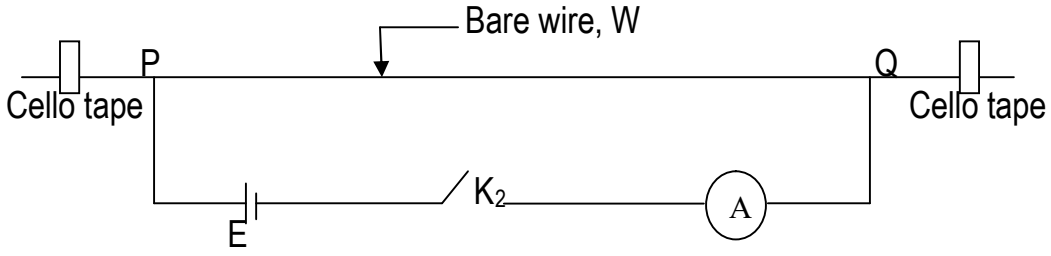

Figure 3.2

(o) Close switch K_2.

(p) Read and record the current I in the circuit.

(q) Disconnect the circuit in figure 3.2

(r) Connect the voltmeter across cell E and note the reading V_c on it.

(s)Plot a graph of x against y.

(t) Find the slope m of the graph.

(u) Calculate the value of R from the expression

$$R = \frac{mV_c}{l_s I}$$

(v) Calculate the resistivity ρ, of the material of the wire from the Expression $\rho = \frac{\pi d^2 R}{4}$.

S.6 practical physics paper 3- Pre-mock exams 2017

Apparatus required

Question 1

1 pendulum bob, 1 piece of thread about 1 m, 1 retort stand with a clamp, 2 pieces of wooden blocks each approximately 5cm x 2cm x1cm, 1 stop clock, 1 short piece of thread about 30 cm, 1 metre rule.

Question 2

1 convex lens (f = 15.0cm) in a holder, 1 screen with wire gauze, 1 metre rule, 1 torch bulb, 2 dry cells in a holder, 3 pieces of connecting wire, 1 switch, 1 white screen, 1 plane mirror in a holder, 1 optical pin in a holder.

Question 3

1 centre-zero galvanometer, 2 dry cells (each 1.5V) labeled D, 1 dry cell (1.5V) labeled E, 1 jockey, 2 switches, one labeled K_1 and the other K_2, 1 double cell holder, 1 single cell holder, 1 potentiometer slide wire, 8 pieces of connecting wires, 2 pieces of cello tape, 1 SWG 30 constantan wire 1.60m long labeled W, 1 metre rule.