SCHOOL OF PHYSICS
UNIVERSITI SAINS MALAYSIA

ZCT191/192 PHYSICS PRACTICAL I/II

1GP2 PROJECTILE MOTION

Instructions and Assessment Guidelines

In this document, you will find the instructions and assessment guidelines for the **1GP2 Projectile Motion** experiment.

INSTRUCTIONS

1. Please read through the two files "**1GP2 – Lab Manual**" and "**1GP2 – Instructions and Assessment Guidelines**" uploaded on usm elearning portal before entering the lab.
2. You may start the experiment straight away once you have entered the lab. The lecturer-in-charge will enter the lab at any time to take attendance and check your experimental data.
3. To start the experiment, one member of each group must get a steel ball (projectile) from the counter at the main entrance. Only one steel ball is allowed for each group, and it must be returned to the counter upon completion of the experiment.

ASSESSMENT GUIDELINES

The assessment of this experiment consists of three parts, namely

Lab report (50%)
Experiment (30%)
Viva voce and presentation (20%)

LAB REPORT (50%)

Your lab report should consist of the following sections:

Title
Abstract
Theory
Experimental Methodology
Data and Analysis
Discussion and Conclusion
Appendix (if any)
References

Other important information regarding the lab report for this experiment:

1. You are given maximum liberty and flexibility on what title to give, how to write the objectives and abstracts, how to explain the theory and methodology, how to present your data and analysis, what to write for the discussion and conclusion and which references to be included in the lab report for this experiment.

2. Marks will be allocated based on the amount of effort that you put in, as well as the level of details, organization, clarity, accuracy, and correctness of your lab report.

3. For the data and analysis section, you MUST AT LEAST include the following:

    a. Graph of range versus angle of inclination for different initial speeds.
    b. Graph of height of projection versus angle of inclination for different initial speeds
    c. Graph of range versus initial speeds at a fixed angle of inclination of $\theta=45°$
    d. Linear graphs that could help you to calculate the gravitational acceleration.

4. You are encouraged to include additional graphs not mentioned in point 3. Remember: Marks will be awarded based on the effort that you put in.

5. Whenever a linear graph is involved, you MUST use Linear Least Square Regression method to draw the best fit line.

6. Whenever you report the value of a particular quantity calculated from the experimental data, you MUST provide the uncertainty of that value.

7. All the calculations for the Linear Least Square Regression and the experimental uncertainties MUST be provided in the Appendix. You are highly encouraged to use computer software such Microsoft Excel, MATLAB, Scilab, Mathematica, etc. to

perform the calculations or plot the graphs. If you have any program codes, you may include them in the Appendix.

8. As for the submission of the lab report, you MUST submit your file using the link entitled "**1GP2 - Lab Report Submission**" provided on usm elearning portal.

9. The deadline for the submission of lab report is exactly ONE WEEK after the second session. For example, students in group T6 have their second session on 7 November 2023, so the deadline for lab report submission for this group would be 14 November 2023. Late submission will be penalized.

EXPERIMENT (30%)

For this part of the assessment, students will be evaluated based on four aspects, namely

Knowledge sharing among members (5%)
Display of leadership (5%)
Correlating experiment results to physics concepts (10%)
Lab courtesy and safety awareness (10%)

VIVA VOCE AND PRESENTATION (20%)

For the viva voce and presentation, each student is expected to record a video of him/herself giving an oral presentation. In your video, you MUST include the following:

1. An introduction of yourself (your name, matric number, experiment group, partner's name, etc.)
2. An overview of the experiment that you have performed.
3. Answers to the following questions:
   a) What do you think is the best angle of projection to start the experiment with?
   b) Suggest a way to accurately measure the height of projection of the steel ball in this experiment.
   c) Suggest a way to determine the time taken for the projectile in this experiment to reach the maximum height.
   d) From the theoretical physics point of view, will the type of material of the ball affect the range and height of projection? Why and why not?
   e) If your answer to Question 3 d) was "Yes", state whether steel or wooden ball would give more accurate results and explain your answer. If your answer to Question 3 d) was "No", explain why in the real experiments performed there are still significant discrepancies in the range and height of projection obtained using steel and wooden ball.

Guidelines for the submission of viva voce and presentation video:

1. Make sure that your face is clearly visible in the video recording, without any covering such as face mask, sunglasses, etc.
2. Your video length should be less than 10 minutes.
3. Upload your video on your personal YouTube channel. The title of the video should be "**VIVA VOCE FOR 1GP2 - YOUR NAME (YOUR EXPERIMENT GROUP)**". You may make the video private if you wish to.
4. Then, copy and paste the link to your video in the following google form: https://forms.gle/sfSx7zH2YSJErjYN7
5. The deadline for the submission of video (by filling up the google form in item #4) is the same as the deadline for lab report submission. For example, students in group T6 must submit their video on 14 November 2023.

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