

**Western Australian Certificate of Education**

**ATAR course examination, 2020**

**Question/Answer Booklet**

12 PHYSICS

Name

**Practical Test - Circular Motion**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Student Number: In figures |  |  |  |  |  |  |  |  |  |  |

**Mark:**  In words

#### Time allowed for this paper

Reading time before commencing work: five minutes

Working time for paper: fifty minutes

**Materials required/recommended for this paper**

To be provided by the supervisor

This Question/Answer Booklet

Formulae and Data Booklet

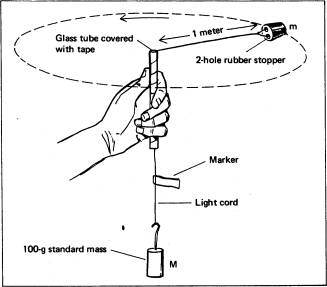
***To be provided by the candidate***

Standard items: pens, (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: non-programmable calculators satisfying the conditions set by the School Curriculum and Standards Authority for this course

**Important note to candidates**

No other items may be taken into the examination room. It is your responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor before reading any further.

**Experimental outline**

When the plastic tube is moved in a small circle above your head, the rubber cork moves around in a horizontal circle at the end of a string that passes through the tube and has a mass hanger with slotted masses suspended from its lower end.

Mass of slotted weights (M) used = 0.100 kg

The following results were obtained.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Radius r (m)** | **Time for 20 swings (s)** | | **Average period T**  **( )** | **V =**  **(ms-1)** | **V2**  **( )** |
| **Trial 1** | **Trial 2** |
| 0.30 ± 0.02 | 15.1 ± 0.5 | 15.2 ± 0.5 | 0.76 ± 0.05 |  |  |
| 0.40 ± 0.02 | 16.9 ± 0.5 | 17.0 ± 0.5 | 0.85 ± 0.05 |  |  |
| 0.50 ± 0.02 | 18.5 ± 0.5 | 18.9 ± 0.5 | 0.94 ± 0.05 |  |  |
| 0.60 ± 0.02 | 21.4 ± 0.5 | 21.20 ± 0.5 | 1.07 ± 0.05 |  |  |
| 0.70 ± 0.02 | 22.9 ± 0.5 | 22.8 ± 0.5 | 1.14 ± 0.05 |  |  |

1. Complete the table, remembering to complete unfinished units that should appear and expressing data to an appropriate number of significant figures.

***(Do not include the absolute uncertainties - that will be tested later.)*** (5 marks)

2. Graph the **speed squared (v2)** versus the **radius (r)** on the grid provided.

(Plot v2 on the y-axis and radius, r on the x-axis) (4 marks)

prac exam youngs mod 10 by 10

3. Determine the gradient of the graph. Be sure to indicate on the graph which points were used. (4 marks)

4. Use the gradient to determine the mass of the rubber stopper. Show all working. (4 marks)

5. Consider the measurement: r = 0.60 ± 0.02. Calculate the percentage error in the measurement and therefore the absolute error in the measurement for the velocity (v) column. (4 marks)

6. Describe **two** errors affecting the results of the experiment above. (2 marks)

7. Give **two** reasons why it is desirable to use 20 swings to calculate a value for the

period (T). Consider aspects of error and measuring difficulties. (2 marks)