

**Western Australian Certificate of Education**

**ATAR course examination, 2017**

**Question/Answer Booklet**

11 PHYSICS

Name

**Test 2 - Motion**

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| 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.

**Structure of this paper**

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| --- | --- | --- | --- | --- | --- |
| Section | Number of questions available | Number of questions to be answered | Suggested working time  (minutes) | Marks available | Percentage of exam |
| Section One:  Short Answers |  |  |  |  |  |
| Section Two:  Problem-solving | 3 | 3 | 50 | 28 | 100 |
| Section Three:  Comprehension |  |  |  |  |  |
|  |  |  |  | **Total** | 100 |

**Instructions to candidates**

1. The rules for the conduct of examinations at Holy Cross College are detailed in the College Examination Policy*.* Sitting this examination implies that you agree to abide by these rules.

2. Write your answers in this Question/Answer Booklet.

3. Working or reasoning should be clearly shown when calculating or estimating answers.

4. You must be careful to confine your responses to the specific questions asked and to follow any instructions that are specific to a particular question.

5. Spare pages are included at the end of this booklet. They can be used for planning your

responses and/or as additional space if required to continue an answer.

• Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.

• Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number.

Fill in the number of the question(s) that you are continuing to answer at the top of the page.

6. Answers to questions involving calculations should be ***evaluated and given in decimal***

***form*.** It is suggested that you quote all answers to ***three significant figures***, with the

exception of questions for which estimates are required. Despite an incorrect final result, credit may be obtained for method and working, providing these are ***clearly and legibly set out***.

7. Questions containing the instruction "estimate" may give insufficient numerical data for their solution. Students should provide appropriate figures to enable an approximate solution to be obtained. Give final answers to a maximum of two significant figures and include appropriate units where applicable.

8. Note that when an answer is a vector quantity, it must be given with magnitude and direction.

9. In all calculations, units must be consistent throughout your working.

1. A Year 12 student in Lyon 2 moved 1.30 x 102 m north (in 55.0 s) and then 1.50 x 102 m west

(in 75.0 s) to get to room HH6 for her Mathematics class after doing Chemistry.

Determine (by calculation) the following.

(a) Total distance covered by the student. (1 mark)

(b) Total displacement. (3 marks)

(c) Average speed for the entire motion. (2 marks)

(d) Average velocity for the motion. (3 marks)

2. A motorbike is stationary at a set of traffic lights. It accelerates uniformly to 20.0 ms-1 in 5.00 s before

maintaining its speed for another 15.0 s. At this point, it accelerates uniformly to 28.0 ms-1 in 2.00 s to

pass a car before braking uniformly to come to a stop at a stop sign in 10.0 s.

(a) Draw a velocity-time graph for the motion of the motorbike, including scales and labels on the

axes. (Assume the motion is in a straight line.) (3 marks)

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(b) From the graph, determine the distance between the lights and the stop sign. (4 marks)

(c) What is the deceleration of the motorbike as it comes to a stop? (2 marks)

3. A boy on the first floor of the Trayning building yells down to his friend to throw back up his

soccer ball that had fallen over the rail. His friend throws it vertically upwards and it goes to a

height of 5.00 m above its release point before falling back down so that the boy catches it 3.90 m

above its release point.

***(Ignore any sideways movement.)***

(a) Calculate the velocity of the soccer ball at release if it is to make it up 5.00 m above its release

point. (3 marks)

(b) What is the velocity of the soccer ball when it is caught? (If you didn't get an answer to part (a), assume the value is 11.0 ms-1.) (2 marks)

(c) How long is the soccer ball in flight before it is caught? (2 marks)

(d) Draw a velocity-time graph for this motion. Include scales and labels on the axes. (3 marks)