Pre-U Physics Revision Guide

Westminster School

December 8, 2016

Contents

Introduction

Revising for the Pre-U

Structure of Assessment

Components	Weighting
Paper 1 Multiple Choice 1 hour 30 minutes Candidates answer 40 multiple-choice questions based on Parts A and B of the syllabus content. 40 marks	20%
Paper 2 Written Paper 2 hours Section 1: Candidates answer structured questions based on Part A of the syllabus content. Section 2: Candidates answer structured questions related to pre-released material. 100 marks	30%
Paper 3 Written Paper 3 hours Section 1: Candidates answer structured questions requiring short answers or calculations and some longer answers. The questions are focused on Part B of the syllabus content, but may also draw on Part A. Section 2: Candidates answer three questions from a choice of six. Three questions will have a strong mathematical focus and three questions will focus on philosophical issues and/or physics concepts. Learning outcomes marked with an asterisk (*) will only be assessed in this section. 140 marks	35%
Practical Investigation 20 hours Candidates plan and carry out an investigation of a practical problem of their own choosing. Candidates are assessed on their ability to: plan; make detailed observations of measurements; use a range of measuring instruments; use appropriate physics principles; and produce a well-organised report. 30 marks	15%

Part A

1 Mechanics

Scalars and Vectors

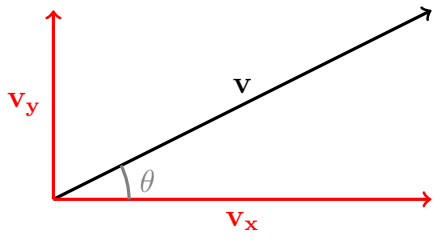
(a) distinguish between scalar and vector quantities and give examples of each

A scalar quantity[1] is one which has only a magnitude whereas a vector has *both* magnitude and direction. We often use positive and negative values to indicate direction (e.g. $v = -2\ ms^{-1}$) but this does not mean that all negative values are vectors!

Note that there are different ways of multiplying vectors and scalars. Two vectors can be multiplied to give a scalar *or* a vector. For example, word done is the (scalar) product of force and displacement, both vectors.

(b) resolve a vector into two components at right angles to each other by drawing and by calculation

Vectors can be split into two components using trigonometry. The diagram below shows a velocity vector being split into horizontal and vertical components v_x and v_y.

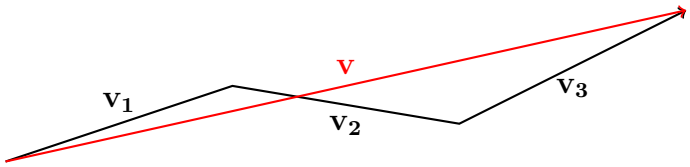


$$\mathbf{v} = \mathbf{v_x} + \mathbf{v_y}$$
$$v_x = v\cos\theta$$
$$v_y = v\sin\theta$$

[1] strictly we are modelling a physical quantity as a mathematical object

(c) combine any number of coplanar vectors at any angle to each other by drawing

Vectors can be added by placing them end to end. The resultant vector is the one joining the start of the first vector to the end of the final vector. Its magnitude and direction can be calculated by trigonometry or scale drawing.



$$\mathbf{v} = \mathbf{v_1} + \mathbf{v_2} + \mathbf{v_3}$$

Forces and Accelerations

(d) calculate the moment of a force and use the conditions for equilibrium to solve problems (restricted to coplanar forces)