

Forces

Mark Scheme 3

Level	IGCSE
Subject	Physics
ExamBoard	CIE
Topic	General Physics
Sub-Topic	Forces
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 3

Time Allowed: 37 minutes

Score: /31

Percentage: /100

- 1 (a) all four = 40 N OR all four add up to 160 N upwards B1
B1
- (b) $W \times 0.17/0.20/0.23 = 160 \times 0.72/0.75/0.78$ C1
 $W \times 0.17 = 160 \times 0.78$ or 600 N C1
 730/734 N A1
- (ii) force by P = 160 + answer to (i) correctly evaluated B1
 all others = 0 B1
- [Total: 7]**
- 2 (a) (i) (note: diagram may be drawn in any orientation)
 sides correct length, by eye B1
 forces drawn at 45° , by eye B1
 parallelogram completed B1
 correct diagonal drawn / correct resultant if intersecting arcs shown B1
- (ii) magnitude: between 5500 N and 5700 B1
 direction: between 28° and 32° B1
- (b) (i) it has direction (as well as magnitude) B1
- (ii) any example which is clearly a vector B1 [8]

- 3 (a) 5 points correctly plotted $\pm\frac{1}{2}$ small square –1 e.e.o.o. (ignore 0,0) B2
- (b) 3 N one, however identified OR 3rd value OR 4th value B1
- (c) good straight line through origin and candidate's remaining points B1
- (d) straight line / constant gradient M1
does obey Hooke's Law A1
OR
special case: obeys Hooke's law because force \propto extension or wtte B1
- (e) graph becomes non-linear / curves / bends B1
Ignore reference to direction of curve or bend.
- (f) will have exceeded / reached proportional / elastic limit
OR permanently deformed or equiv OR straightened
OR will have broken OR no longer elastic or wtte B1

[8]

- 4 (a) in direction of the force Do not accept forward on its own. B1
- (b) changes direction / causes acceleration / stops straight line motion / keeps object from leaving circle / keeps path circular / pulls object into circle B1
- (c) (1. 600 N B1
2. same as his 1. accept 600 N if no value given i (c) (i) 1. B1
- (ii) ma OR 60×2.5 C1
150 N A1
- (iii) 750 N e.c.f. from (c) (i) 2 and/or (c) (ii) B1
- (iv) same as his (c) (i) 2 accept 600 N if no value given in (c) (i) 2. B1

[8]