

Resultant Forces

Mark Scheme

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Physics
Exam Board	AQA
Topic	6.5 Forces
Sub-Topic	Resultant Forces
Difficulty Level	Gold Level
Booklet	Mark Scheme

Time Allowed: 28 minutes

Score: /28

Percentage: /100

Grade Boundaries:

M1.(a) the forces are equal in size and act in opposite directions

1

(b) (i) forwards / to the right / in the direction of the 300 N force
answers in either order

1

accelerating

1

(ii) constant velocity to the right

1

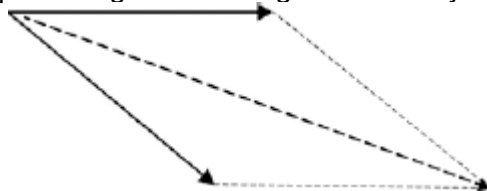
(iii) resultant force is zero
accept forces are equal / balanced

1

so boat continues in the same direction at the same speed

1

(iv) parallelogram or triangle is correctly drawn with resultant



3

value of resultant in the range 545 N – 595 N

parallelogram drawn without resultant gains 1 mark

If no triangle or parallelogram drawn:

*drawn resultant line is **between** the two 300 N forces gains 1*

mark

drawn resultant line is between and longer than the two 300 N forces gains **2** marks

1
[10]

M2.(a) more streamlined

accept decrease surface area

1

air resistance is smaller (for same speed)

accept drag for air resistance

friction is insufficient

1

so reaches a higher speed (before resultant force is 0)

ignore reference to mass

1

(b) (i) 1.7

allow **1** mark for correct method, ie $\frac{5}{3}$

or allow **1** mark for an answer with more than 2 sig figs that rounds to 1.7

or allow **1** mark for an answer of 17

2

(ii) 7.5

allow **1** mark for correct use of graph, eg $\frac{1}{2} \times 5 \times 3$

2

(iii) air (resistance)

accept wind (resistance)

drag is insufficient

friction is insufficient

1

[8]

- M3.**
- (a) (i) a single force that has the same effect as all the forces combined
accept all the forces added / the sum of the forces / overall force
 1
- (ii) constant speed (in a straight line)
*do **not** accept stationary*
 or constant velocity
 1
- (b) 3
allow 1 mark for correct substitution into transformed equation
accept answer 0.003 gains 1 mark
answer = 0.75 gains 1 mark
 2
- m/s²
 1
- (c) as speed increases air resistance increases
accept drag / friction for air resistance
 1
- reducing the resultant force
 1

[7]

- M4.**
- (a) *idea that* balanced by friction force* / pushing force equals friction force (*note “balanced” by unspecified force)
 or
 specification of relevant force but no reference to balancing
 in both 1(a) and 1(b) gains 1 mark overall

for 1 mark

1

- (b) balanced by upwards force of table*

for 1 mark

1

- (c) makes it (slightly) warm / hot

or

wears it away (slightly) / damages surface

for 1 mark

1

[3]