FREE REVISION PACK

Scalars & Vectors

AQA A-level Physics · 7407 / 7408 · Specification 3.4.1.1

Easy | Medium | Multiple choice · past-paper questions

6	6	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Which quantities are vectors?	AQA June 2019 · AS Paper 2 · Q23	1 mark
2	Easy	Momentum, mass and velocity	AQA June 2017 · AS Paper 2 · Q15	1 mark
3	Easy	Spot the scalar	AQA June 2016 · AS Paper 2 · Q18	1 mark
4	Medium	Picture hanging on a nail	AQA June 2019 · AS Paper 2 · Q22	1 mark
5	Medium	Aircraft in a crosswind	AQA June 2018 · AS Paper 2 · Q25	1 mark
6	Medium	Three forces that can never balance	AQA June 2018 · A-level Paper 1 · Q20	1 mark

Key ideas to have ready

- A **scalar** has size only (mass, distance, speed, energy, power). A **vector** has size and direction (displacement, velocity, force, momentum, acceleration).
- Add vectors **tip to tail**. For two vectors at right angles, use Pythagoras for the size and trigonometry for the direction.
- **Resolving:** a vector F at angle θ to a direction has component F cos θ along it and F sin θ at right angles to it.
- A body is in **equilibrium** when the resultant force is zero: the force vectors drawn tip to tail make a closed shape.

How to use this pack

1. The questions are grouped into levels (Easy and Medium). Work through them in order, and check your answers at the end of each level before moving on.
2. Every question is multiple choice with one correct answer. Write down your working anyway; that is how you find mistakes.
3. The separate mark scheme uses the same numbers and explains every answer.

Levels are based on how students did in AQA's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

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Easy

Definitions and one-step ideas. Most students get these right.

Questions 1–3

Only **one** answer per question is allowed. For each question, completely fill in the circle alongside the appropriate answer.

AQA June 2019 · AS Paper 2 · Q23

1 Which row contains vector quantities only?

[1 mark]

A	acceleration	mass	⬭
B	displacement	momentum	⬭
C	energy	force	⬭
D	distance	speed	⬭

AQA June 2017 · AS Paper 2 · Q15

2 Which row correctly states whether momentum, mass and velocity are scalar or vector quantities?

[1 mark]

	Momentum	**Mass**	**Velocity**	
A	scalar	scalar	vector	⬭
B	vector	scalar	scalar	⬭
C	scalar	vector	scalar	⬭
D	vector	scalar	vector	⬭

AQA June 2016 · AS Paper 2 · Q18

3 Which is a scalar quantity?

[1 mark]

A momentum ⬭

B weight ⬭

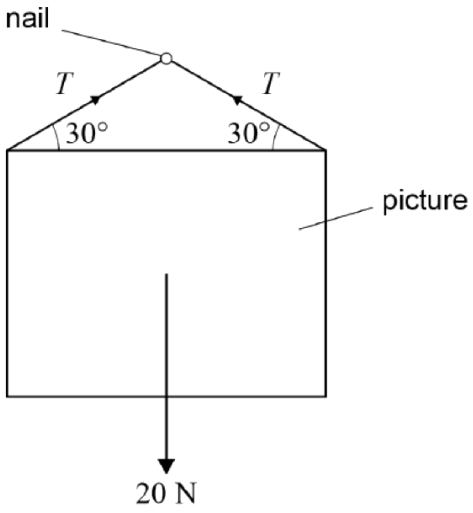
C power ⬭

D moment ⬭

Medium Two or three steps. Roughly a third to a half of students get these right. **Questions 4–6**

AQA June 2019 · AS Paper 2 · Q22

4 A uniform picture is suspended from a string which passes over a smooth nail. The tension in the string is T and the weight of the picture is 20 N.



What is T?

A 10 N ○

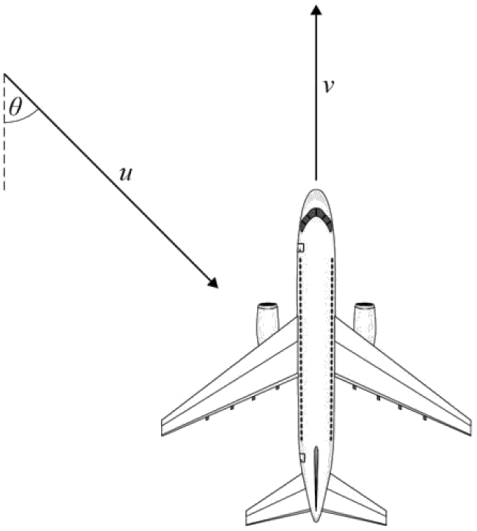
B 12 N ○

C 20 N ○

D 40 N ○

AQA June 2018 · AS Paper 2 · Q25

5 An aircraft is flying due north through still air with a speed v
The aircraft enters a region where the wind is blowing with a speed u from a direction which makes an angle of θ with due south.



What is the time taken for the aircraft to fly a distance D due north of its current position in this windy region?

[1 mark]

A $\dfrac{D}{v - u\cos\theta}$ ⬭

B $\dfrac{D}{v - u\sin\theta}$ ⬭

C $\dfrac{D}{v + u\cos\theta}$ ⬭

D $\dfrac{D}{v + u\sin\theta}$ ⬭

AQA June 2018 · A-level Paper 1 · Q20

6 Three coplanar forces F_1, F_2 and F_3 act on a point object.

Which combination of forces can never produce a resultant force of zero?

[1 mark]

	F_1 / N	F_2 / N	F_3 / N	
A	3	4	5	⬭
B	8	8	8	⬭
C	2	10	10	⬭
D	3	6	10	⬭

End of questions. Check your answers with the matching mark scheme. More free packs and 1-to-1 tuition:
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