

QUESTIONSHEET 1

(a) skis spread force over larger area than boots	1
(b) (i) pressure = force / area	1
500 N / 0.2 m ² × 2	1
= 1250 Pa/Pascal/Nm ⁻²	1
(ii) 500N / 0.05 m ² × 2	1
= 5000 Pa/Pascal/Nm ⁻²	1
(iii) area = force / pressure	1
600 N / 1250 Pa	1
= 0.48 m ² /2	1
= 0.24 m ²	1
TOTAL / 10	

QUESTIONSHEET 2

(a) Any three from: road surface condition tyre condition brake condition reaction time speed of bicycle	3
(b) (i) bigger, so greater mass	1
(ii) deceleration = change in speed / time	1
-10 ms ⁻¹ / 2.5 s	1
= - 4 ms ⁻² (accept 4 ms ⁻²)	1
TOTAL / 7	

QUESTIONSHEET 3

(a) None/no forces acting	1
(b) gets faster/speeds up/velocity increases	1
force backwards produces equal and opposite force forwards/ force one way produces equal force in opposite direction	1
(c) acceleration = force / mass	1
20 000 / 1000	1
= 20 ms ⁻² / 0.02 kms ⁻²	1
(d) acceleration = change in velocity / time	1
20 ms ⁻² × 10 s	1
change in velocity = 200 ms ⁻¹	1
final velocity = 2200 ms ⁻¹	1
	TOTAL / 10

QUESTIONSHEET 4

(a) 250 Pa × 55 m ³ / 50 m ³	1
= 275 Pa/Nm ⁻²	1
(b)(i) 15	
10	
8	3
(ii) the volume decreases/reduces/goes down (NOT is less, is smaller)	1
(c) One from: bicycle tyres/car tyres/life jackets/dinghies/air bags in cars	1
	TOTAL / 7

QUESTIONSHEET 5

(a) arrow directly downwards labelled gravity	1
arrow directly upwards labelled air resistance	1
(b) (i) Sweet	1
air resistance greater for paper than sweet	1
(ii) force = mass \times acceleration	1
0.01 kg \times 10 ms ⁻² / 1000	1
= 0.1 N	1
(c) (i) both fall to ground	1
hit ground at same time	1
(ii) no atmosphere to exert force/no air resistance/ no air to exert force	1
	TOTAL / 10

QUESTIONSHEET 6

(a) (i) It goes up/rises	1
(ii) force is transmitted by/passed through liquid	1
(b) (i) pressure = force / area	1
2000 N / 0.001 m ²	
or 2 kN / 0.001m ²	1
= 2000 kPa/2 000 000 Pa (or Nm ⁻²)	1
	TOTAL / 5

QUESTIONSHEET 7

(a) equal and opposite/balanced	1
(b) 50 N	1
towards team X	1
(c) 750 N	1
towards team Y	1
(d) acceleration = force / mass	1
800 N / 200 kg	1
= 4 ms ⁻² towards team X	1
	TOTAL / 9

QUESTIONSHEET 8

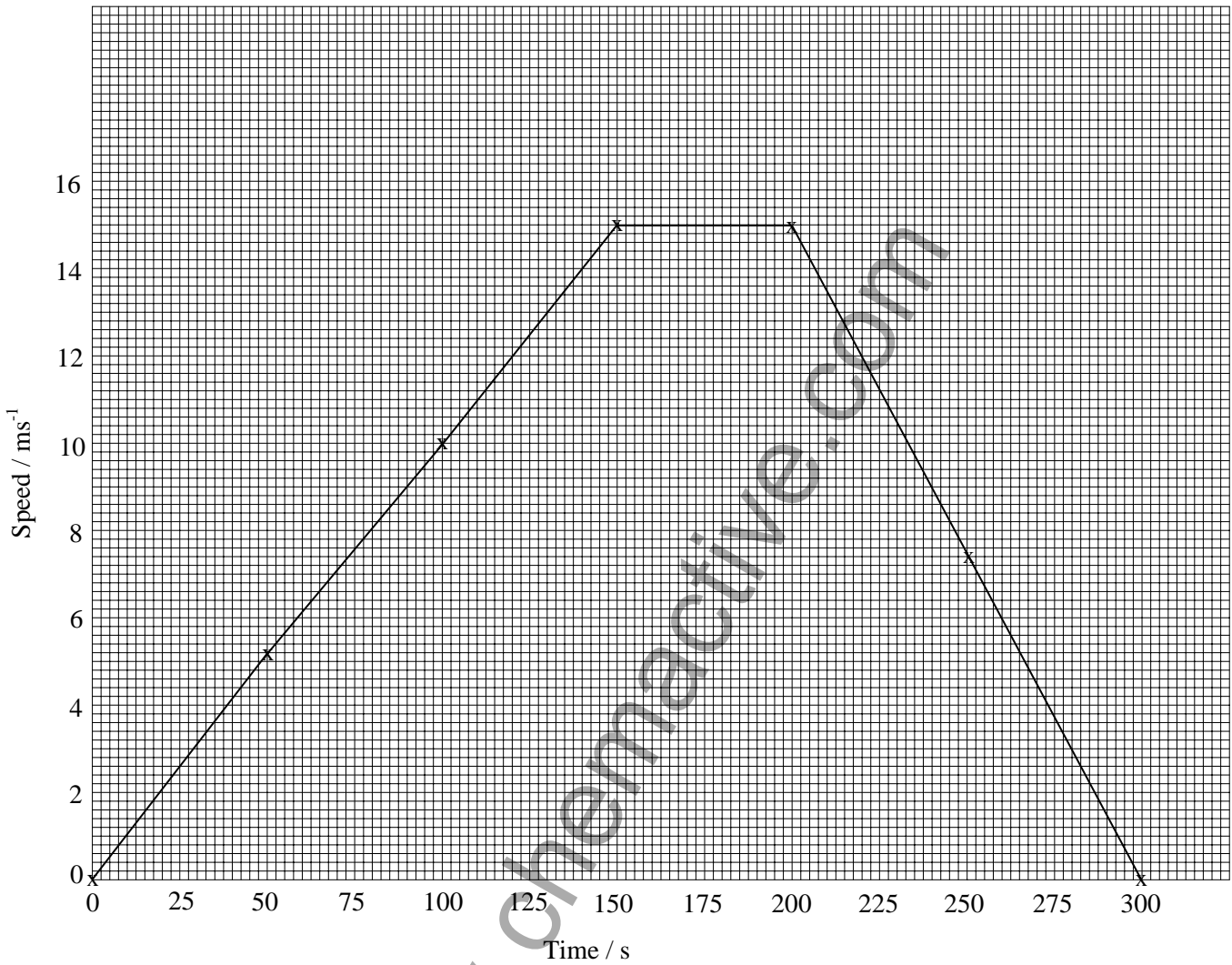
(a) weight is the force that gravity exerts on an object	1
mass measures the amount of matter in a body	1
(b) (i) Newton	1
(ii) 55 × 10	1
= 550 N	1
(iii) W = m × g	
so m = W / g	1
0.001 / 10	1
= 0.0001 g	1
	TOTAL / 8

QUESTIONSHEET 9

(a) Alice	1
(b) (i) average speed/(speed) = distance / time	1
200 m / 30 s	1
= 6.67 m ⁻²	1
(ii) time = distance / speed/average speed	1
300 m / 6.67 m ⁻²	1
= 44.9 / 45 s	1
(c) Direction of motion	1
	TOTAL / 8

QUESTIONSHEET 10

(a) (i)



all points correctly plotted
points joined with line

2
1

(ii) 8 ms⁻¹

1

(b) acceleration = change in speed / time
5 ms⁻¹ / 50 s
= 0.1 ms⁻²

1
1
1

(c) the forces are balanced/no resultant force/
equal and opposite

1

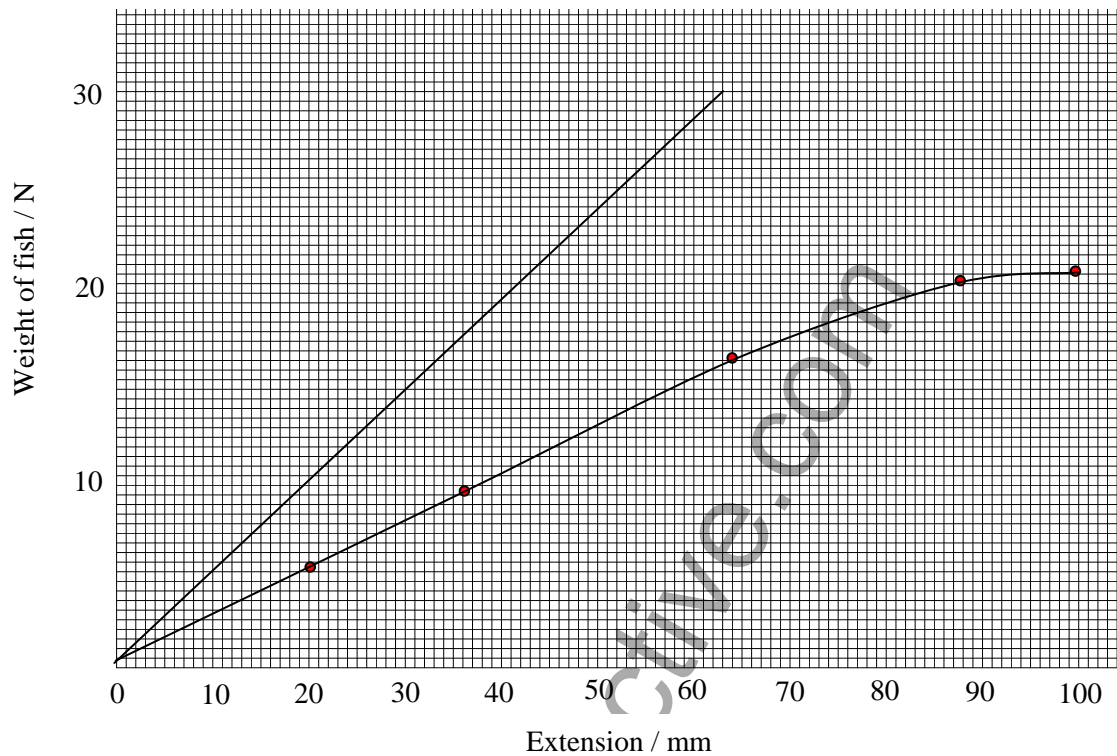
TOTAL / 8

QUESTIONSHEET 11

(a) 23.5 N

1

(b)(i)



points plotted correctly
best fit line

1

1

(ii) 1.6 kg

1

(iii) elastic limit has been reached/exceeded/
spring stretched beyond elastic limit
spring will not return to original length

1

1

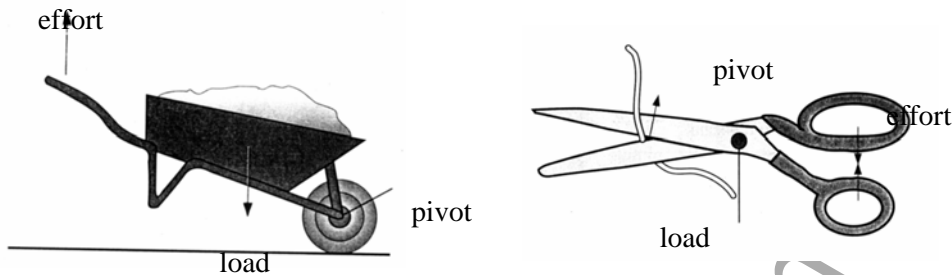
(iv) between 18 N and 19.5 N

1

TOTAL / 8

QUESTIONSHEET 12

(a) (i)



½ mark for each correct label, round to integer

- | | |
|--|---|
| (ii) wheelbarrow – load and effort on same side of pivot | 1 |
| scissors – load & effort on opposite sides of pivot | 1 |
| (b) less effort applied to do same work | 1 |
| more movement of screwdriver | 1 |
| (c) $10 \times 25 = 250$ | 1 |
| $250 / 100$ | 1 |
| $= 2.5 \text{ N}$ | 1 |

TOTAL / 10

QUESTIONSHEET 13

- | | |
|---|---|
| (a) B, C, A | 1 |
| less likely to topple if greater mass at base | 1 |
| (b) (i) contains weight in base | 1 |
| (ii) point through which weight acts
producing a balance point | 1 |
| (c) suspend plywood | 1 |
| hang a weight from suspension point | 1 |
| marks position of string | 1 |
| repeat with new position | 1 |
| where lines cross is balance point | 1 |

TOTAL / 10

QUESTIONSHEET 14

- | | |
|--|---|
| (a) (i) spread mass over larger area | 1 |
| less pressure on roof | 1 |
| (ii) spread mass over larger area | 1 |
| less likely to sink in soft snow | 1 |
| (iii) sharp knife has smaller surface area on cutting edge | 1 |
| more pressure applied | 1 |
| (b) $600 / 2 = 300 \text{ N}$ each foot. | 1 |
| $= 300 / (0.01)^2$ | |
| $= 3\,000\,000 \text{ N} / \text{m}^2$ | 1 |
| $= 3000 \text{ kN/m}^2$ | 1 |

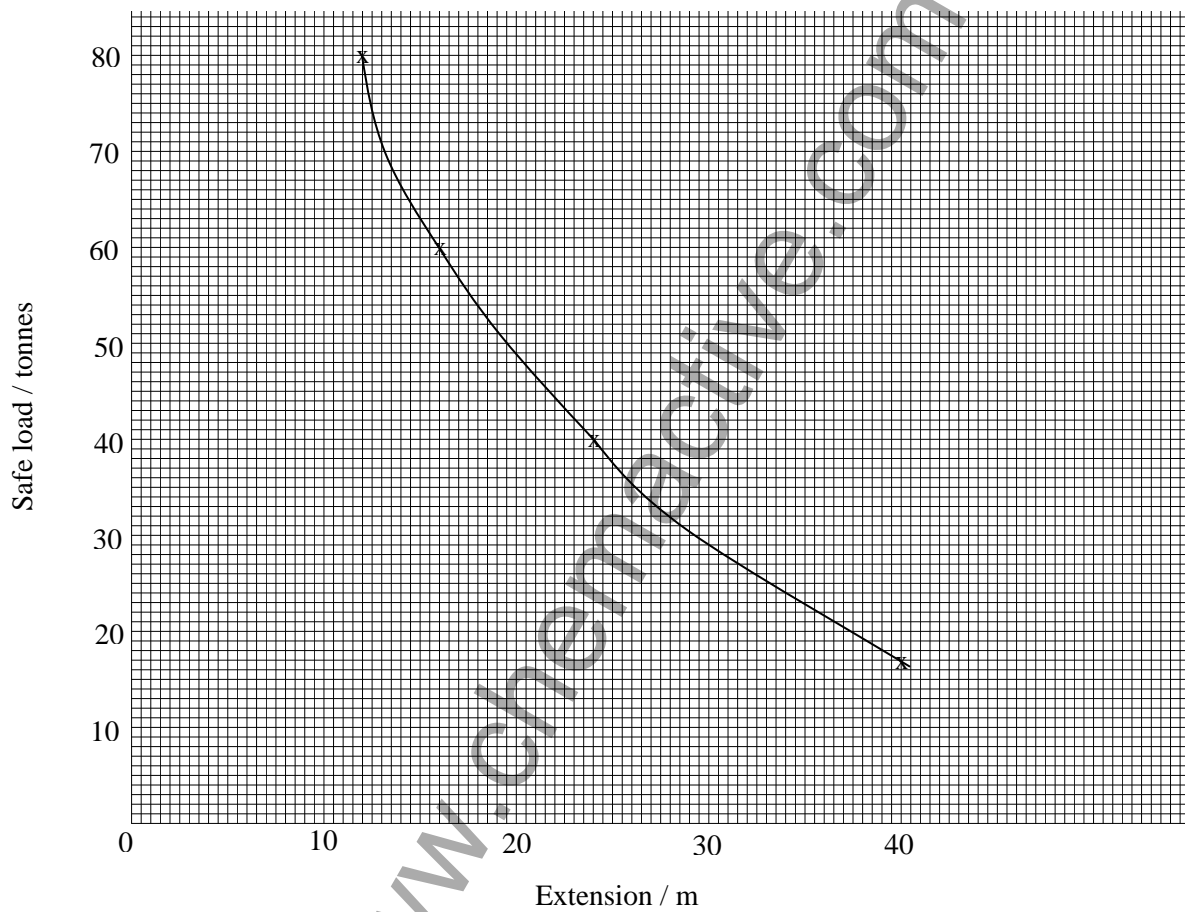
TOTAL / 9

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QUESTIONSHEET 15

- | | |
|--|---|
| (a) LHS – $400 \times 2 = 800$ | 1 |
| RHS – $300 \times 2 = 600$ | 1 |
| difference = 200 | 1 |
| position = $250 / 200$ | 1 |
| \Rightarrow 1.25 m from pivot on Dick’s side | 1 |

(b)(i)



- | | |
|------------------|---|
| sensible scales | 1 |
| labelled axes | 1 |
| correct plotting | 2 |

(ii) 20 m 1

(iii) 27 tonnes 1

TOTAL / 11

QUESTIONSHEET 16

(a) (i) -10 N	1
(ii) 0 N	1
(iii) + 100 N	1
(b) (i) $500\,000 + 250\,000$ $= 750\,000$ N	1 1
(ii) the exact angles	1
(iii) use the angles & forces to a scale to draw triangle measure side in direction of boat	1 1 1
TOTAL / 9	

QUESTIONSHEET 17

(a) Stretches evenly returns to original length	1 1
(b) (i) 12 cm	1
(ii) 8.5 cm	1
(c) yes it is no longer stretching uniformly/evenly	1 1
(d) 50 N balance	1
TOTAL / 7	

QUESTIONSHEET 18

(a) (i) useful	1
(ii) nuisance	1
(iii) nuisance	1
(iv) useful	1
(v) useful	1
(b) floats on air cushion	1
no contact with sea	1
	TOTAL / 7

QUESTIONSHEET 19

(a) (i) draw has mass	1
work done to move it	1
(ii) you have mass	1
work done to lift you	1
(b) climb flight of stairs	1
larger mass moved	1
through greater distance	1
	TOTAL / 7

QUESTIONSHEET 20

One mark for each word/phrase

push
pull
friction
slowly
magnetic
tension
electrical / electrostatic
gravity
float
rise

TOTAL / 10
