CAMBRIDGE LOWER SECONDARY CHECKPOINT

PRACTICE QUESTIONS & MARK SCHEMES

Stage 8 / Subject: Physics

Topic: Pressure and Diffusion/ Pressure- Set-1

Note:

- The practice sheets contain a few sample 'Expert-written Model Answers'
- These should help you understand how to interpret the mark schemes and frame your own answers for other questions

1 Fig. 4.1 shows end views of the walls built by two bricklayers.

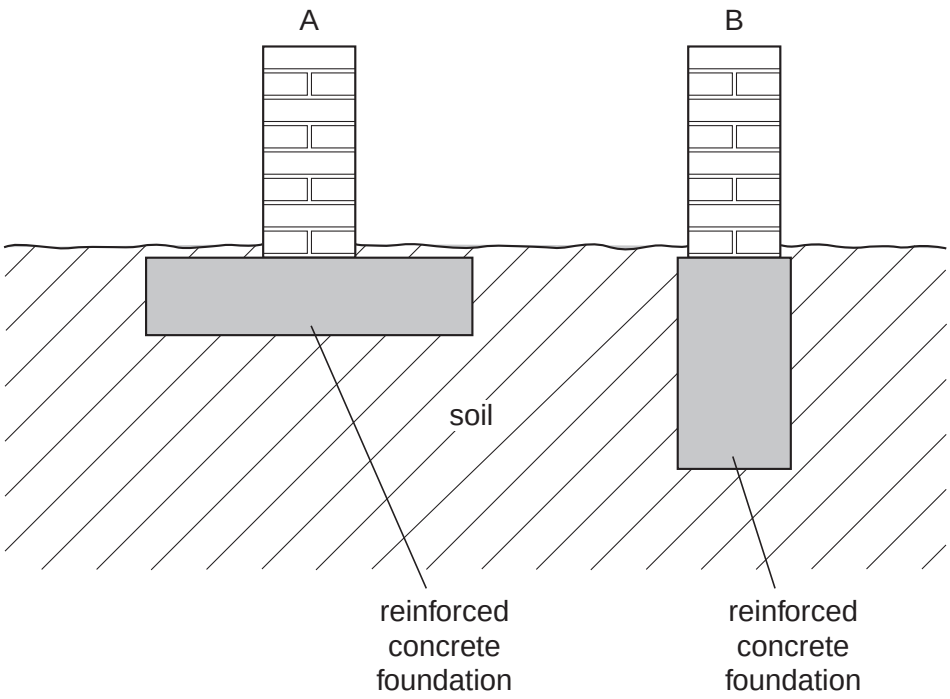


Fig. 4.1

Which wall is the least likely to sink into the soil, and why?

.....

.....

.....

..... [2]

MARK SCHEME:

(a) wall A AND bigger area B1
lower pressure (on soil) B1

Expert Answer:

[For reference only , so as to enable you to frame your answers correctly by referring to the mark schemes]

(a) The wall A with the bigger area is less likely to sink in the soil as it exerts a lower pressure on the soil as compared to wall B

2 A young boy, skating on a frozen pond, has fallen through some thin ice about 10m from the shore of the pond. Fig. 4.1 shows the situation.

Fig. 4.1

A man, standing near the pond, hears the boy's shouts for help.

The man weighs more than the boy.

(a) Why would it be unsafe for the man to walk on the ice to rescue the boy?

.....

.....[1]

(b) Suggest and explain what the man could do to cross the ice to reach the boy safely.

.....

.....

.....

.....

.....[4]

[Total: 5]

MARKING SCHEME:

(a) greater pressure from man **OR** man will fall through ice **OR** ice will break / crack B1

(b) idea of increasing area **OR** spreading load M1

any three from: A3
larger (surface) area
load / weight / force more spread out
less pressure
use of $P = F / A$

[Total: 5]

Expert Answer:

(a) Because the man would exert a greater pressure on the ice.

(b)The man could use a plank with a large surface area and travel on it, so that the weight is more spread out and consequently the pressure exerted by him on the ice is reduced.

3 Fig. 7.1 shows a car and a snow tractor.

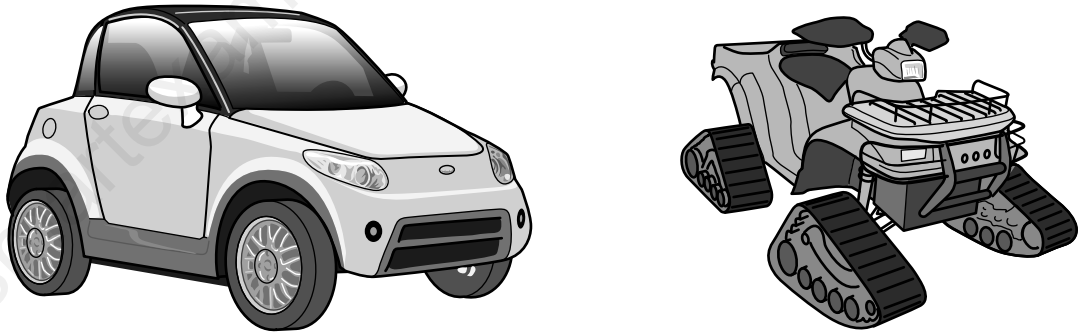


Fig. 7.1

The car and the snow tractor have the same weight.

(a) Explain why the snow tractor can travel across soft snow without sinking, but the car cannot.

.....

.....

.....

.....

.....[3]

MARKING SCHEME:

(a) tractor tracks have larger area (in contact with ground)
OR reverse argument for car — B1

pressure (on ground) mentioned
OR weight spread out (over larger area) **NOT** pressure is spread out — B1

correct argument linking pressure and area — B1

Expert answer:

The tractor tracks have a larger area in contact with the ground. Hence the weight of the tractor is spread over a larger surface area. Since weight is a force, this means that the force is spread on a large surface area leading to an overall decrease in the pressure preventing it from sinking

4 Fig. 5.1 shows two men repairing a weak roof using a crawler-board.

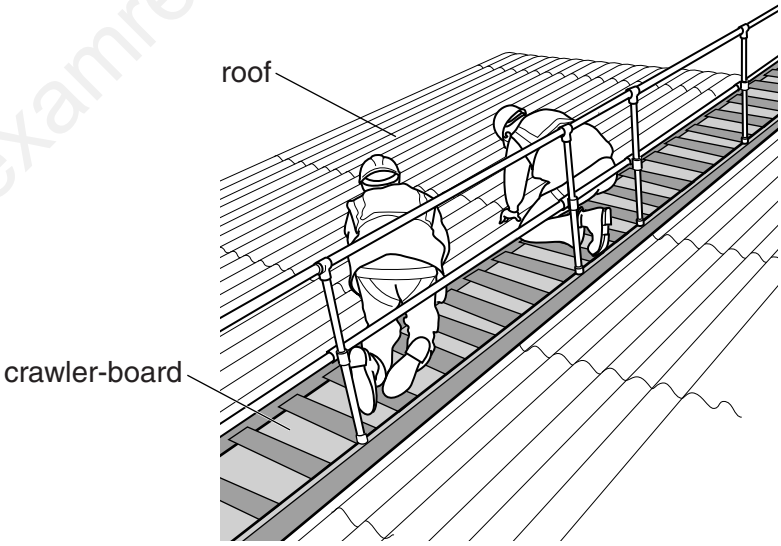


Fig. 5.1

(a) Explain why use of the crawler-board prevents the men from falling through the roof.

.....

.....

.....

.....[2]

(b) The crawler-board has a weight of 400 N. The total weight of the two men is 1600 N. The area of the crawler-board in contact with the roof is 0.8 m^2.

Calculate the pressure on the roof when the men are on the crawler-board. Include the unit.

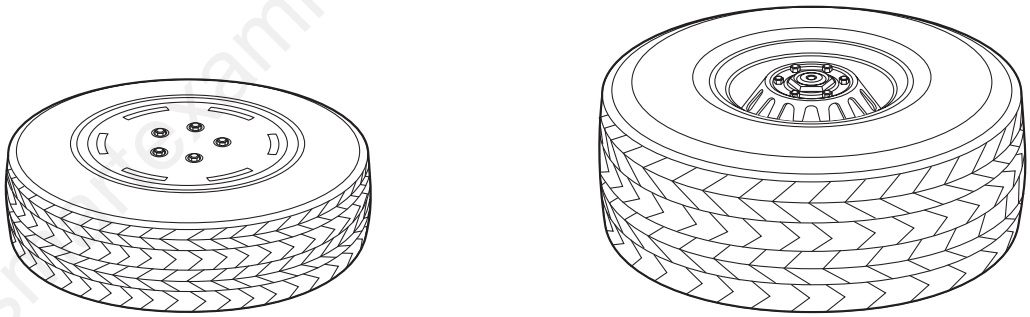
pressure = ...[5]

[Total: 7]

MARKING SCHEME:

(a)	**any two from:** larger area (in contact with roof) weight **OR** force spread out lower pressure (on roof)	**B2**
(b)	400 + 1600 seen **OR** 2000(N)	**B1**
	P = F / A stated	**C1**
	2000 / 0.8	**C1**
	2500	**A1**
	N/m^2 **OR** Pa	**B1**
		Total: 7

5 **(a)** A farmer has two vehicles with the same weight and the same number of wheels. Fig. 4.1 shows what the wheels on these two vehicles look like.



vehicle 1 vehicle 2

Fig. 4.1

Which vehicle should the farmer use when driving across his fields when the ground is very soft? Give your reasons.

vehicle .....

reasons .....

.....

..... [4]

(b) **(i)** If you stepped on the point of a sharp nail with your bare foot, it would be extremely painful. Explain, in terms of pressure, why this is so.

.....

.....

(ii) A person can lie on a bed of nail-points if there is a large number of nails. Explain why this is **not** extremely painful.

.....

.....

[5]

MARKING SCHEME:

(a)		vehicle 2	F	M1
		large(r) <u>area</u> (in contact with ground)	C	A1
		low/less <u>pressure</u>	C	A1
		less likely to sink/get stuck	F	A1
(b)	**(i)**	small area	F	C1
		large pressure	F	B1
	(ii)	(weight spread over) large(r) area NOT body area	C	B1
		small/less pressure	C	B1
		reference to weight somewhere in **(b)**	C	<u>B1</u>
				<u>9</u>

6 **(a)** Fig. 3.1 shows two examples of footwear being worn by people of equal weight at a Winter Olympics competition.

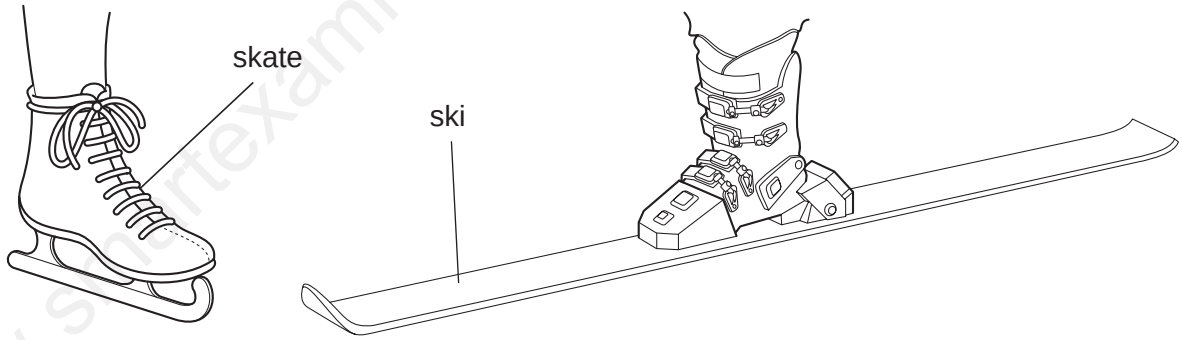


Fig. 3.1

Which footwear creates the greatest pressure below it, and why?

Which? .....

Why? ..... [2]

MARKING SCHEME:

(a)	skate	**M1**
	small area (in contact with ice)	**A1**