3.15 Pressure, Moments and Levers: 10-minute Pack

AQA 8464 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Farida, weight 600 N, is standing still. When she wears trainers, the total area of both shoe soles in contact with the ground is 0.040 m^2. When she wears stiletto heels, the total contact area is only 0.00050 m^2. Use the equation p = F / A.

(a) Calculate the pressure Farida exerts on the ground when wearing trainers. **(2)**

.....

(b) Calculate the pressure Farida exerts on the ground when wearing stiletto heels. **(2)**

.....

(c) Explain, using your answers to parts (a) and (b), why stiletto heels are more likely to leave dents in a soft wooden floor than trainers, even though Farida's weight is the same in both cases. **(2)**

.....

.....

(d) State one other everyday example where a large contact area is used to reduce the pressure exerted on a surface. **(1)**

(Total for Question 1 is 7 marks)

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2 Atmospheric pressure is the pressure caused by the atmosphere, the layer of air surrounding the Earth.

(a) State what causes atmospheric pressure. **(1)**

(b) State how atmospheric pressure changes as altitude (height above sea level) increases. **(1)**

(Total for Question 2 is 2 marks)

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Mark scheme · 3.15 Pressure, Moments and Levers: 10-minute Pack

Question 1

(a) substitutes: p = 600 / 0.040 **M1**

(a) 15000 Pa cao **A1**

(a) Answer: 15000 Pa

(b) substitutes: p = 600 / 0.00050 **M1**

(b) 1200000 Pa cao (accept 1.2 x 10^6 Pa) **A1**

(b) Answer: 1200000 Pa (1.2 x 10^6 Pa)

(c) the stiletto heels have a much smaller contact area than the trainers, oe **B1**

(c) for the same force (weight), a smaller area produces a much greater pressure, which is more likely to damage the floor, oe **B1**

(c) Answer: The stiletto heels have a much smaller area, so for the same weight they produce a much greater pressure, which is more likely to dent the floor.

(d) any sensible example, e.g. snowshoes, skis, wide tractor tyres, wide rucksack straps, a wide foundation for a building **B1**

(d) Answer: E.g. snowshoes, skis, or wide tractor tyres.

Question 2

(a) collisions between air molecules in the atmosphere and a surface, oe (accept: the weight of the column of air above a surface) **B1**

(a) Answer: Collisions between air molecules and a surface (caused by the weight of the air above).

(b) atmospheric pressure decreases as altitude increases, oe **B1**

(b) Answer: Atmospheric pressure decreases as altitude increases.

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