Pressure – 2023 June O Level 5054

1. June/2023/Paper_ 5054/21/No.4

(a) A student pushes a drawing pin into a wooden board, as shown in Fig. 4.1.

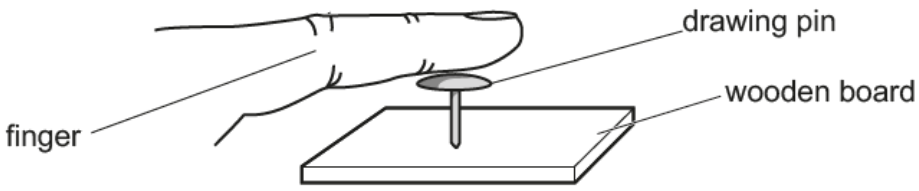

Fig. 4.1

The area of the pin in contact with the finger is $5.0 \times 10^{-5}\,m^2$. The student pushes downwards with a force of 26 N.

The mass of the drawing pin is very small.

(i) Calculate the pressure exerted by the finger on the drawing pin.

pressure = ... Pa [2]

(ii) Compare the force exerted by the finger on the drawing pin with the force exerted by the drawing pin on the wooden board.

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..... [1]

(iii) Explain why the drawing pin goes into the wooden board but not into the finger.

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..... [2]

(b) Fig. 4.2 shows water emerging from a plastic bag that contains a number of small holes.

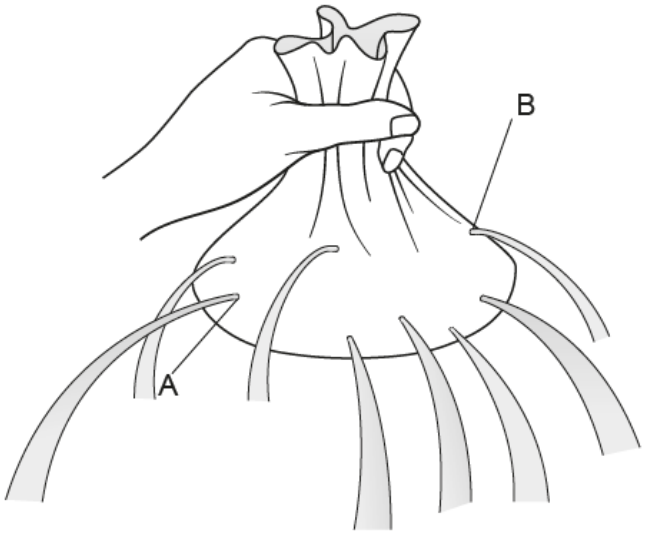

Fig. 4.2

(i) Explain why the water emerges from each hole in a direction at right angles to the surface of the bag.

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..... [2]

(ii) The holes at A and B are the same size.

Explain why the water emerges faster from the hole at A than from the hole at B.

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..... [1]

[Total: 8]