

Name of the Student: _____

Max. Marks : 25 Marks

Time : 25 Minutes

Q1.

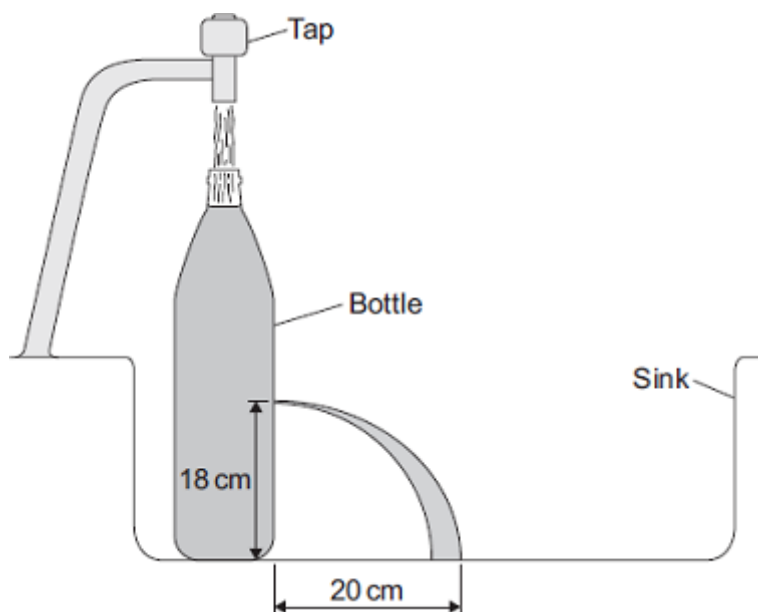
Some students fill an empty plastic bottle with water.
 The weight of the water in the bottle is 24 N and the cross-sectional area of the bottom of the bottle is 0.008 m^2 .

- (a) Calculate the pressure of the water on the bottom of the bottle and give the unit.

Pressure = _____

(3)

- (b) The students made four holes in the bottle along a vertical line.
 They put the bottle in a sink. They used water from a tap to keep the bottle filled to the top.



The students measured and recorded the vertical heights of the holes above the sink.
 They also measured the horizontal distances the water landed away from the bottle.
 A pair of measurements for one of the holes is shown in the diagram.

The complete data from the experiment is shown in the table.

Hole	Vertical height	Horizontal distance
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	in cm	in cm
J	24	15
K	18	20
L	12	30
M	6	40

(i) Which hole is shown in the diagram?

Draw a ring around the correct answer.

J **K** **L**

(1)

(ii) On the diagram, draw the path of the water coming out of hole **M**.

Use the information in the table to help you.

(2)

(c) Suggest **one** problem that might arise from trying to collect data from a fifth hole with a vertical height of 1 cm above the sink.

(1)

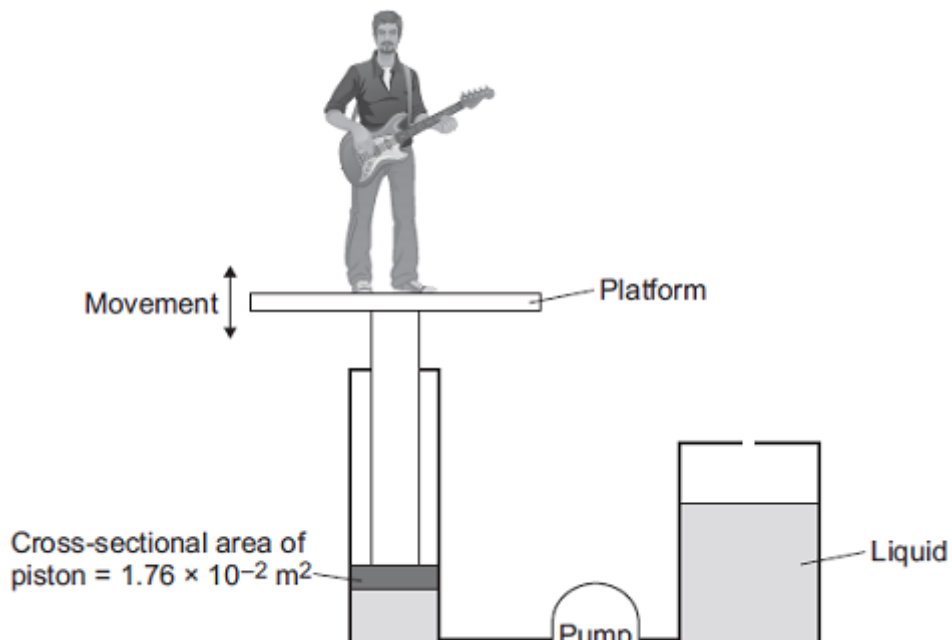
(Total 7 marks)

Q2.

Musicians sometimes perform on a moving platform.

Figure 1 shows the parts of the lifting machine used to move the platform up and down.

Figure 1



(a) What type of system uses a liquid to transmit a force?

(1)

(b) The pump creates a pressure in the liquid of 8.75×10^4 Pa to move the platform upwards. Calculate the force that the liquid applies to the piston.

Force = _____ N

(2)

(c) The liquid usually used in the machine is made by processing oil from underground wells. A new development is to use plant oil as the liquid.

Extracting plant oil requires less energy than extracting oil from underground wells.

Suggest an environmental advantage of using plant oil.

(1)

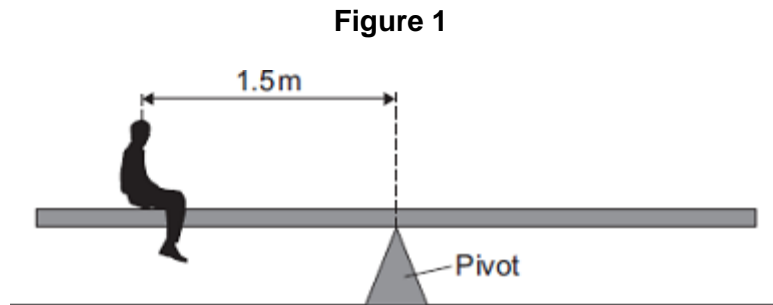
(d) Musicians often use loudspeakers.

Figure 2 shows how a loudspeaker is constructed.

Figure 2

- (b) Some children build a see-saw using a plank of wood and a pivot. The centre of mass of the plank is above the pivot.

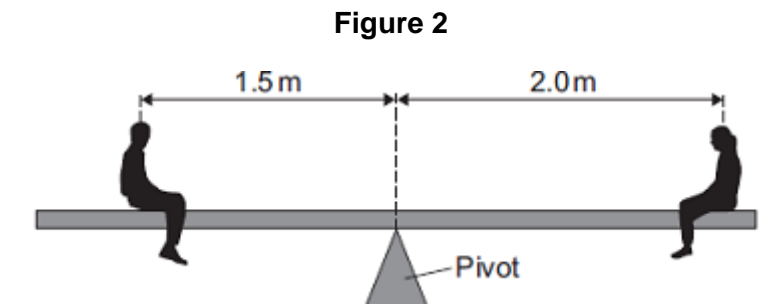
Figure 1 shows a boy sitting on the see-saw. His weight is 400 N.



Calculate the anticlockwise moment of the boy in Nm.

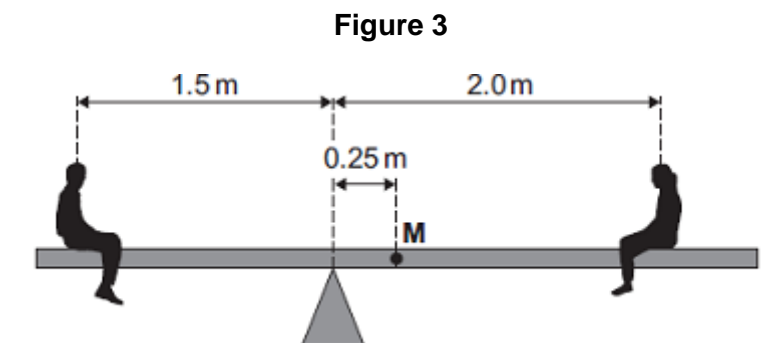
Anticlockwise moment = _____ Nm

- (c) **Figure 2** shows a girl sitting at the opposite end of the see-saw. Her weight is 300 N.



The see-saw is now balanced.

The children move the plank. Its centre of mass, **M**, is now 0.25 m from the pivot as shown in **Figure 3**.



The boy and girl sit on the see-saw as shown in **Figure 3**.

- (i) Describe **and** explain the rotation of the see-saw.

(3)

- (ii) The boy gets off the see-saw and a bigger boy gets on it in the same place. The girl stays in the position shown in **Figure 3**. The plank is balanced. The weight of the plank is 270 N.

Calculate the weight of the bigger boy.

Weight of the bigger boy = _____ N

(3)

(Total 10 marks)