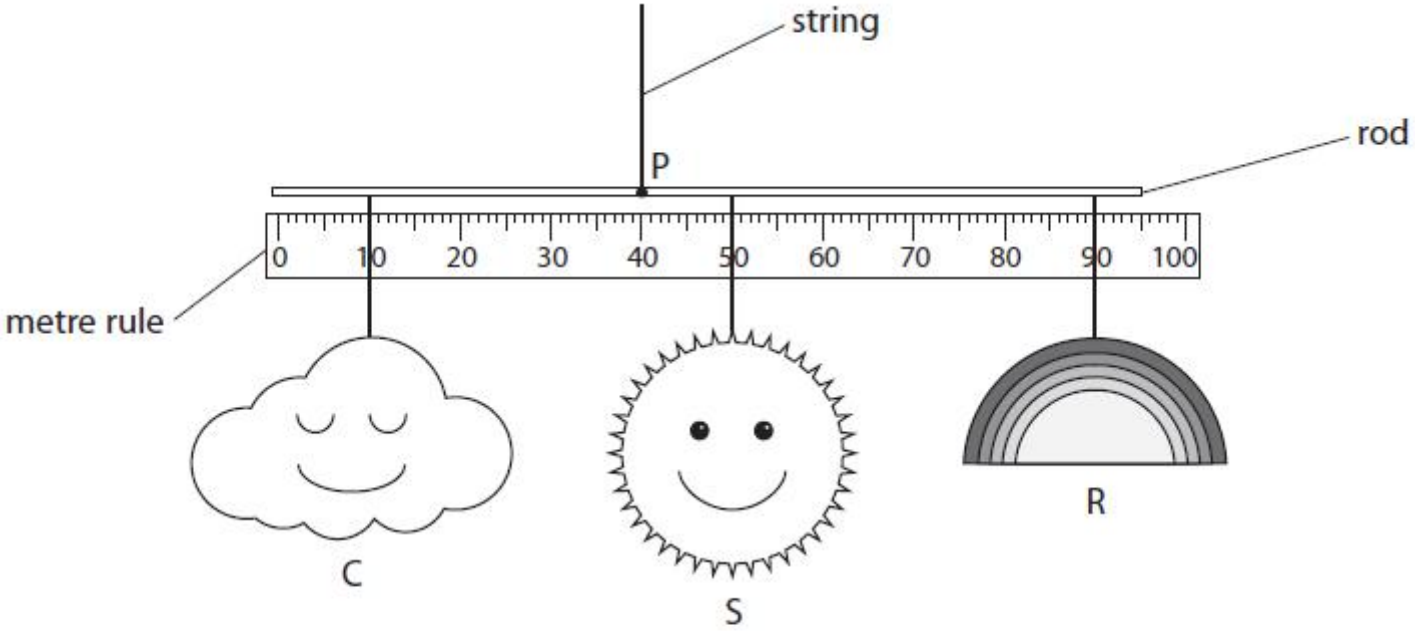
Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Q1.

Figure 13 shows a toy that a student makes for a nursery school.
for a nursery school. The rod hangs by a string from the ceiling.



weight of S = 2.0 N weight of R = 1.0 N

Figure 13

(i) The moment of C about point P is 0.60 Nm.
Calculate the weight of C.
Use the equation

$$\text{moment} = F \times d$$

(2)

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weight of C ..... N

(ii) Show that the total moment of S and R about P is 0.70 N m.

(2)

(iii) Using the data in the question and the principle of moments, determine if the toy shown in Figure 13 is in equilibrium.

The rod is very light so its weight can be ignored.

(3)

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(Total for question = 7 marks)

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Q2.

Figure 12 shows three toy animals hanging from a rod.

The rod hangs from the ceiling by a string tied to the centre of the rod.

The system is in equilibrium.

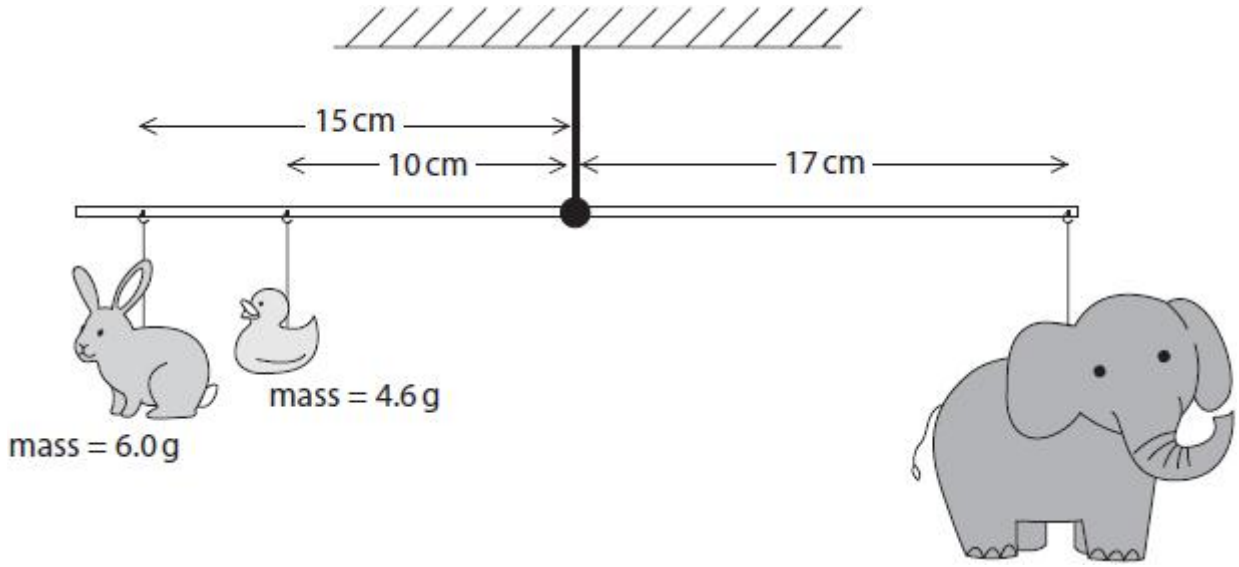


Figure 12

Use the principle of moments to calculate the mass of the toy elephant.

(4)

mass = ... g

(Total for question = 4 marks)

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Q3.

Figure 19 shows two forces, P and Q, acting at point X.

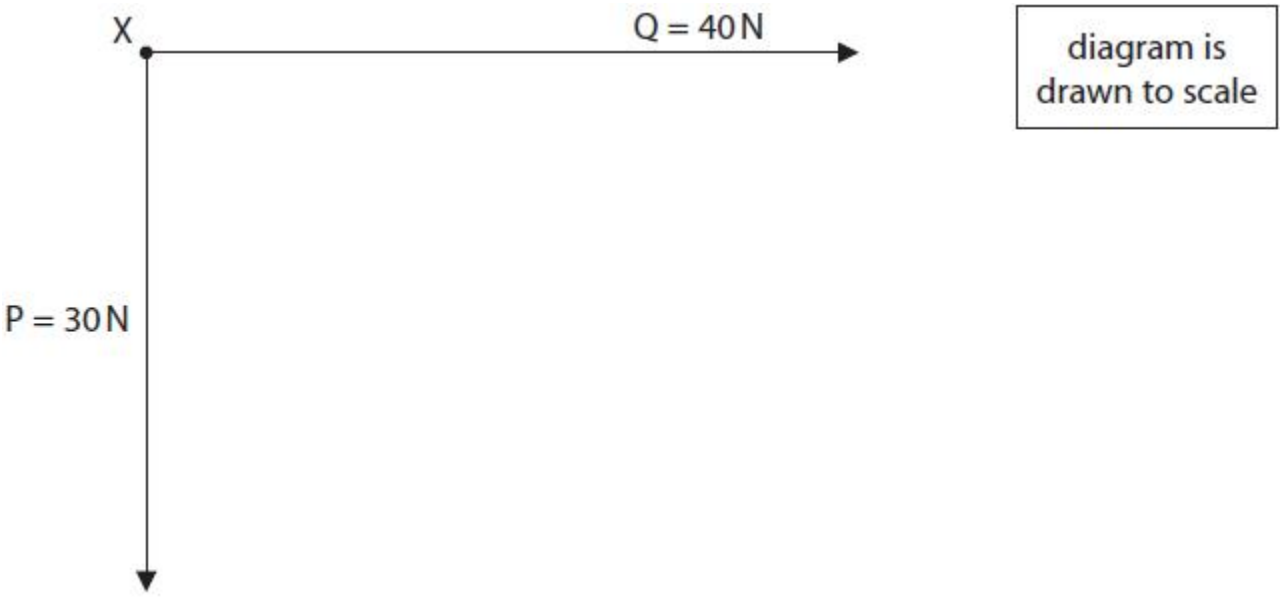


Figure 19

Complete the diagram in Figure 19 to show the size and direction of the resultant force, R, on point X.

(Total for question = 2 marks)

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Q4.

Figure 14 shows a demolition ball of mass 400 kg.

The ball is used to demolish a wall.

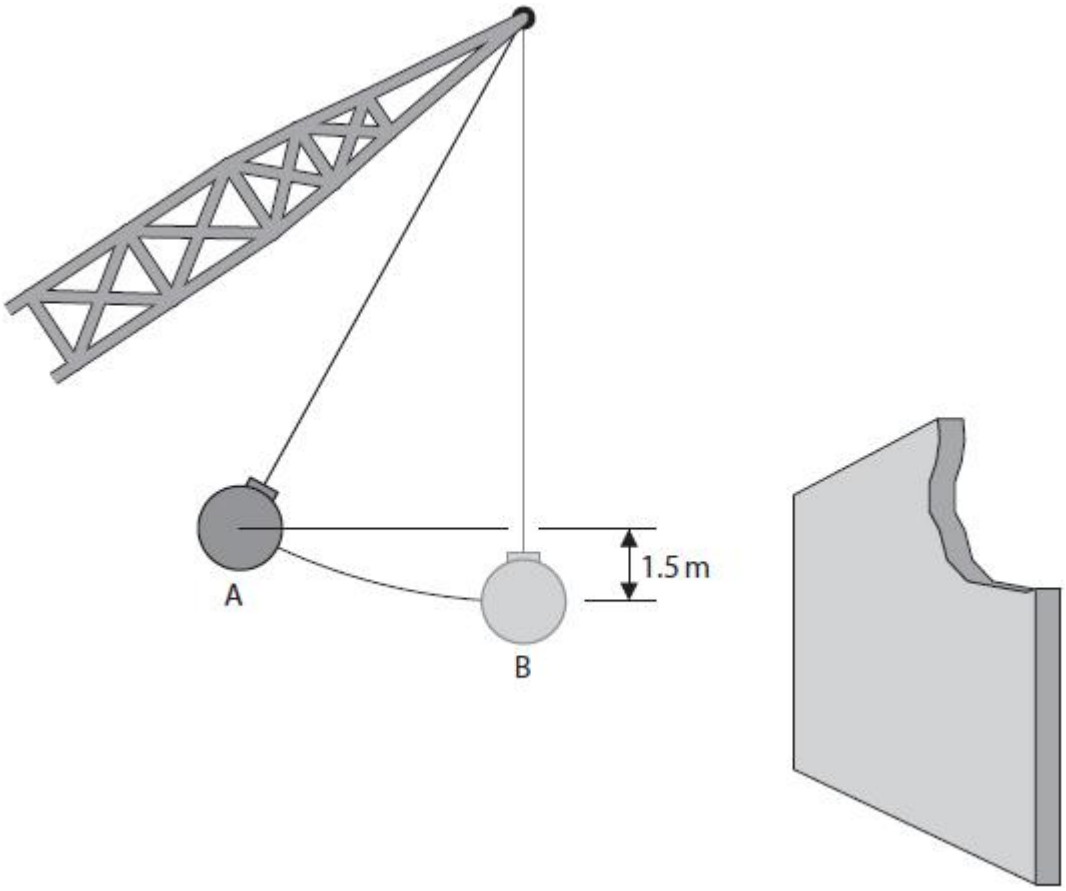


Figure 14

As the ball swings from A to B, it moves through a vertical height of 1.5 m.

(i) Calculate the change in gravitational potential energy.

Take gravitational field strength, g, to be 10 N/kg.

(3)

(ii) The heavy ball comes to rest soon after smashing into the wall. In doing this, the temperatures of the ball, wall and surroundings all increase slightly.

Explain this observation.

(2)

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(iii) Which of these quantities of the ball changes in **both** magnitude and direction while the ball is swinging?

Put a cross (☒)in the box next to your answer.

(1)

- ☐ **A** gravitational potential energy
- ☐ **B** velocity
- ☐ **C** the gravitational force acting
- ☐ **D** kinetic energy

(Total for question = 6 marks)

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