ÉCOLE GLOBALE
INTERNATIONAL GIRLS SCHOOL
Dehradun

HOLIDAY HOMEWORK - CLASS IX (PHYSICS)

WORKSHEET 2

(based on entire syllabus)

1.

Parachutes are used to slow down a certain racing car.

Fig. 1.1 shows the racing car, of total mass 750 kg, slowing down by using parachutes.

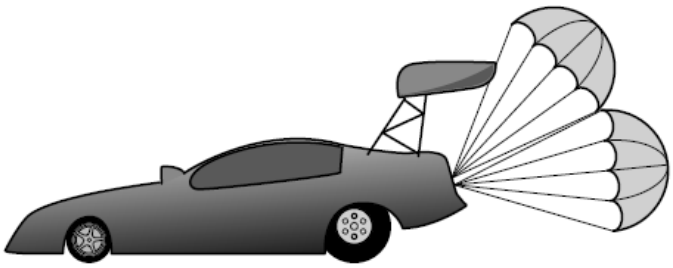

Fig. 1.1

Fig. 1.2 is the speed-time graph for 20 s after the car reaches full speed.

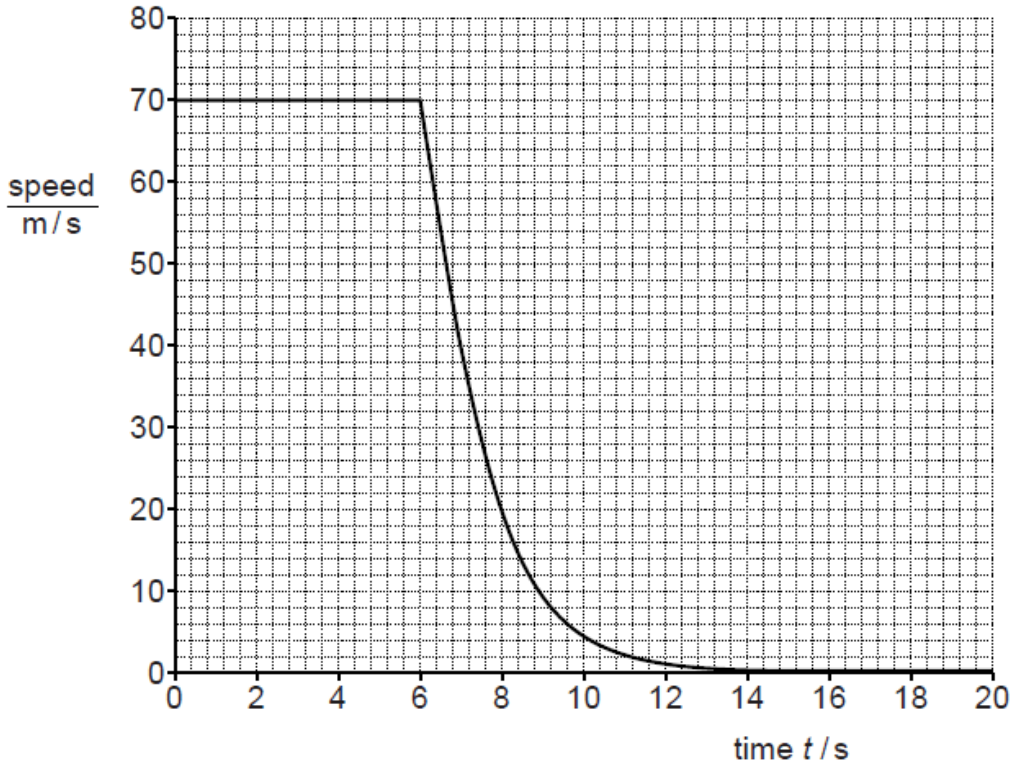

Fig. 1.2

At time t = 6.0 s, the parachutes open.

(a) On Fig. 1.2,

(i) mark a point, labelled A, where the car is moving at constant speed,

(ii) mark a point, labelled B, where the car is decelerating at a uniform rate,

(iii) mark a point, labelled C, where the car is decelerating at non-uniform rate.

(b) Calculate

(i) the deceleration of the car at time t = 6.5 s,

(ii) the resultant force acting on the car at this time.

(c) Explain why there is no resultant force acting on the car at time t = 4.0 s.

2.

A student wishes to determine the density of a small, irregularly shaped stone.

(a) With the aid of a labelled diagram, describe an experiment to determine the volume of the stone.

(b) **(i)** State the other quantity, apart from the volume, that must be measured in order to determine the density.

..... [1]

(ii) State the formula that is used to calculate the density.

.....

..... [1]

(c) The student now wishes to determine the volume of a small, irregularly shaped piece of wood that floats in water. He notices that a small lead weight tied to the wood makes it sink in water.

Describe how the student can adapt the experiment in **(a)** to determine the volume of the wood. You may draw a diagram.

3.

A metre rule balances when the 50 cm mark is directly above a pivot.

(a) State where in the rule its centre of mass is located.

(b) Fig. 3.1 shows an apple and a 0.40 N weight placed on the rule so that the rule remains balanced at the 50 cm mark.

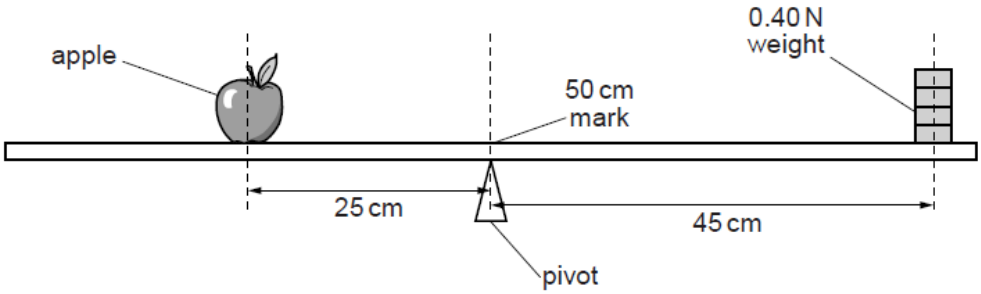

Fig. 3.1 (not to scale)

The centre of mass of the apple is 25 cm from the pivot and the centre of mass of the weight is 45 cm from the pivot.

Calculate

(i) the weight of the apple,

(ii) the mass of the apple.

(c) The apple is not moved. The weight is removed from the rule and the pivot is moved to the left until the rule balances as shown in Fig. 3.2.

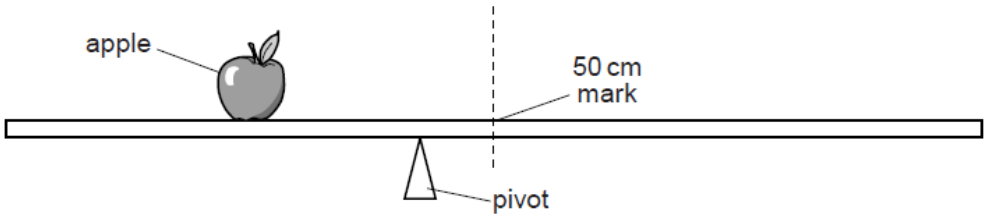

Fig. 3.2 (not to scale)

(i) Explain why the arrangement in Fig. 3.2 balances.

(ii) The pivot in Fig. 3.2 is closer to the 50 cm mark than to the centre of mass of the apple.

Compare the weight of the rule to the weight of the apple.

4.

A teacher shows a class examples of three states of matter. These are a solid metal block resting on the bench, a liquid in a glass beaker and a gas in a clear balloon in the laboratory.

Fig. 4.1a represents the arrangement of molecules in the solid.

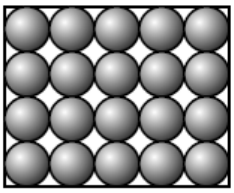

Fig. 4.1a

Fig. 4.1b

Fig. 4.1c

(a) **(i)** Complete Fig. 4.1b, to show the arrangement of molecules in the liquid.

(ii) Complete Fig. 4.1c, to show the arrangement of molecules in the gas.

(b) (i) In the list below, draw a ring around the state of matter that is the easiest to compress.

the solid **the liquid** **the gas**

(ii) In terms of its molecules, explain why this state of matter is the easiest to compress.

5.

During both boiling and evaporation, liquid water is converted into water vapour.

The rate at which the mass of **boiling** water decreases depends only on the rate at which the water is gaining thermal energy.

(a) The specific latent heat of vaporisation of water is 2.3×10^6 J/kg. Thermal energy is supplied to boiling water in a kettle at a rate of 460 W.

Calculate the mass of water that is boiled away in 180 s.

(b) The rate at which the mass of **evaporating** water decreases depends on other factors.

(i) State two of these factors.

(ii) State two other ways in which evaporation is different from boiling.

6.

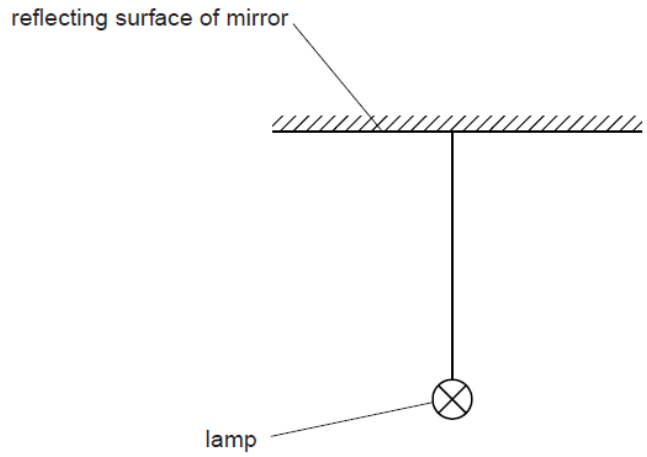

Fig. 8.1

A lamp in a large room is suspended below a horizontal mirror that is fixed to the ceiling. Fig. 8.1 is a scale diagram of the lamp and mirror.

An image of the lamp is formed by the mirror.

(a) (i) On Fig. 8.1, draw two rays from the centre of the lamp that strike the mirror. Use these rays to locate the image. Label the image I. [3]

(ii) State **two** characteristics of this image.

1. .....

2. .....

[2]

(b) Suggest an advantage of positioning a mirror above the lamp.

.....

.....

7.

The liquids in five liquid-in-glass thermometers A, B, C, D and E expand linearly with temperature. All the thermometers have scales marked in °C. Fig. 6.1 accurately represents the scales of these five thermometers.

(a) (i) Use information from the scales of the thermometers in Fig. 6.1 to state which thermometer has the greatest range.

(ii) State and explain which thermometer has the greatest sensitivity.

(b) Suggest two design features that would cause a liquid-in-glass thermometer to have a large sensitivity.

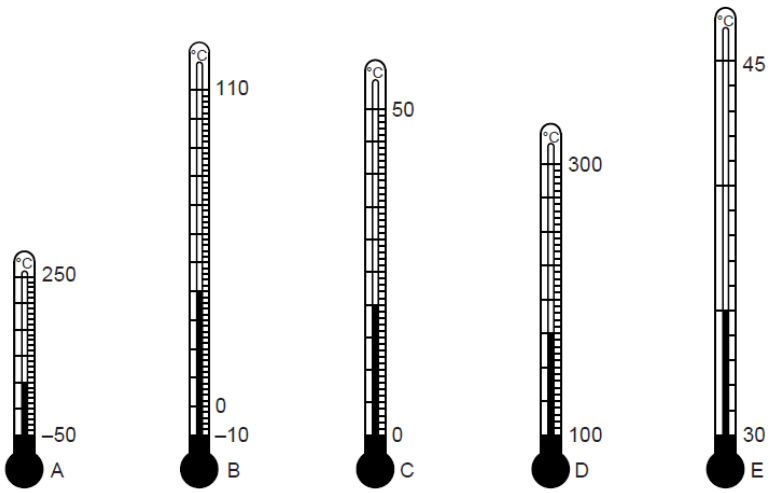

Fig. 6.1