



## Section A: Answer all questions

### Question 1:

Fill in the blanks:

a) A cooking pot is made of iron. Iron is a good \_\_\_\_\_ of heat and so heat energy passes quickly from the fire to the food. On the other hand, the handle of the pot is covered with plastic, because this is a/n \_\_\_\_\_ and so you do not burn your hand. [2]

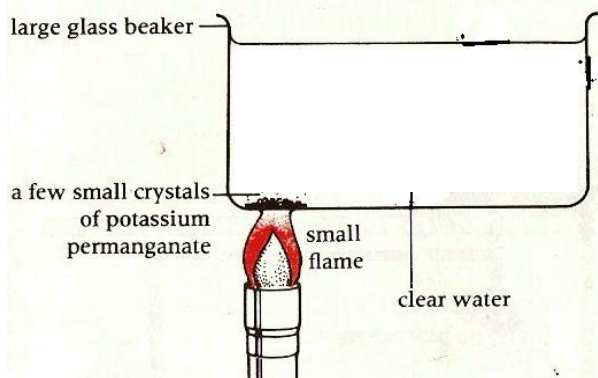
b) Hot water rises, because when heated its volume \_\_\_\_\_ and its density \_\_\_\_\_. [2]

c) Wearing a black T-shirt is not a good idea in the summer sun because black is a good \_\_\_\_\_ of heat by radiation and you become hotter. It is better if you wear a/n \_\_\_\_\_ T-shirt. [2]

d) Temperature is measured with a/n \_\_\_\_\_. A rise in temperature of  $10^{\circ}\text{C}$  is equal to a rise of \_\_\_\_\_ K. [2]

### Question 2:

a) You are provided with the following: violet crystals, a beaker full of water, a glass tube, a tripod, a wire gauze and Bunsen burner.



i) Explain briefly how you would demonstrate convection in water.

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[3]

ii) Draw the convection currents on the diagram. [1]

b) An ice cube is surrounded with a piece of wire gauze and put in a test-tube full of water. The ice cube sinks to the bottom. The test tube is heated at the top. After a while the water at the top starts boiling while the ice cube at the bottom does not melt.

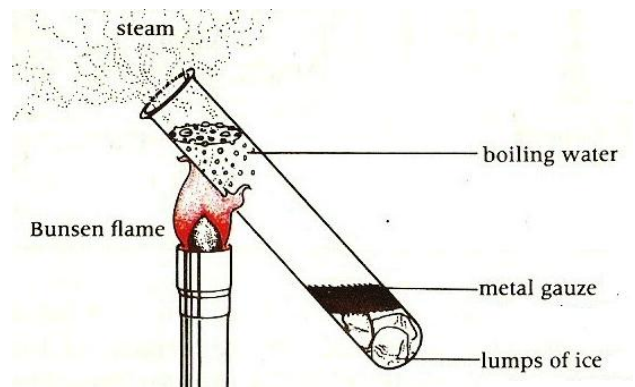
i) Why was the ice cube covered in wire gauze?

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[1]

ii) Can heat reach the ice-cube by convection? Why?

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[2]

iii) What do you conclude from this experiment?

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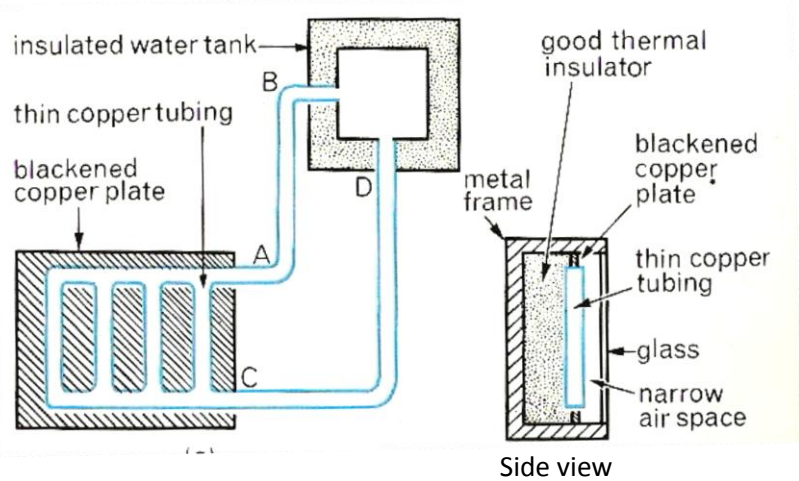
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[1]

### Question 3:

The diagram shows the panel of a solar water heater. The design helps to heat the water quickly. In fact it is placed facing south so that it faces the sun.

To answer the following questions you are advised to mention physics principles, like greenhouse, good absorber of heat by radiation, good conductor, etc.



a) Why are the copper pipes painted black?

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[2]

b) Why are the pipes made of copper?

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[1]

c) What is the purpose of the glass pane?

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[2]

d) Why is the underside of the panel insulated?

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[1]

e) Why is the insulated water tank positioned higher than the solar panel?

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[2]

**Question 4:**

A boy lets a stone to fall into an empty well. He hears a sound as it hits the bottom 3 seconds later.

a) What is the initial velocity of the stone?

\_\_\_\_\_ [1]

b) With what acceleration does the stone fall?

\_\_\_\_\_ [1]

c) What is the depth of the well?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

d) With what velocity does the stone hit the bottom?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

**Question 5:**

a) During the day in summer, the sand on a beach is much hotter than the sea. At night the reverse is true. Explain this using the phrase "specific heat capacity".

\_\_\_\_\_  
\_\_\_\_\_ [2]

b) A teacher heated some water in the laboratory. The following were the readings noted:

- Mass of water = 0.26 kg
- Initial Temperature = 20°C
- Final Temperature = 32°C
- Power of Heater = 50 W
- Time heater is switched on = 300s.

i) Calculate the change in temperature of the water.

\_\_\_\_\_ [1]

i) Calculate the heat energy given to the water.

\_\_\_\_\_ [2]

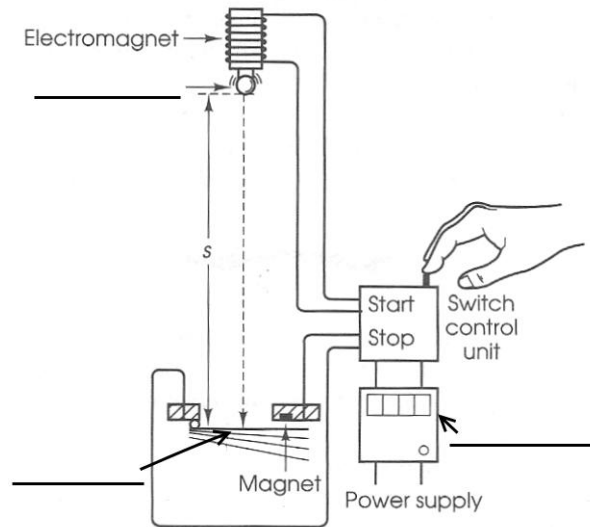
ii) Calculate the specific heat capacity of the water using these readings.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]



**Question 7:**

Two students set about to find the acceleration due to gravity. Their teacher provided them with the necessary apparatus already set up as shown below:



a) Label the diagram using the spaces provided. [3]

b) Describe briefly how you would have carried out the experiment to obtain the results required.

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[3]

c) While carrying out this experiment, these students recorded the following results:

Distance (m)	Time (s)	Acceleration due to gravity, "g" (m/s <sup>2</sup> )
2.0	0.66	9.18
2.0	0.67	8.91
2.0	0.65	

i) Calculate the missing acceleration due to gravity in the table above. [2]

ii) Why does the value of "g" vary from one experiment to the other, although the distance is the same?

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[1]

iii) Calculate the average value of "g" from the results obtained.

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[1]

iv) Given that the actual value of "g" is 9.81m/s<sup>2</sup>, comment on the value obtained by these students.

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[1]

d) These students decide to repeat this experiment. This time they intend to use a stopwatch to measure the time taken for the ball to fall.

i) Do you think that this is a good idea? Why?

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[2]

ii) List two precautions that you would have taken to obtain a value closer to the actual value.

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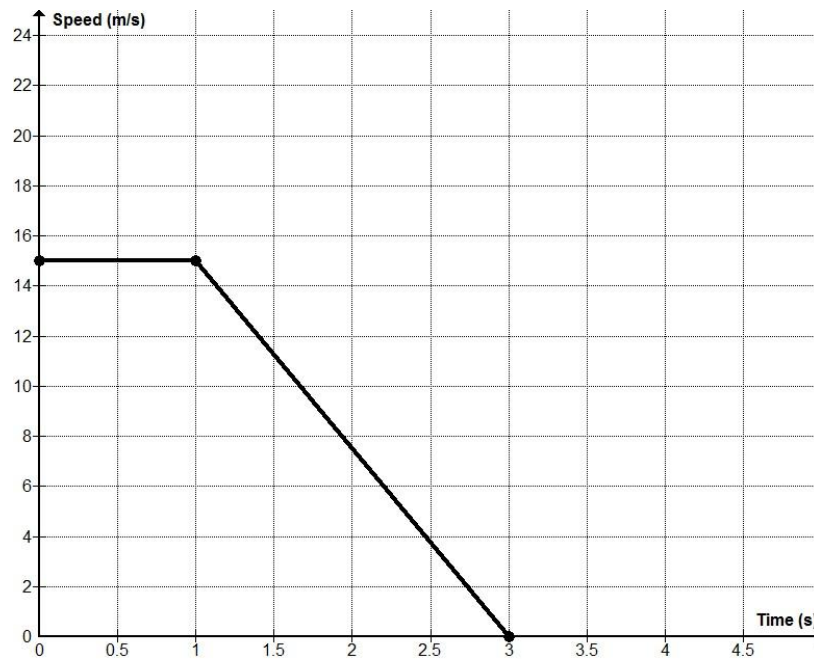
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[2]

### Question 8:

Driving cars is a pleasurable experience to most people. When accidents happen they are caused by a series of events which may cause death or serious injury to the persons involved. The graph below shows how the speed of a car changes after a driver notices a hazard.



a) Using the graph, describe what happens to the speed of the vehicle.

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[2]

b) Why does the vehicle continue moving at constant speed although the driver has seen the hazard?

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[1]

c) Calculate the total distance until the driver comes to a stop.

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d) On the graph above, draw a sketch to show what would happen if the driver was faced with the same situation but was driving:

i) slower. Label your sketch X. [2]

ii) faster, under the influence of alcohol. Label your sketch Y. [2]

e) Name two factors that affect thinking distance.

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f) Name two factors that affect braking distance.

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g) Comment on the total distance travelled in d) i) and ii) with respect to road safety!

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