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Section A: This section carries 40 marks

Question 1: This question is about heat energy.

- a) The SI unit of heat energy is the _____ [1]
- b) When heat is supplied to an object its _____ rises. [1]
- c) Temperature is measured by using a _____. [1]
- d) Increasing the temperature of an object increases the energy of its _____ [1]
- e) Change 30°C into kelvins _____. [2]
- f) Change 100K into degree celcius _____. [2]

Question 2: This question is about pressure.

- a) Pressure is measured in _____ or in _____. [2]
- b) In solids the pressure increases if the force _____. The pressure also increases if the area _____. [2]
- c) In liquids, the pressure increases if the depth _____ and if the density _____. [2]
- d) The pressure of a fixed mass of gas _____ if the temperature of the gas rises and decreases if the volume _____. [2]

Question 3:

Ruth and her friend Sonia are sitting down, having a conversation.

- a) Ruth, of mass 50 kg, is sitting on a wooden box. The box has a mass of 2 kg and the area of the base of the box is 0.4 m^2 .
- i) Find the total mass of Ruth and the box and hence their total weight.
- _____
- _____
- _____ [2]

ii) What is the pressure exerted by the girl and the box on the ground?

[2]

b) Sonia, of mass 45 kg, is sitting next to Ruth on a chair with four legs having a mass of 3 kg. If each leg has a base area of 0.0006 m^2 find the pressure exerted by Sonia and the chair on the ground (only Sonia is sitting on the chair).

[3]

c) Why is there such a large difference in the pressure exerted by the two girls on the ground?

[2]

Question 4: This question is about specific heat capacity.

An electric heater of power 50 W was used to heat a metal block of mass 800 g. The heater was switched for 4 minutes and the temperature of the block rose from 21°C to 53°C . Find:

a) the time in seconds during which the heater was switched on.

[1]

b) the mass of the metal block in kg.

[1]

c) the change in temperature during heating.

[1]

d) the energy supplied by the heater.

[2]

e) the specific heat capacity of the metal.

[3]

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Question 5: Fill in the blanks.

When an object is stationary, it needs a _____ to make it move. The bigger the mass, the _____ the force needed to start it moving. We say that masses have _____, a reluctance to start moving. In a similar way, moving objects need a _____ to stop them moving. Their _____ tends to keep them moving. [5]

If the forces on a mass are balanced, then:

- If it is at rest,

_____ [1]
- If it is moving,

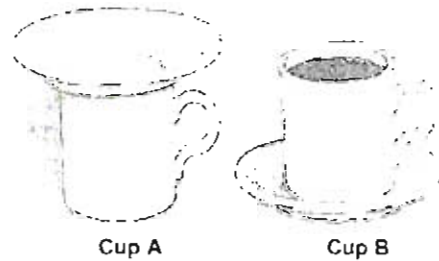
_____ [1]

Section B: This section carries 45 marks

Question 6:

Some of the following words have to be used to help you answer questions a) to d). Choose any one of them. Note that some words have to be left out.

radiation, conduction, quickly, slowly, convection, emit, absorb, high, small, infra-red, ultra-violet, warmer, colder, more, less.



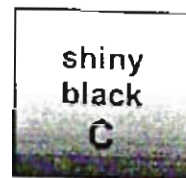
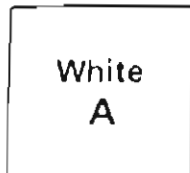
- a) The figure shows two cups containing hot tea. Cup A is covered by a saucer while Cup B is left uncovered.
 - i. Heat energy travels in the tea inside the cups by _____ [1]
 - ii. Heat travels in the material from which the cups are made by _____ [1]
 - iii. Cup A will cool more _____ than cup B. Explain why. _____ [2]
- b) Heat travels from the sun to our planet the Earth by _____ [1]
- c) Some _____ rays from the hot sun have a _____ amount of energy. So they can enter a greenhouse. The plants in the greenhouse _____ these rays. Then the plants _____ these rays but with a _____ amount of energy. So these rays are trapped inside the greenhouse and it gets _____. [6]
- d) Warm air rises because it is _____ dense than cold air. [1]

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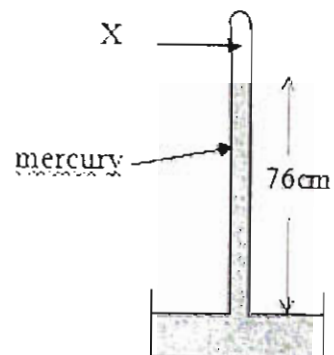
2b. The figures below represent three sheets of copper A, B and C, painted in different colours.

- i. Surface _____ absorbs heat energy very quickly. [1]
- ii. Surface _____ is a very good emitter of thermal radiation. [1]
- iii. Surface _____ is the best reflector of heat energy. [1]



Question 7:

a) The diagram shows an instrument consisting of a long glass tube containing mercury. This instrument is used to measure atmospheric pressure.



i) What is this instrument called?

_____ [1]

ii) What is the space labelled X?

_____ [1]

iii) What keeps the mercury in the tube?

_____ [1]

iv) Calculate the atmospheric pressure if the height of the mercury in the tube is 0.76 m and the density of mercury is 13600 kg/m^3 .

 _____ [2]

v) What would happen to the height of the mercury in the tube if the instrument were taken up on a high mountain? Give a reason.

 _____ [2]

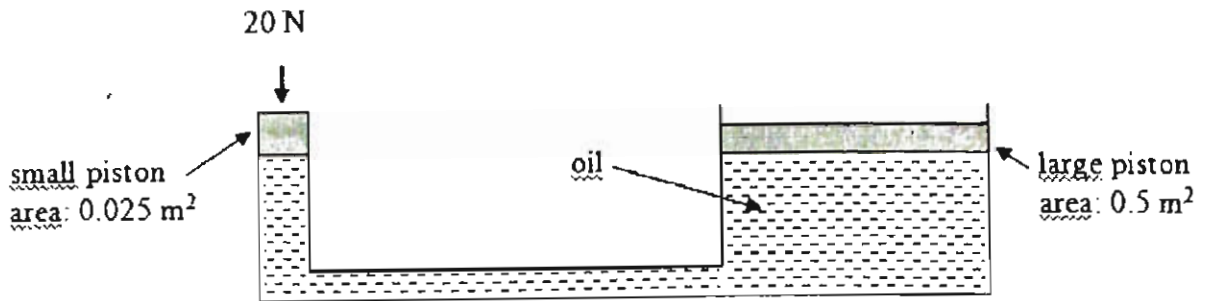
vi) How is the mercury height affected if the weather changes from fine to stormy?

_____ [1]

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Do this

- b) The diagram shows a hydraulic machine. A force of 20 N is applied to the small piston having an area of 0.025 m^2 . The area of the large piston is 0.5 m^2 . The space between the two pistons is filled with oil.



- i) Calculate the pressure applied by the small piston on the oil.
- _____
- _____ [2]
- ii) What pressure is applied by the oil to the large piston?
- _____ [1]
- iii) What load could be lifted by the large piston when the force applied to the small piston is 20 N?
- _____
- _____ [2]
- iv) Can the space between the pistons be filled with air instead of oil? Explain.
- _____
- _____ [2]

Question 8:

The table below shows how the velocity of a car changes during a particular journey.

velocity m/s	0.0	5.0	10.0	15.0	20.0	20.0	20.0	20.0	21.5	23.0
time/s	0	1	2	3	4	5	6	7	8	9

- a) Plot a graph of velocity (y-axis) against time (x-axis) [6]

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- b) By using the graph or otherwise, calculate the acceleration of the car in the first 4s.

_____ [3]

- c) Describe the movement of the car in the next 3s.

_____ [1]

- d) What is the area under a velocity–time graph equal to?

_____ [1]

- e) Calculate the distance moved by the car in the first 4s.

_____ [3]

- f) What does the car do in the last 2s?

_____ [1]