Year 11 Physics NAME_____

Test: Heat

1.

(a) Explain why a cup of water at 70°C has less thermal energy than a bucket of water at 40°C.

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_____ (2 marks)

(b) State why a bucket of vegetable oil at 40°C does not have the same amount of thermal energy as the bucket of water.

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_____ (1 mark)

(c) Suggest a reason why measuring temperature in kelvin can be more useful than degrees Celsius.

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_____ (1 mark)

2. Consider two wooden blocks, one at 0°C and one at 50°C. Both are left in the same room overnight and then their temperatures are measured in the morning. The room temperature is 25°C.

(a) Define 'heat'.

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_____ (1 mark)

(b) Hence explain what each of the temperatures will be in the morning.

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_____ (2 marks)

(c) Explain one thing that would be different if the 0°C block was metal instead of wood.

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_____ (2 marks)

3. We put our cold hands near a fire to warm them up. One of the forms of energy we feel from the fire is radiant heat.

   (a) Explain how radiant heat works.

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   _____ (2 marks)

   (b) Explain one way, other than radiant heat, that our hands can be warmed by a fire.

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   _____ (2 marks)

4. A kettle boils water by transferring heat into it.

   (a) Define 'latent heat'.

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   _____ (1 mark)

   (b) If a certain amount of water requires 22.7 kJ of energy to boil, use proportionality to determine the energy required to boil half as much water. Assume the water is at its boiling point (100°C).

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   _____ (2 marks)

   (c) If a kettle transfers 15 kJ of energy into 50g of water with an initial temperature of 50°C, calculate the mass of water that would be boiled. The specific heat capacity of water is 4.18×10^3 J/kg/K and the latent heat of vaporisation of water is 2.27×10^6 J/kg.

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   _____ (3 marks)

5. State two differences between evaporation and boiling.

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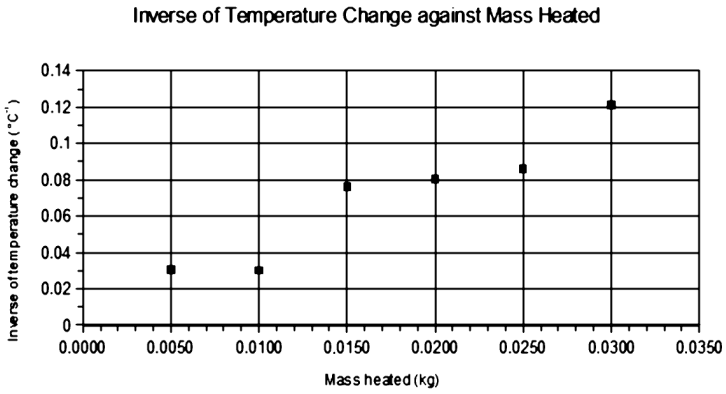
_____ (2 marks)

6. An experiment is conducted to investigate the relationship between the mass of an object and the temperature change it experiences. The energy transferred is kept constant at 500 J.



(a) Write a hypothesis for this experiment.

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_____ (2 marks)

(b) Draw a line of best fit on the graph above. (1 mark)

(c) Determine the slope of the line of best fit. Include the units for the slope.

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_____ (2 marks)

(d) From the slope calculated, determine the specific heat capacity of the object.

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_____ (2 marks)

(e) Draw and label a second line to show the expected results if this experiment was repeated for a different object with lower specific heat capacity. (1 mark)