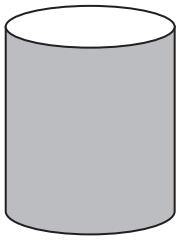
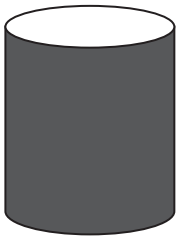
13 A student uses four containers, A, B, C and D, to investigate heat transfer.



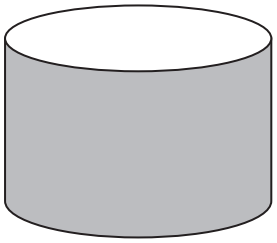
A

shiny
metal container



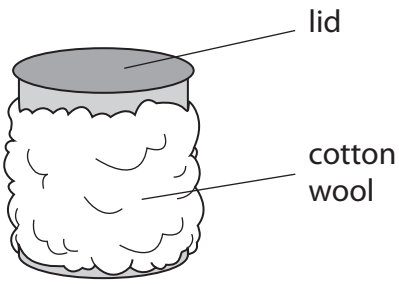
B

metal container
painted black



C

wide shiny
metal container



D

metal container
wrapped in cotton wool

The student places boiling water into each of the four containers.

She then records how the temperature of the water in each container varies with time.

(a) How could the student make sure that the investigation is a fair test?

(2)

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(b) (i) Explain which container loses the most thermal energy by radiation.

(2)

(ii) Explain which container loses the most thermal energy by convection.

(2)

(c) After 20 minutes, container D has the highest temperature.

Explain why container D remains hot for the longest time.

Refer to three methods of thermal energy transfer in your answer.

(4)

(Total for Question 13 = 10 marks)

TOTAL FOR PAPER = 120 MARKS

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