

Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Mark Schemes

Q1.

- (a) (black) is a good absorber of (infrared) radiation 1
- (b) (i) amount of energy required to change (the state of a substance) from solid to liquid
(with no change in temperature)
melt is insufficient 1
- unit mass / 1kg 1
- (ii) 5.1×10^6 (J)
accept 5×10^6
allow 1 mark for correct substitution ie $E = 15 \times 3.4 \times 10^5$ 2
- (c) (i) mass of ice
allow volume / weight / amount / quantity of ice 1
- (ii) to distribute the salt throughout the ice 1
- to keep all the ice at the same temperature 1
- (iii) melting point decreases as the mass of salt is increased
allow concentration for mass
accept negative correlation
*do **not** accept inversely proportional* 1
- (d) 60 000 (J)
accept 60 KJ
allow 2 marks for correct substitution ie $E = 500 \times 2.0 \times 60$
*allow 2 marks for an answer of 1000 **or** 60*
allow 1 mark for correct substitution ie
 *$E = 500 \times 2.0$ **or** $0.50 \times 2.0 \times 60$*
allow 1 mark for an answer of 1 3
- (e) Marks awarded for this answer will be determined by the Quality of Communication (QC) as well as the standard of the scientific response. Examiners should also apply a 'best-fit' approach to the marking.

0 marks

No relevant content

Level 1 (1–2 marks)

There is an attempt at a description of some advantages or disadvantages.

Level 2 (3–4 marks)

There is a basic description of some advantages **and** / **or** disadvantages for some of the methods

Level 3 (5–6 marks)

There is a clear description of the advantages and disadvantages of all the methods.

examples of the points made in the response

extra information

energy storage

advantages:

- no fuel costs
- no environmental effects

disadvantages:

- expensive to set up and maintain
- need to dig deep under road
- dependent on (summer) weather
- digging up earth and disrupting habitats

salt spreading

advantages:

- easily available
- cheap

disadvantages:

- can damage trees / plants / drinking water / cars
- needs to be cleaned away

undersoil heating

advantages:

- not dependent on weather
- can be switched on and off

disadvantages:

- costly
- bad for environment