

- M1.** (a) 60% sector correct
 other two sectors closer to 13:7 than 12:8 or 14:6
 sectors correctly labelled (w.r.t rank order of size)
each for 1 mark

3

- (b) (i) *ideas that wasted energy*
 is transferred to surrounding air
 pan
 stove
 is converted to another/correctly named energy form
any 2 for 1 mark each

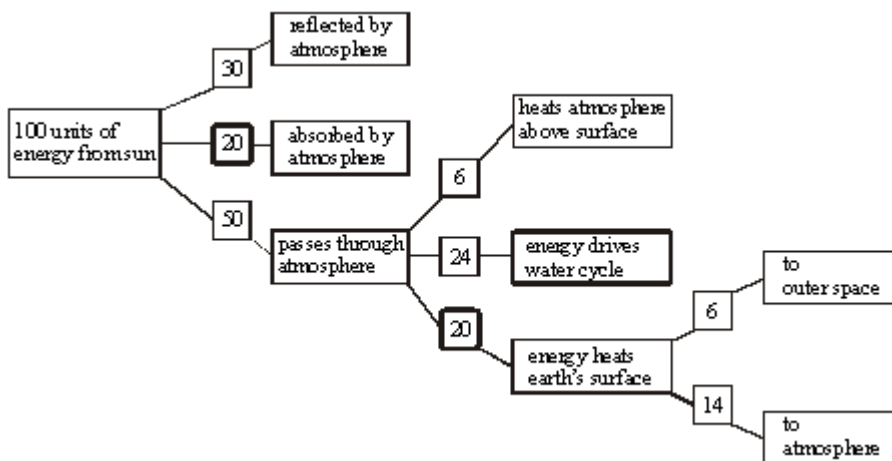
2

- (ii) 40
for 1 mark

1

[6]

M2.



each for 1 mark
allow 'error carried forward' to the last box'

[3]

- M3.** (a) weight (lifted)
or
height (lifted) 1
- (b) any **two** from:
• calculate a mean
• spot anomalies
• reduce the effect of random errors 2
- (c) as speed increases, the efficiency increases 1
- (but) graph tends towards a constant value
or
appears to reach a limit
accept efficiency cannot be greater than 100% 1
- (d) heating the surroundings 1
- (e) 0 (%) 1

[7]

- M4.** (a) (i) as a source of thermal radiation
accept heat for thermal radiation
accept to act as the Sun
*do **not** accept sunlight alone* 1
- (ii) any **one** from:
- volume of water
accept amount for volume
 - distance between lamp and boiling tube
 - initial / starting temperature of water
 - same room temperature
*do **not** accept time or same insulation material* 1
- (iii) any **one** from:
- greater sensitivity / precision
*do **not** accept more reliable (negates mark)*
 - could link to a computer for (automatic) data analysis
 - could take more frequent readings
 - reduces instrument reading error
accept more accurate
*do **not** accept easier to use on its own* 1
- (b) (i) acts as a control
accept to be able to make a comparison
accept to see the difference
*do **not** accept 'to make it a fair test' OWTTE on its own* 1
- (ii) (plastic) foam and aluminium foil 1
- (iii) (aluminium) foil is a poor absorber of thermal radiation
accept heat / infra red for thermal radiation 1
- or** (aluminium) foil is a (good) reflector of thermal radiation
*do **not** accept 'reflects sunlight' on its own*

(plastic) foam traps air which is a (good) insulator
accept (plastic) foam is a poor conductor / (good) insulator
*do **not** accept 'the material' is a good insulator / poor conductor*

1

- (c) particles vibrate with a bigger / stronger amplitude / faster / with more (kinetic) energy

accept particles vibrate more
*do **not** accept start to vibrate only*

1

energy transferred by collisions with other particles

*do **not** accept answers in terms of free/mobile electrons*

1

[9]

- M5.** (a) (i) radiation 1
- (ii) traps (small pockets of) air 1
do not accept it's an insulator
do not accept reduces conduction and / or convection
do not allow it doesn't allow heat to escape
- (b) (i) bigger temperature difference (between the water and surroundings)at the start (than at the end) 1
do not accept water is hotter
- (ii) starting temperature (of the water) 1
accept thickness of fleece
do not accept same amount of fleece
do not accept thermometer / can
do not accept time is the same
- (iii) 18 (°C) 1
correct answer only
- (iv) **M** 1
- smallest temperature drop (after 20 mins) 1
cannot score if M is not chosen
accept it's the best insulator
accept smallest loss in heat
accept keeps heat / warmth in for longer

[7]