

Efficiency and Reducing Unwanted Energy Transfers 2 MS

QUESTION 1

| QUESTION | ANSWER | EXTRA INFORMATION | MARKS |
|-------------|---|--|------------|
| a) | air (bubbles are) trapped (in the foam) (and so the) air cannot circulate / move / form convection current | do not accept air traps heat foam has air pockets is insufficient air is a good insulator is insufficient no convection current is insufficient answers in term of warm air from the room being trapped are incorrect and score no marks | 1 1 |
| b) | it will increase because the glass is not (such) a good insulator (as the wall) | room will be cooler is insufficient the U-value has increased is insufficient | 2 |
| Total marks | | | 4 |

QUESTION 2

| QUESTION | ANSWER | EXTRA INFORMATION | MARKS |
|----------|--|--|-------|
| a) | warms it | do not accept answers in terms of waste gases or pollution | 1 |
| b) | 80% or 0.8 | answers of 80 or 0.8 plus a unit gain 1 mark only or allow 1 mark for a correct substitution, ie 16/20 an answer of 35% or 0.35 gains 1 mark answers of 85%, 75%, 0.85 or 0.75 gain 1 mark | 2 |
| c) | some of the energy that would be wasted (by a coal-burning power | accept less waste energy | 1 |

| | | | |
|-------------|--|--|---|
| | station) is usefully used (to heat homes etc) | accept energy used to heat homes etc | 1 |
| d)i) | A system of cables and transformers | | 1 |
| d)ii) | less energy / power loss / wasted (in shorter cables) | accept no energy / power loss / wasted (in shorter cables) accept energy is lost when transmitted through cables do not accept electricity for energy | 1 |
| Total marks | | | 7 |

QUESTION 3

| QUESTION | ANSWER | EXTRA INFORMATION | MARKS |
|-------------|---|-------------------|-------|
| | 0.38 4 2 2 38 3 60 1 | | |
| Total marks | | | 4 |

QUESTION 4

| QUESTION | ANSWER | EXTRA INFORMATION | MARKS |
|-------------|---|---|-------------|
| a)i) | 7pm | accept 19.00 / 1900 | 1 |
| a)ii) | 8pm temperature drops more slowly | accept 20.00 / 2000 accept heat for temperature accept line is less steep | 1 1 |
| b) | insulator conduction* convection* | *answers can be either way around | 1 1 1 |
| Total marks | | | 6 |

QUESTION 5

| QUESTION | ANSWER | EXTRA INFORMATION | MARKS |
|----------|-----------------------------|---|-------|
| a)i) | 0.6 | accept 60 % allow 1 mark for useful energy = 480 answer 0.6 with any unit or 60 gains 1 mark only | 2 |
| a)ii) | transferred to surroundings | accept goes into the air | 1 |

| | | | |
|-------------|--|---|---|
| | | accept heats the surroundings up accept gets spread out accept transferred into heat (only) do not accept wasted / lost unless qualified destroyed negates mark transferred into light / sound negates mark | |
| b) | any two from: ☒ (more) electricity needs to be generated ☒ (more) power stations needed ☒ (more) fossil fuels burnt ☒ (more) pollutant gases emitted | (more) electricity is being used accept named fossil fuel accept named gas accept harmful for pollutant accept greenhouse gases accept atmospheric pollution accept answer in terms of any form of electricity generation and an associated environmental problem | 2 |
| Total marks | | | 5 |

QUESTION 6

| QUESTION | ANSWER | EXTRA INFORMATION | MARKS |
|-------------|-------------------------------------|--|-------|
| a) | heat / thermal or / and sound | do not accept noise other forms of energy eg light negates answer | 1 |
| b) | 0.4 or 40 % | allow 1 mark for 2000/5000 or equivalent fraction an answer 0.4 % gains 1 mark answers 0.4 or 40 given with any unit gains 1 mark 40 without % gains 1 mark | 2 |
| Total marks | | | 3 |

QUESTION 7

| QUESTION | ANSWER | EXTRA INFORMATION | MARKS |
|----------|---|--|------------|
| a)i) | 4 | allow 1 mark for correct transformation and substitution ie 0.6/0.15 substitution only scores if no subsequent steps are shown | 2 |
| a)ii) | diagram showing two output arrows with one arrow wider than the other with the narrower arrow labelled electrical / electricity / | | 1 1 |

| | | | |
|-------------|--|--|---|
| | useful | | |
| a)iii) | <p>any one from:</p> <ul style="list-style-type: none"> • time of day / year • position of solar cells • angle of solar cells (to the Sun) • latitude • cloud cover • solar cells covered in dust / dirt <p>causes a change in intensity of sun(light)</p> | | 1 |
| b) | <p>any one from:</p> <ul style="list-style-type: none"> • to check reliability / validity / accuracy <p>to avoid bias</p> | <p>accept charger for solar cells</p> <p>accept any reasonable suggestion</p> <p>that would lead to a change in intensity of sun(light)</p> <p>the weather is insufficient</p> <p>do not accept any physical changes to the charger eg area</p> <p>accept brightness for intensity</p> <p>accept a description of the reduction of intensity</p> | |
| c) | <p>any two from:</p> <ul style="list-style-type: none"> • produce no / less (air)pollution •energy is free •(energy) is renewable • conserves fossil fuel stocks • can be used in remote areas • do not need to connect to the National Grid | <p>accept named pollutant</p> <p>accept produces no waste</p> <p>(gases)</p> <p>accept it is a free resource</p> <p>do not accept it is free</p> | 2 |
| Total marks | | | 8 |