

Name of the Student: \_\_\_\_\_

Max. Marks : 21 Marks

Time : 21 Minutes

Mark Schemes

**Q1.**

(a) (i) vacuum  
*do not allow stopper* 1

(ii) (absence of particles) means no (transfer of energy between) particles for conduction  
*accept particles or atoms or molecules or electrons* 1

no movement of molecules for (transfer of energy by) convection  
*accept particles/atoms/electrons*  
*if answer to (a)(i) is correct: then in (a)(ii) have stated 'conduction and convection both need a medium/particles/materials' = 2 marks*  
*(If medium is specified, it must be correct, conduction can be solid, liquid or gas, convection must be liquid or gas)*  
*if answer to (a)(i) is incorrect then in (a)(ii) have stated 'conduction and convection both need a medium...' = 1 mark, unless further qualified by stating about absence of particles, in which case get a second mark.* 1

(b) (i) silvered surface  
*accept silver surface* 1

(ii) silvered is a bad emitter/radiator 1

surface reflects heat/energy/radiation (at inner and outer surface)  
**or** is a bad absorber (of energy)  
*accept bounces off* 1

[6]

**Q2.**

(i) radiation **or** infra red  
*do not accept rays*  
*do not accept waves*  
*accept electromagnetic waves* 1

(ii) good absorber (of heat) to absorb heat (**or** infrared)

do **not** accept 'attract' **or** 'capture' **or** soak

1

(iii) reduce heat loss (from the panel)

*accept (good) (heat) insulator*

*accept stop **or** reduce conduction*

*accept stop **or** reduce convection*

*accept traps heat*

*accept keeps water hot*

1

(iv) to reflect (back into the panel) heat **or** infrared **or** Sun's energy

*do **not** accept 'bouncing'*

*do **not** accept reflect Sun*

*do **not** accept reflect sunlight **or** sun's rays*

1

radiated **or** given out by the (black) pipe

*accept back to pipe*

*accept reduce heat loss for 1 mark*

*accept reduce heat loss by radiation for 2 marks*

*accept stop heat loss by radiation for 1 mark*

1

[5]

### Q3.

(a) (i) convection current correctly shown  
with arrows extending to above  
insulation label line

*circulation must show water rising in the left half of the tank accept  
continuous **or** broken arrows **must** be at least **one** arrow up and **one**  
arrow down*

*allow 1 mark for correct diagram which does not extend high enough*

2

(ii) it expands or it gets less dense

*do **not** allow hot water rises*

*do **not** accept explanation in terms of molecules expanding **or**  
changing density*

*do **not** accept lighter **or** heavier*

1

more dense water falls

*allow cold water falls if qualified with a suitable reason*

1

(b) (i) reflects heat back into the room **or** where it came from

*accept infrared or radiation or energy for heat*

*accept bounce for reflect if in correct context*

1

(ii) air is a (good) insulator or poor conductor **or** air stops conduction

*do **not** accept plastic foam is a good insulator **or** bad conductor*

1

air is trapped

convection loss reduced or stopped

(c) **two** out of the following three:

*any answer which gains credit must contain a comparison*

rate of evaporation decreases

*accept less sweat can evaporate **or** evaporation is more difficult*

less heat energy removed from the body

higher *humidity* the less water vapour can be absorbed (into the air)

*accept sweat for water vapour*

*do **not** credit description of high humidity*

*accept a correct answer in terms of dynamic equilibrium*