**2019 Year 11 Physics**

**Task 3: Investigation Validation Test – *Answers***

Energy efficient homes

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_/20

1. One way to passively cool a house is to have a breeze go through the house.
2. Explain with the use of diagrams how a cooling breeze is generated for a house in Perth (4)

State the convection cycle process (1)

State the reason why there is a temperature difference between the ocean and the land (the land heats up/cools down faster) (1)

Diagram show convection current over land and water (1)

Labels (1)

1. Explain how the layout and orientation the house impacts the effectiveness of a breeze. (3)

Open windows/doors on either side of the house allows the breeze to efficient travel though the house (1)

Orientating these doors/windows inline with the breeze conditions (west to east in Perth) allows the most air flow (1)

This allows the breeze to be used to maximum effectiveness. (1)

1. Air is a very poor conductor of heat energy. Insulation bats consisting of fibre and air, conduct heat energy better than air.
2. Why do we install insulation bats when our ceilings are already full of air? (2)

Air can still transfer heat/energy via convection (1)

The insulation traps the air, stopping the convection current (1)

1. Some insulation bats have a shiny, foil side. Using physics terms, describe how the foil side increases the insulation’s effectiveness. (2)

Insulation bats have a shiny side to reflect radiation energy (1)

This stops energy from being passed through the insulation (1)

1. How can installing a solar hot water system of a roof help lower the temperature inside a house? (2)

The solar hot water system works by absorbing radiant energy from the sun. (1)

Installing it on the roof stops the roof from receiving that energy (1)

1. Name a passive heating technique and describe how it works, to help keep your house warmer in the wintertime (3)

Name of object – anything reasonable (1)

Uses radiant, conduction or convection in explanation (1)

Clear explanation (1)

1. With reference to heating and cooling explain the differences between synthetic grass and natural grass can have on the temperature of a house next to these objects (4)

Natural grass - when heat is absorbed, water is evaporated, taking energy with it (1)

Natural grass – keeps area cool by absorbing energy and turning it into potential chemical energy via photosynthesis (1)

Synthetic grass - can only absorb energy (1)

This energy (excess or defect) is transferred into the foundations through conduction (1)

End of Test