

Q4bii

Mark scheme: any four from

- MP1. cover traps air **IGNORE** 'traps heat'
- MP2. (trapped) air is a poor conductor / (good) insulator;
- MP3. plastic is a poor conductor / (good) insulator;
- MP4. conduction reduced **CONDONE** "conduction stopped"
- MP5. convection reduced / stopped;
- MP6. less evaporation (from water surface) **CONDONE** "no evaporation"

The plastic prevents the hot air molecules present in the water from escaping as plastic is a good insulator.

When the pool is covered by plastic cover, convectional currents is reduced because less warm air is replaced. Therefore, the air that is warmed is trapped above water, which causes the water to heat up again.

Because plastic is a thermal insulator, less thermal energy is lost to the surroundings.

The plastic cover traps air and the water which prevents any circulation and convection currents.

The air trapped is a poor conductor of heat so thermal energy transfer by conduction is reduced.

Q8b

Mark scheme: any four from

MP1. air resistance/drag increases (greatly) when parachute is opened;

ALLOW "upwards force"

MP2. idea that air resistance/drag is greater than the weight;

ALLOW upwards force is bigger than downwards force

MP3. (therefore) deceleration / upwards acceleration;

ALLOW idea of upwards resultant force; **IGNORE** "velocity decreases"

MP4. idea that air resistance/drag decreases with speed;

MP5. resultant force (eventually) becomes zero;

ALLOW "forces are balanced again"; **ALLOW** air resistance/drag = weight

MP6. constant speed achieved; **ALLOW** idea that there is no acceleration

When the parachute jumper, opens her parachute, the surface area massively increases which causes the air resistance to increase. The air resistance is greater than weight of the parachute jumper. Hence, the unbalanced force acts upwards. The velocity decreases and the jumper ~~decel~~ decelerates as she is moving in the opposite direction. As the velocity decreases, the air resistance also decreases until there is a point when both the air resistance and weight are balanced. There is no unbalanced force acting on her, no acceleration and she falls with constant velocity — terminal velocity.

The change in velocity takes place due to the unbalanced force acting opposite to the downward movement. Air resistance increases, causing the drag force to be greater than weight which causes deceleration as there is unbalanced force acting towards the direction of air resistance. As the time passes, the unbalanced force starts to decrease as air resistance decreases. At the point C, there is zero unbalanced force, therefore air resistance and weight are equal, which causes the parachute jumper to reach terminal velocity ~~again~~ again.