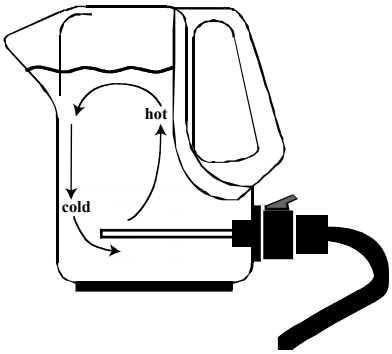
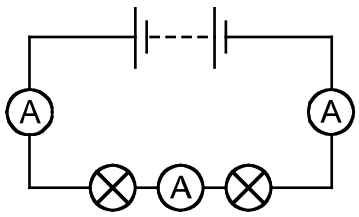
Assessment Schedule – 2005

Science: Describe aspects of physics (90191)

Evidence Statement

Question	Achievement	Achievement with Merit	Achievement with Excellence
1(a)	Correct solution $F_{gravity} = 150 \times 10$ $= 1\,500$ N		
1(b)		Correct solution $E_p = mgh$ $= 150 \times 10 \times 5\,000$ $= 7\,500\,000$ J	
1(c)	**Force -** Friction / Air Resistance / drag / wind resistance **Direction** – upwards **BOTH required**		
1(d)	Correct solution **or** unit	Correct solution **and** unit $F = ma$ $a = \frac{F}{m}$ $= 825 / 150$ $= 5.5$ ms^{-2} (m/s^2) or Nkg^{-1}	
1(e)	Idea that the parachute increases / causes the friction / drag / air resistance / wind resistance / surface area. **OR** Idea that the parachute causes an unbalanced force (reducing the speed).	Any ONE of the following: Increased surface area (or concept of) causes an increase in friction / drag / air resistance / wind resistance **OR** Friction is greater than gravity / weight force (causing the forces to be unbalanced).	**All** THREE ideas: Increased surface area (or concept of) causes an increase in friction / drag / air resistance / wind resistance **AND** Friction is greater than gravity / weight force (causing the forces to be unbalanced) leading to a reduction in speed**.**
1(f)	acceleration **OR** 5.5 ms^{-2} **OR** speed increasing		
1(g)	forces are balanced / in equilibrium. **OR** The net force is zero **OR** forces cancel each other **OR** friction force equals gravity force **OR** forces are equal and opposite.	The forces acting are balanced, because they are of equal size but opposite direction.	
1(h)		One correct distance (area under part of graph) calculated / shown **OR** correct working shown for the calculation of one distance.	Correct solution Distance travelled = area under graph D = ($\frac{1}{2} \times 10 \times 55$) + ($50 \times 55$) = 275 + 2 750 = 3 025 m

Question	Achievement	Achievement with Merit	Achievement with Excellence
2(a)	Conduction		
2(b)	Correctly drawn arrows to show convection currents  **up from element and down shown**		
2(c)	**EITHER** Warm particles / water rise and cold particles / water sink **OR** Warm water is less dense and rises. **OR** Cold water is more dense and sinks **OR** As water particles gain heat energy they move apart and therefore are less dense / rise. **OR** Cold water particles are closer together and therefore more dense / sink.	Uses **ONE** idea to **explain** convection: Warm water particles, (which have gained heat energy from the element), move apart and the water becomes less dense and therefore rises. **OR** Cold water particles are more closely packed and as a result become more dense therefore it sinks.	Uses **BOTH** ideas to **discuss** convection: Warm water particles, (which have gained heat energy from the element), move apart and the water becomes less dense and therefore rises. **AND** Cold water particles are more dense and therefore sink. **OR** Clear explanation of cold water replacing the warm water particles.
2(d)	Plastic is a (good) insulator / bad conductor (of heat energy). **OR** Definition of insulator Eg: Reduces heat loss through conduction **OR** Explains that the plastic prevents the conduction of heat **OR** Plastic **insulates** the jug. Note: If talk about electrical conductivity, negates.	Plastic is a good insulator / bad conductor of heat energy. **AND** This means that the heat (energy) from the water inside the jug will not pass through. Ie: Idea of heat transfer to the outside being prevented.	

Question	Achievement	Achievement with Merit	Achievement with Excellence
3(a)	Correct symbol and placement of ammeter in series in one of the places shown below.  		
3(b)	Correct solution V = 12/2 = 6 V		
3(c)	Correct solution I = V/R = 6 / 15 (or 12 / 30) = 0.4 A (check for follow-on from 3(b))		
3(d)	Correct unit **or** solution	Correct solution **and** unit $P = VI$ $= 6 \times 0.4$ = 2.4 W (allow for follow-on from 3(b), (c))	
3(e)	12 V		
3(f)	I_{Total} = sum of I in each branch = 0.8 + 0.8 = 1.6 A		
3(g)	The parallel circuit has less resistance than the series circuit (or vice versa). **OR** Circuit B has more pathways therefore it is able to **draw** more current than circuit A which has only one pathway.	When bulbs are placed in parallel it reduces the overall resistance of the circuit. A lower resistance results in a higher current. (or vice versa) **OR** Explains the difference in current between the circuits in terms of Ohm's Law in FULL.	
3(h)		Correct solution $R_{Total} = V_{Total} / I_{Total}$ = 12 / 1.6 = 7.5 Ω **OR** $1/R_T = 1/15 + 1/15 = 2/15$ $R_T = 7.5$ Ω (allow for follow-on from 3(f))	
3(i)	Correct unit J / Joule / kJ / kilojoule	**EITHER** Correctly calculated power / value $P = V I$ $= 12 \times 0.8$ = 9.6 **OR** Incorrectly calculated power correctly substituted into Energy = $P \times 600$ NB: <u>Must</u> show equation E = Pt **OR** Correct solution (5760) but wrong / no unit	Correct solution **and** unit $P = V I$ $= 12 \times 0.8$ = 9.6 Energy = $P t$ $= 9.6 \times (10 \times 60)$ $= 9.6 \times 600$ = 5 760 J or 5.76 kJ (Check for possible follow-on from 3(e))

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
TEN opportunities answered at Achievement (or higher). 10 × A	FOURTEEN opportunities answered with SIX at Merit level (or higher) and EIGHT at Achievement level. 6 × M *plus* 8 × A	SIXTEEN opportunities answered with TWO at Excellence level (with at least one from 1 (e) or 2 (c) and one of 1 (h) or 3 (i), SIX at Merit level and EIGHT at Achievement level. 2 × E *plus* 6 × M *plus* 8 × A