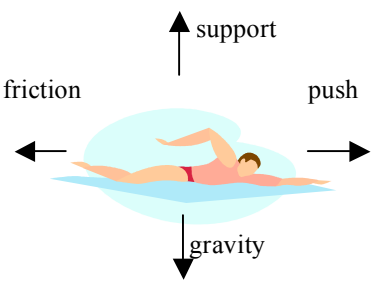
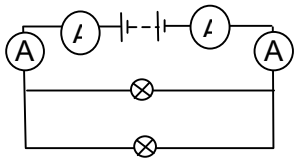
Assessment Schedule – 2007

Science: Describe aspects of physics (90191)

Evidence Statement

Q	Achievement	Achievement with Merit	Achievement with Excellence
1(a)	14 m s^{-1}		
1(b)	**ONE** of: • (Constant) deceleration • Slowing down • Reducing speed • -14ms^{-2}		
1(c)		Correct solution a = slope = 14 / 8 = 1.75 m s^{-2}	
1(d)	Push force is greater than friction **OR** Vice versa		
1(e)		Correct solution for one area.	Correct solution d = area under graph = (0.5 × 8 × 14) + (4 × 14) = 56 + 56 = 112 m
1(f)	**ONE** of: • Spikes increase friction. • Cause more traction/grip • Spikes increase the reaction/push/thrust force. • Leads to a greater acceleration.	Explains effect of spikes. (MUST refer to change in force(s)) Spikes on shoes increase the effect of friction. Resulting in a greater reaction/push/thrust force. **OR** Increase in friction leads to greater acceleration. **OR** Increase in reaction/push/thrust force leads to a greater acceleration.	
1(g)	Correct solution $v_{av} = \frac{d}{t}$ = (2 × 50) / 90 = 1.11 m s^{-1}		
1(h)	Correct labels and directions for ALL 4 forces  		

1(i)	Correct solution $F_g = mg$ $= 100 \times 10$ $= 1000$ N		
1(j)	Correct unit OR solution Joules / J / Nm	Correct solution AND unit $W = F \times d$ or $W = E_p = mgh$ $= 100 \times 10 \times 1.5$ $= 1500$ J (1.5kJ) **Possible f/o from 1(i)**	
1(k)	Energy change from: Gravitational potential energy or E_p or GPE To Kinetic energy + (heat) + (sound)		
2(a)	Radiation		
2(b)	**ONE** of: • Black is a (good) absorber of radiation/heat/energy. • Shiny/light colours reflect radiation/heat/energy. • Black reflects little radiation/heat/energy. • Black is a good emitter of radiation. • Black reflects little radiation/heat/energy. • Black emits heat well.	Explains statement. Black is a (good) absorber, unlike shiny / light colour which reflect radiation/heat/energy. **OR** Black is a (good) absorber meaning that it is able to transfer the heat energy <u>quickly</u> to the water.	
2(c)	Convection		
2(d)	**ONE** of the following • Hot water is less dense than cold water. • If hot water added at bottom hot water rises. • Convection currents will not occur if heated water enters at top. • If hot water enters at top hot water will stay at top/cold water at bottom. • Convection currents will occur if heated water enters at bottom.	Explains **ONE** achieved statement. Explains difference between hot and cold water in terms of density. **OR** Explains convection current in terms of density. **OR** Explains that the hot water will stay at the top of the pool as it is less dense than the cold. **OR** Explains that the cold water will stay at the bottom of the pool, as it is more dense that the hot.	Explains **and** compares the top and bottom of pool. Hot water is less dense than cold water, so it will rise causing the cold water to sink and fill its place, creating convection currents. If the hot water entered at the top it would stay there (and there would be no convection currents occurring) and therefore the water below would not heat up.
3(a)	Correct solution $V = IR$ $= 1.2 \times 4$ $= 4.8$ V		
3(b)	Correct unit OR solution Watts / W/kW/Joules per second / J s^{-1}	Correct solution AND unit $P = VI$ $= 4.8 \times 1.2$ $= 5.76$ W **Possible follow on from 3(a)**	

3(c)	Basic definition Joules of energy (5.76 J) per second OR Rate of energy conversion/supply OR Energy / time	Explains in terms of lamp Power reading tells you how many joules of energy (5.76 J) are being converted into heat and/or light per second (by the lamp). OR Tells you the rate at which electrical energy is converted into light and / or heat.	
3(d)		**EITHER** Correctly calculated voltage $V_{\text{lamp A}} = 12 - 4.8$ $= 7.2$ V **Possible f / o from 3(a).** **OR** Incorrectly calculated voltage (MUST show working) correctly substituted into $R = \frac{V}{1.2}$ NB: MUST show equation $R = \frac{V}{I}$	Correct solution $V_{\text{lamp A}} = 12 - 4.8 = 7.2$ V Possible f / o from 3(a). $R = \frac{V}{I}$ $= \frac{7.2}{1.2}$ $= 6\ \Omega$ **OR** $R_{\text{TOTAL}} = \frac{V_{\text{TOTAL}}}{I_{\text{TOTAL}}}$ $= \frac{12}{1.2}$ $= 10\Omega$ $R_{\mathbf{B}} = R_{\text{TOTAL}} - 4\ \Omega$ $= 6\ \Omega$
3(e)	Lamp B is brighter than 4 Ω lamp. **(possible f/o from 3(d))**		
3(f)	Correct placement in **ONE** of places shown below. 		
3(g)	**ONE** of: • Parallel circuit has less resistance. OR vice versa • Parallel circuit has an extra pathway OR vice versa • Both bulbs receive 12V (compared with series circuit).	Explain in terms of resistance and pathways. Parallel circuit has less resistance than the series circuit due to an increased number of pathways. **OR** Vice versa **OR** Explains in terms of V=IR and fact that they now receive 12V leading to a higher current.	

3(h)	Correct identification. 4 Ω lamp is brighter. **(possible f/o from 3(d)).**	Correct identification and partially explains: 4 Ω lamp is brighter. **PLUS** Has a lower resistance therefore more current flowing through it. **OR** Has a greater power output than lamp B, because it has a lower resistance/ increased current.	Correct identification and explains fully: 4 Ω lamp is brighter. **PLUS** Because the 4 Ω lamp has less resistance, a greater current will flow through it. **PLUS** This results in a greater power output than lamp B (which has a higher resistance) **OR** This results in 4Ω lamp converting energy per second faster than B.

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
TWELVE questions answered correctly. Minimum of 12 A/M/E	FIFTEEN questions answered correctly, including at least SIX at Merit level. Minimum of 6 M/E + 9 A	SEVENTEEN questions answered correctly, including at least TWO at Excellence level (ONE from either 1(e) or 3(d) and ONE from 2(d) or 3(h)) and at least SIX at Merit level. Minimum of 2 E + 6 M + 9 A