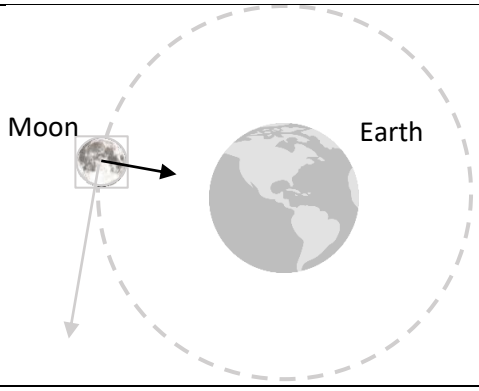
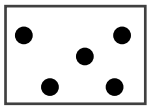
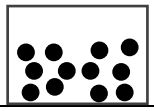
DEPARTMENT FOR CURRICULUM,
LIFELONG LEARNING AND EMPLOYABILITY
Directorate for Learning and Assessment Programmes
Educational Assessment Unit

Annual Examinations for Secondary Schools 2022

YEAR 9 PHYSICS MARKING SCHEME

SECTION A				**40 MARKS**	
Question			**Answer**	**Mark**	**Additional Guidelines**
1	**a**		galaxy eight 365¼ or 365.25	1 1 1	Accept also 365
1	**b**	**i.**	C, D	1	Both must be correct for mark to be awarded.
1	**b**	**ii.**	B, D	1	Both must be correct for mark to be awarded.
1	**c**	**i.**		1	
1	**c**	**ii.**	Gravitational force	1	Accept force of gravity or gravitational pull
1	**c**	**iii.**	distance	1	

2	**a**		 Box A Particles in a gas  Box B Particles in a liquid	1 1	
2	**b**	**i.**	Vibrate about a fixed (mean) position.	1	
2	**b**	**ii.**	Move at random with high speeds	1	
2	**c**		Particles in a gas are far apart whilst particles in solids and liquids are not.	1	
2	**d**		$\rho = \frac{m}{V} = \frac{0.0648}{0.000024} = 2700\ \text{kg/m}^3$	1 1	Correct answer and unit
2	**e**		The density of aluminium is larger than the density of water so it will sink.	1	

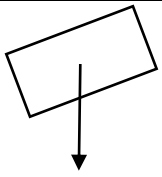
3	**a**		Stirrer	1	
3	**b**		t = 7 × 60 = 420 s E = P × t = 50 × 420 = 21000 J	1 1 1	Changing minutes to seconds Working E = P × t Correct answer and unit
3	**c**		Δθ = 31 – 23 = 8°C	1	
3	**d**		$c = \frac{Q}{m\Delta\theta} = \frac{21\,000}{0.5 \times 8} = 5250\ \text{J/kg °C}$	1 1	Correct answer and unit
3	**e**		Heat energy losses	1	

4	**a**	**i.**	0.05	1 1	For correct reading. For correct conversion.
4	**a**	ii.	Directly proportional	1	
4	**b**	**i.**	Smaller than	1	
4	**b**	ii.	For the same amount of force, a larger extension is obtained.	1	Accept any other reasonable answer.

4	**b**	**iii.**	No, he is not correct. The extension obtained with a 10 N force is much larger than expected.	1 1	Accept any other reasonable answer.
4	**b**	**iv.**	The spring will be permanently deformed.	1	Accept any other correct answer.

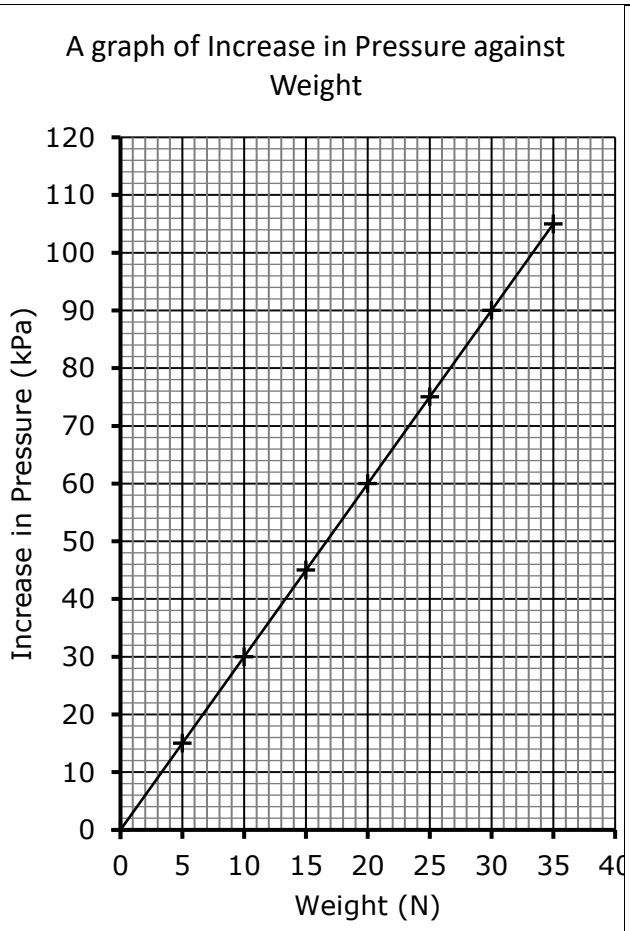
5	**a**		The turning effect of a force.	1	Accept any other correct answers.
5	**b**		Crate	1	
5	**c**		Z. The moment is largest at this point as it has the largest distance from the pivot.	1 1	
5	**d**	**i.**	larger than	1	
5	**d**	**ii.**	In equilibrium, the total anticlockwise moments equal the total clockwise moments $F \times 5 = 10 \times 25$ $F = 50\ \text{N}$	1 1 1	

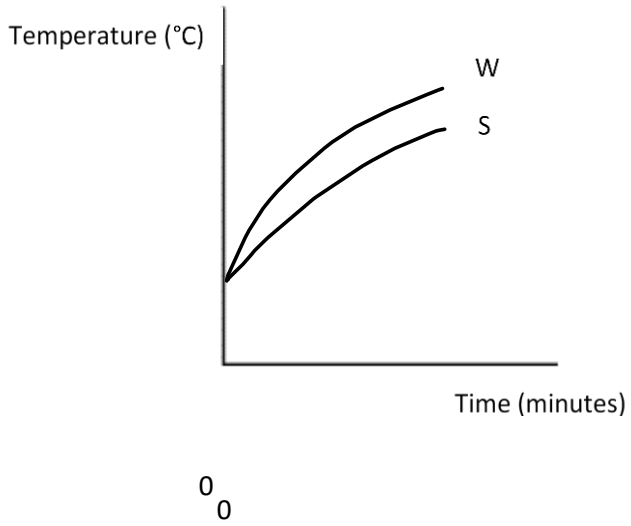
SECTION B			**45 MARKS**
Question	**Answer**	**Mark**	**Additional Guidelines**

6	**a**		 	1	
6	**b**		Chemical → Kinetic Energy → Gravitational Potential energy	3	
6	**c**		W = mg = 28 × 10 = 280 N	1	
6	**d**		$\text{PE} = \text{mgh} = 28 \times 10 \times\ 4 = 1120\ \text{J}$	2	Deduct one mark for missing or incorrect units.

6	**e**		$\mathrm{P} = \frac{E}{t} = \frac{1120}{7} = 160\ \mathrm{W}$	2	Deduct one mark for missing or incorrect units.
6	**f**		$\text{Power Input} = \frac{\text{Power output}}{\text{Efficiency}}$ $= \frac{160}{60} \times 100 = 267\ \mathrm{W}$	1 1	
6	**g**		Because of energy losses due to friction which produce heat and sound	1 1	
6	**h**		$PE\ lost = KE\ gained$ $mgh = \frac{1}{2}mv^2$ $1120 = \frac{1}{2} \times 28 \times v^2$ $v = \sqrt{80} = 8.9\ \mathrm{m/s}$	2	

7	**a**	**i**	Decreases	1	
7	**a**	**ii**	remains the same	1	
7	**a**	**iii**	increases	1	
7	**b**		$P = \frac{F}{A} = \frac{4}{0.0002} = 20\,000\ \mathrm{Pa}$	2	Deduct 1 mark for missing or incorrect units.

7	**c**	**i**		5	1 mark for correct labelling of axis. 1 mark for title. 1 mark for correct size. 2 marks for plotting points correctly.
7	**c**	**ii**	Straight line passing through the origin.	1	
7	**c**	**iii**	105 kPa = 105 000 Pa $P = \frac{F}{A}$ $105\,000 = \frac{35}{A}$ $A = \frac{35}{105\,000}$ $A = 3.33 \times 10^{-4}\ \mathrm{m}^2$ or $A = 0.000333\ \mathrm{m}^2$	1 1 1	Accept any correct corresponding pair of values. Deduct 1 mark for missing or incorrect units.
7	**d**		Atmospheric Pressure	1	

8	**a**		radiation reflecting	1 1	
8	**b**	**i**	Heater H marked in any position in which it is equidistant from each shoebox.	1	
8	**b**	**i**	Sun Penthouse	1 1	
8	**b**	**iii**	- She switches on the heater and starts the stopwatch - Temperature readings of each shoebox are noted at regular time intervals - Results are tabulated	1 1 1	
8	**b**	**iv**		4	1 mark for each correct label of axes 1 mark for correct positions of W and S 1 mark for correct shape of graphs (graphs must show an increase, not necessarily curved.)
8	**b**	**v**	Shoeboxes are identical in size / thickness / material.	1	Accept other correct precautions
8	**c**		Any two correct answers: E.g. Double glazing, Roof insulation Double walls	1 1	Accept other correct answers

Please Note: When marking questions, apply the '**follow through**' rule. This means that if a student gives a wrong answer for part (a) of a question and then uses it in subsequent answers, marks should be deducted for part (a) only. The subsequent parts should be given full marks if these are relatively correct.