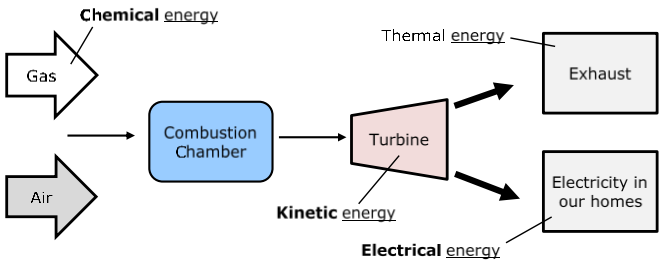
DEPARTMENT FOR CURRICULUM,
LIFELONG LEARNING AND EMPLOYABILITY
Directorate for Learning and Assessment Programmes
Educational Assessment Unit

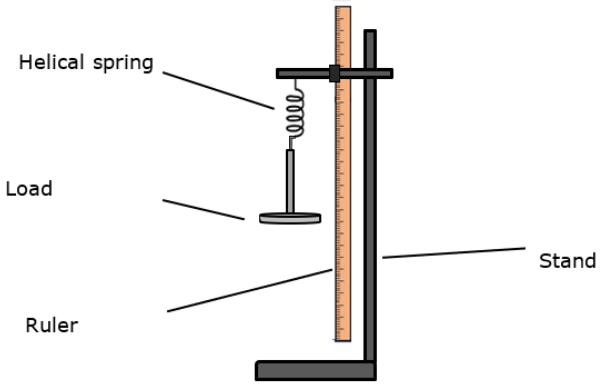
Track 2

Annual Examinations for Secondary Schools 2022

YEAR 11 PHYSICS MARKING SCHEME

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.

SECTION A			40 MARKS
Question	Answer	Mark	Additional Guidelines
1 a	Non-renewable energy resources are available in limited supplies. Renewable resources are replenished naturally and over relatively short periods of time.	1 1	Accept any reasonable answer
b	<table><tr><td>Renewable sources of energy</td><td>Non-Renewable sources of energy</td></tr><tr><td>Hydroelectric Geothermal Wind</td><td>Nuclear</td></tr></table>	2	Award 1 mark if two or three correct answers are given.
c	Solar energy	1	Accept any reasonable answer
d	Advantage: No Pollution Disadvantage: Not always available	1 1	Accept any reasonable answers related to part c)
e		1 1 1	Chemical Kinetic Electrical

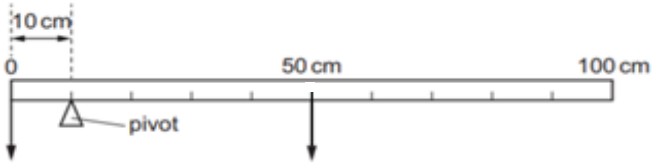
2	a		The load is directly proportional to the extension, provided that the elastic limit has not been exceeded.	1 1	Accept limit of proportionality.
	b			1 1	1 mark for each pair of correct answers.
	c		Read length at eye level to avoid parallax error.	1	Accept also use a pointer.
	d	i		1	

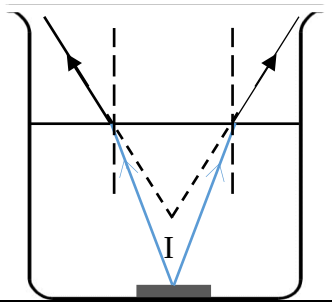
Load (N)	0	1	2	3	4	5	6
Length of Spring (cm)	2	2.4	2.8	3.2	3.6	4.2	5.1
Extension (cm)	0	0.4	0.8	1.2	1.6	2.2	3.1

	d	ii	0.02	1	
	d	iii	5	1	
	e	i	Graph B	1	
	e	ii	Graph A	1	

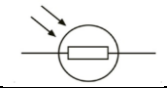
3	a	i	Wavelength	1	
		ii	$\frac{10}{5} = 2 \text{ cm} = 0.02 \text{ m}$	2	Accept answers in cm or m
	b	i	$\frac{2}{5} = 0.4 \text{ s}$	1	
		ii	$f = \frac{1}{T} = \frac{1}{0.4} = 2.5 \text{ Hz}$	1	
	c	i	Decreases	1	
		ii	Decreases	1	
		iii	Remains the same	1	
	d	i	Amplitude is a point with the largest displacement from the rest position.	1	Accept any other correct definition
		ii	K.	1	

4	a	i	He measures the distance from mic A to mic B. He bursts the balloon using the pin and reads time from the timer. He uses the equation speed $= \frac{\text{distance}}{\text{time}}$	1 1 1	Accept any other correct answer.
		ii	Read the distance from the ruler at eye level.	1	Accept any other correct answer.
		iii	speed $= \frac{\text{distance}}{\text{time}} = \frac{0.82}{0.0024} = 341.67$ m/s	2	Deduct 1 mark for missing or incorrect unit.
	b	i	Reflection of sound	1	
		ii	Distance = $480 \times 2 = 960$ m speed $= \frac{\text{distance}}{\text{time}} = \frac{960}{3} = 320$ m/s	1 1	Accept other correct methods
		iii	In Elisa's method there is more human error.	1	Accept other correct answers.

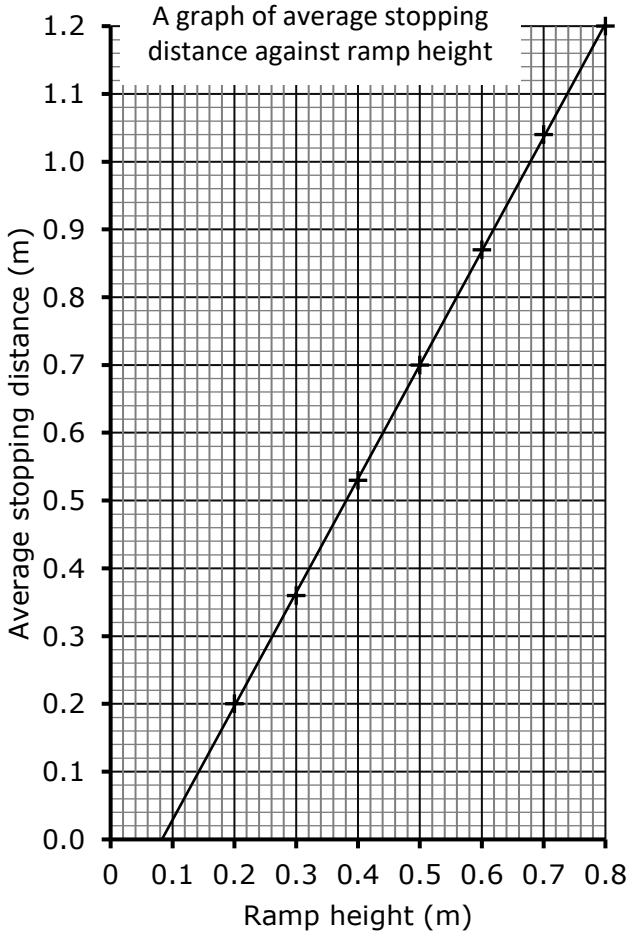
5	a		In equilibrium: Total upward forces are equal to total downward forces. Total clockwise moments are equal to total anti-clockwise moments.	1 1	
	b	i	Correct position of the weight.  Weight	1	
		ii	If balanced: Total clockwise moment = Total anti-clockwise moment W × 40 = 5 × 10 W = 1.25 N	2	
		iii	Reaction = 5 + 1.25 = 6.25 N	1	
		iv	Anti-clockwise	1	
	c	i	Move the cue slowly on the pivot until it is balanced.	2	Accept other correct answers.
		ii	A point from which the weight of a body or system may be considered to act.	1	Accept other correct answers.

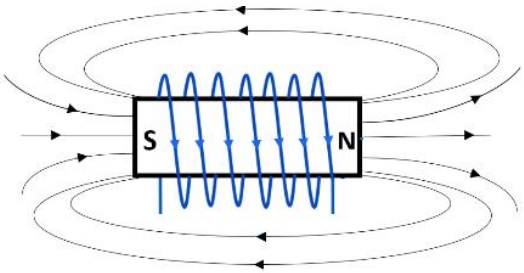
6	a	i	Real	1	
		ii	Apparent	1	
		Iii	Virtual image	1	
		iv	$n = \frac{Real\ depth}{Apparent\ depth} = \frac{19.5}{15} = 1.3$	2	
	b			3	1 mark for correct drawing of normals. 1 mark for correct refracted rays. 1 mark for correct position of image.
	c		The incident ray in water has an angle larger than the critical angle, and total internal reflection occurs.	1 1	

7	a		$\frac{1}{R_{total}} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{12} + \frac{1}{6} = \frac{3}{12}$ $R_{total} = 4\ \Omega$	1 1	Deduct one mark for missing or incorrect units.
	b		$V = IR$ $V = 2 \times 4$ $V = 8\ \text{V}$	1 1	Deduct one mark for missing or incorrect units.
	c		$V = V_1 + V_2$ $12 = 8 + V_2$ $V_2 = 12 - 8 = 4\ \text{V}$	1	
	d		$V = IR$ $I = \frac{V}{R} = \frac{4}{3}\ A$ $I = 1.33\ \text{A}$	1 1	Deduct one mark for missing or incorrect units.
	e		$I = 2 - 1.33 = 0.67\ \text{A}$	1	
	f		$V = IR$ $R = \frac{4}{0.67}$ $R = 5.97 \cong 6\ \Omega$	1 1	

8	a		$E = Pt = \frac{100}{1000} \times 2 \times 14 \times 24 = 67.2$ kWh	3	1 mark for changing W to kW
	b		1 kWh costs 13 cents 67.2 kWh costs 67.2 × 13 = 873.6 c	2	Accept also €8.74
	c	i	Light Dependent Resistor	1	
	c	ii		1	
	c	iii	The bulbs will switch on for a number of hours only, so the cost will be less.	1	Accept any other reasonable answer.
	c	iv	Light intensity meter	1	Accept any other reasonable answer
	c	v	A non-ohmic conductor is one which does not obey Ohm's Law.	1	

SECTION B			45 MARKS	
Question			Answer	Mark	Additional Guidelines
9	a	i	$P = hpg = 500 \times 1020 \times 10$ $= 5\ 100\ 000$ Pa	2	Deduct one mark for missing or incorrect unit
9	a	ii	Air pressure = 101 000 Pa Total pressure = 5 100 000 + 101 000 = 5 201 000 Pa	1 1	
9	a	iii	$\rho = \frac{m}{v} = \frac{130}{0.16} = 812.5$ kg / m^3	2	Deduct one mark for missing or incorrect unit
9	a	iv	Rises to the surface Smaller than	1 1	
9	b	i	Liquids are incompressible or Pressure (acts)/(is transmitted) equally in all directions in liquids	1	
9	b	ii	$F = PA = 25000 \times 0.01 = 250$ N	2	Deduct 1 mark for missing or incorrect unit.
9	b	iii	Equal to Greater than	1 1	
9	b	iv	Pressure decreases. Air is compressible so not all pressure is transmitted	1 1	Deduct 1 mark for missing or incorrect unit.

10	a	i	3, 1, 4, 2	3	
10	a	ii	Use the same trolley / same pizza box throughout the experiment.	1	Accept any other correct answers.
10	b	i	Graph • has correctly labelled and positioned axes; • is drawn over at least 70% of graph paper; • has the correct title; • is correctly plotted; • straight line through all the points.  	1 1 1 1 1	
10	b	ii	0.65 m	1	
10	c	i	1^{st} stays at rest.	1 1	
10	c	ii	$s = ut + \frac{1}{2}at^2$ $1.28 = 0 \times t + \frac{1}{2} \times 10 \times t^2$ $\frac{1.28}{5} = t^2$ $0.51\ s = t$	1 1	
10	c	iii	more	1	

11	a	i		1 1 1	correct field pattern correct labelling of poles correct direction of field lines
11	a	ii	-an opposite -attracted to -incomplete	1 1 1	
11	a	iii	Because they are not ferromagnetic materials.	1	Accept other correct answers
11	a	iv	Any two of: More turns of coil / weaker springy metal strip / less distance between electromagnet and iron rod.	1 1	Accept other correct answers
11	b	i	-perpendicular -changes -higher -larger	1 1 1 1	
11	b	ii	outwards	1	
11	b	iii	Fleming's left hand rule	1	