

Physics B

General Certificate of Secondary Education **B651/01**

Unit 1: Modules P1, P2, P3

Mark Scheme for June 2010

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Question		Expected Answers	Marks	Additional Guidance
1	(a)	A (1)	1	more than one answer scores (0) allow correct answer underlined, circled or ticked in list if answer line is blank
	(b)	B (1)	1	more than one answer scores (0) allow correct answer underlined, circled or ticked in list if answer line is blank
	(c) (i)	°C (1)	1	more than one answer scores (0) allow correct answer underlined, circled or ticked in list if answer line is blank allow C
	(ii)	J (1)	1	more than one answer scores (0) allow correct answer underlined, circled or ticked in list if answer line is blank
Total			4	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	walls (1)	1	more than one answer scores (0) allow correct answer underlined, circled or ticked in list if answer line is blank
	(b)	(i) double glaze (1)	1	allow use of the following: triple glazing (1) curtains / blinds (1) heat reflective film (1) Pilkington K glass(1) smaller windows (1) secondary glazing (1) shutters (1) draught proof the windows /sponge/foam strip(1) plastic over windows(1) ignore thicker glass ignore turn thermostat down
		(ii) loft insulation / roof insulation / AW (1)	1	allow attic insulation (1) fibreglass/any suitable named material (1) ignore thicker tiles not just insulation

Question		Expected Answers	Marks	Additional Guidance
(c)	(i)	(good) insulator (1)	1	allow higher level answers about (trapped air) reducing convection (1) ignore trapped heat
	(ii)	4 (1)	1	
(d)		any 2 from: heat or infrared or IR or radiation reflects (1) idea of back (into room) / house (1) heating needed less often / AW (1)	2	not refraction but refracts heat / IR / radiation back into the room or house (1) ignore bounces ignore heat particles eg reflects heat particles (0) allow reflects heat particles back into the room (1) ignore hot air but reflects hot air back into room (1) ignore less heat escapes (through the wall) ignore references to insulation
		Total	7	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	C (1) A and D (1)	2	more than one answer scores (0) for amplitude answer not B for amplitude answer both needed for the wavelength mark in either order Mark line first otherwise allow correct answer marked on diagram
	(b) (i)	ultraviolet (1)	1	more than one answer scores (0)
	(ii)	microwave (1)	1	more than one answer scores (0)
	(c) (i)	number of waves or oscillations or vibrations or wavelengths or cycles in a second / AW (1)	1	allow number of waves per unit time / in a period of time or named period of time (1) allow how many waves each second (1) allow how often a wave passes a point per second (1)
	(ii)	1 (2) but if answer incorrect 0.2 x 5 scores (1)	2	allow 100 (2) if units m/s are clearly crossed out and cm/s is the unit given by the candidate allow 0.2 x 500 if answer is 100 (1)
		Total	7	

Question		Expected Answers	Marks	Additional Guidance
4		any two from (more) energy use / burning fossil fuels AW (1) more CO ₂ / methane(1) deforestation/AW (1)	2	allow (more) cars / transport / manufacturing / power stations allow higher level answers eg (more) greenhouse gases produced (1) ignore reference to ozone layer/CFCs ignore pollution
		Total	2	

Question		Expected Answers	Marks	Additional Guidance
5	(a)	highest power / AW and longest time / AW (1)	1	both needed allow more watts and used more (1) allow uses the most kWh or the most units (of electricity)/energy(1) allow 3 x 2000 (= 6000) which is the highest ignore used more times per week/more often
	(b)	(i) 3 (2) if answer is incorrect 1.5 x 2 (1)	2	
		(ii) 36 (pence) (1)	1	no working mark allow £0.36 allow ecf from 5(bi) eg 3000 in (5bi) then 36000(pence) = (1)
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
6	(a)	heat (1) light (1)	2	any order allow solar once eg light and solar = (2) solar and heat = (2) solar and solar = (1) allow infrared for heat
	(b)	any two from (energy / convection currents) create wind (1) turns turbine (1) (turbine) produces electrical energy /electricity(1)	2	any mention of wind scores (1) mention of wind turbine/mill scores (2) allow creates wave power (1)
	(c)	(i)	1	Both words required Not Sun flare
		(ii)	1	allow named scientific use eg Hubble / space telescope / international space station not just 'weather' allow any valid photographic use not just mobile phone unless simple explanation eg .making an international call [1] not just TV allow Sky TV/TV transmission/AW (1)
		Total	6	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	gamma / γ (1)	1	allow correct answer ringed ticked or underlined if answer line is blank
	(b)	ionised (1)	1	allow become charged / ions formed (1) ignore references to speed of collision or atoms damaged / break up allow correct description eg electron knocked off or lost or gained
	(c)	rocks / soil / living things / cosmic rays or cosmic radiation / building materials or named building material / isotopes of carbon (1)	1	allow <u>nuclear</u> testing or <u>nuclear</u> bombs or <u>nuclear</u> weapons / <u>nuclear</u> accidents / example of medical use / radon / <u>nuclear</u> waste ignore nuclear power ignore nuclear fallout unless qualified ignore merely buildings or equipment or hospitals ignore radioactive materials ignore food or drink ignore simple references to the Sun eg from the Sun (0) cosmic rays / gamma from the Sun (1) alpha / beta from Sun (0) not X-rays microwaves any incorrect response (in a list) negates the mark
Total			3	

Question		Expected Answers	Marks	Additional Guidance
8	(a)	move magnet / AW (1) or coil / AW (1)	1	Eg place magnet in a coil/nearer coil (1)
	(b)	direct (current) / dc / DC (1)	1	
Total			2	

Question		Expected Answers	Marks	Additional Guidance
9	(a)		4	all 5 correct (4) 3 or 4 correct (3) 2 correct (2) 1 correct (1) ignore black hole – light cannot escape from it
	(b)	(huge) explosion / expansion /Big Bang(1)	1	ignore any reference to pre-existing matter
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
10		distance (1) stopwatch / stop-clock (1) m/s / metres per second / ms ⁻¹ / AW (1)	3	allow length (1) not watch / clock / timer allow any reasonable distance per unit time e.g. mph / km/h not mps
		Total	3	

Question		Expected Answers	Marks	Additional Guidance
11	(a)	53 (m) (1)	1	
	(b)	(i) distance car moves (1) whilst driver reacts/AW (1)	2	allow how far but not how long allow reaction time x speed of car (2) allow the distance to begin braking (1)
		(ii) drugs / alcohol / tiredness / lack of concentration (1)	1	allow how tired you are allow drinking or intoxication (1) allow older (1) allow distractions or named distraction eg mobile phone (use) or children in back of car or passenger talking or radio (on) (1) ignore references to weather but eg bad weather can distract (the driver) (1) eg if its snowing its hard to concentrate (1)
	(c)	reduced risk of skidding or stops skidding / better grip / more friction with road or tyres or wheels / stop car sliding sideways or slipping / helps stop wheels or tyres spinning or locking (1)	1	allow reduces braking / stopping distance (1) allow gives more traction / better traction (1) not controls traction (0) allow examples eg help car stay on the road gives driver more or better control car will slow down faster or in shorter time quicker braking better steering ignore 'helps avoid a crash'
Total			5	

Question		Expected Answers	Marks	Additional Guidance
12	(a)	any two from petrol (1) diesel (1) LPG (1)	2	allow bio-diesel not 'gas'
	(b) (i)	motorbike (1)	1	allow 25 (1) more than one answer scores (0) allow correct answer underlined, circled or ticked in list if answer line is blank
	(ii)	10 (litres) (1)	1	
	(iii)	more or lots of people carried / more cars needed to carry 60 people / less fuel per person / AW (1)	1	allow 'need 12 cars' (1) ignore 60 cars needed ignore references to engine size
	(c)	any one from batteries charged/idea of charging (1) solar power (1)	1	Not just batteries
Total			6	

Question		Expected Answers	Marks	Additional Guidance
13	(a)	800 (J) (2) but if answer incorrect 400 x 2 (1)	2	
	(b)	potential / GPE / PE /gravitational (1)	1	not gravity
	(c) (i)	Increase/decrease speed / AW (1)	1	allow change in speed or velocity /AW(1) allow goes faster/slower(1)
	(ii)	weight (1)	1	allow gravity (1)
	(iii)	kinetic / movement (1)	1	
		Total	6	

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