

Physics B

General Certificate of Secondary Education

Unit **B652/01**: Unit 2 – Modules P4, P5, P6 (Foundation Tier)

Mark Scheme for January 2012

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All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Annotations

Annotations used in scoris

Annotation	Meaning
	correct response
	incorrect response
	benefit of the doubt
	benefit of the doubt not given
	error carried forward
	information omitted
	ignore
	reject
	contradiction

Abbreviations, annotations and conventions used in the detailed Mark Scheme.

- / = alternative and acceptable answers for the same marking point
- (1) = separates marking points
- allow = answers that can be accepted
- not = answers which are not worthy of credit
- reject = answers which are not worthy of credit
- ignore = statements which are irrelevant
- () = words which are not essential to gain credit
- = underlined words must be present in answer to score a mark (although not correctly spelt unless otherwise stated)
- ecf = error carried forward
- AW = alternative wording
- ora = or reverse argument

Question			Answer	Marks	Guidance
1	(a)	(i)	neutral (1)	1	mark the answer line first, if no answer on the line then mark the answers on list ie circled or indicated more than one answer scores 0
		(ii)	earth (1)	1	mark the answer line first, if no answer on the line then mark the answers on list ie circled or indicated more than one answer scores 0
		(iii)	safety / prevent (electrical) fires (1)	1	allow higher level answers e.g. limits current / blows if too much current or electricity / prevents flex or circuit overheating / prevents further damage to the appliance (1) ignore just limits or switches off the electricity e.g. stops too much electricity getting to appliance / stops or cuts off the electricity not fuse 'blows up'
	(b)		live and neutral (1)	1	mark the answer line first, if no answer on the line then mark the answers on list ie circled or indicated more than one answer scores 0
			Total	4	

Question			Answer	Marks	Guidance
2	(a)	(i)	decays (1)	1	allow emissions / counts / disintegrations (1) ignore radioactivity
		(ii)	reduces (over time) / AW (1)	1	allow reduced emissions (1)
	(b)		idea of treating cancer / tumour (1) kills / destroys cells (1)	2	max 1 mark if list given e.g. treats cancer and kidney stones allow a named cancer e.g. cancer of the cervix (1) allow treats cancer patients (1) ignore burns cells / damages cells ignore chemotherapy allow kills cancer cells (2)
	(c)		kills / destroys bacteria / microbes (1)	1	allow to sterilise (equipment) / ensure there are no bacteria or microbes (on the equipment) (1) ignore cleaning
			Total	5	

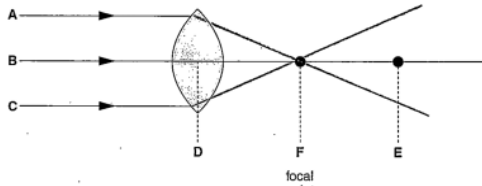
Question		Answer	Marks	Guidance
3	(a)	coal nuclear renewable (1)	1	all three in correct order required for mark
	(b) (i)	uranium (1)	1	allow plutonium (1)
	(ii)	chain (1) heating water / making steam / AW (1)	2	allow fission (1) not fusion allow boiling water (1)
	(c)	(place materials) in reactor / core (1)	1	ignore 'put in nuclear power station'
Total			5	

Question		Answer	Marks	Guidance
4	(a)	(number of) waves per second (1)	1	allow (number of) waves per unit time / AW (1) allow (number of) vibrations per second or per unit time (1) allow other named examples of time e.g. waves per minute (1)
	(b)	any one from scanning (1) cleaning (equipment) (1) breaking / treating (kidney) stones (1)	1	allow baby or pregnancy scan / to confirm pregnancy (1) allow to produce images / picture of body tissues or (unborn) baby(1) ignore look at or see (unborn) baby (in womb) ignore to check the body e.g. to check ears / heart / breathing allow ultrasonic toothbrush / dental treatment (1) allow to break up lens in cataract surgery (1) allow treatment of soft tissue damage (1) allow to measure speed of blood (flow in body) (1) ignore to measure heart rate allow to treat cancer (1)
Total			2	

Question			Answer	Marks	Guidance
5	(a)	(i)	(charged paddles placed on) chest / AW (1) good electrical contact (1)	2	allow make sure it is charged up enough (1) ignore place charged paddles on heart ignore any reference to how paddles are charged allow dries chest / shaves chest / puts gel on chest (1) allow puts conducting pads on chest (1)
		(ii)	(heart muscle) contracts (1)	1	ignore heart starts beating / heart (re)starts / heart gets shocked / heart pumps / spasm
	(b)		any one from idea of where there is a fire / explosion risk (1) idea of where there is a danger to electrical / electronic equipment (1)	1	allow named examples e.g. refuelling (a plane) / in a petrol station / tanker / operating theatre / flour mills / lightning (1) ignore unqualified reference to (excess) oxygen ignore clothing clings / dust on TV / shock
			Total	4	

Question		Answer	Marks	Guidance
6	(a)	Moon (1)	1	
	(b)	(i) gravity (1)	1	allow gravitational (force) (1) allow centripetal (force) (1) not gravitational potential / gravitational (potential) energy / PE / GPE
		(ii) any one from (tele)communications (1) TV (signals) (1) radio (signals) (1) mobile phone (signals) / satellite phones (1) weather forecasting / predicting / monitoring (1) spying / military use (1) surveying / producing images or photographs (1) GPS (1) (space) telescope (1)	1	allow examples of communications e.g. to send signals / to send pictures (1) ignore unqualified reference to weather ignore 'phone hacking'
		Total	3	

Question			Answer	Marks	Guidance
7	(a)	(i)	spread around mountain (1) reflected or bounce from atmosphere (1)	2	maximum 2 marks allow go over the mountain (1) allow diffraction (2) ignore bend or refract over the mountain ignore go through the mountain allow bounce from ionosphere (1) allow reflected from upper atmosphere / reflected from ionosphere (2) as extra marking point allow by use of a satellite / relay stations (1)
		(ii)	aerial (1)	1	allow antenna (1)
		(iii)	(satellite) dish (1)	1	ignore sky allow aerial / antenna
	(b)		long(er) / AW (1)	1	allow bigger (1) allow measured in named large(r) units e.g. metres / kilometres (1)
			Total	5	

Question			Answer	Marks	Guidance
8	(a)	(i)	ray A and ray C touching or through point F (1)	1	
		(ii)	D and F (1)	1	either order
		(iii)	(focal length) increases / AW (1)	1	
	(b)		projector / camera (1) either real image (1) or on screen / AW (1)	2	maximum 2 marks allow magnifying glass (1) with virtual image (1) allow microscope (1) with real / virtual image (1) allow telescope (1) and real image (1) (by objective lens) allow telescope (1) and virtual image (1) (by eye piece) allow specs / glasses / contact lenses / lens in the eye (1) real image (1) on retina / back of eye (1)
			Total	5	

Question		Answer	Marks	Guidance
9	(a)	increases / AW (1)	1	allow add together / (now) 27 (m/s) (1)
	(b)	3600 (kg m/s) (2) but if answer incorrect 300 or $(80 + 220) \times 12$ (1)	2	
	(c)	14.5 (m/s) (2) but if answer incorrect $12 + (0.5 \times 5)$ (1) or 2.5 (1)	2	
	(d)	288 (m) (2) but if answer incorrect $(15 + 33) \times 12 / 2$ (1) or $48 \times 12 / 2$ (1) or 48×6 (1)	2	
		Total	7	

Question			Answer	Marks	Guidance
10	(a)	(i)	Y (1)	1	mark the answer line first, if no answer on the line then mark the answers on list i.e. circled or indicated more than one answer scores 0
		(ii)	U (1)	1	mark the answer line first, if no answer on the line then mark the answers on list i.e. circled or indicated more than one answer scores 0
	(b)		20 (Ω) (2) but if answer is incorrect 8 \div 0.4 (1)	2	
	(c)		35 (Ω) (1)	1	mark the answer line first, if no answer on the line then mark the answers on list i.e. circled or indicated more than one answer scores 0
			Total	5	

Question			Answer	Marks	Guidance
11	(a)	(i)	S (1)	1	mark the answer line first, if no answer on the line then mark the answers on list ie circled or indicated more than one answer scores 0
		(ii)	light (intensity) / brightness (1) <u>temperature</u> (1)	2	allow how dark it is (1) ignore heat or heat content
	(b)	(i)	voltage / pd / PD / potential difference (1)	1	allow current (1) ignore signal ignore value / charge
		(ii)	highlow (1) lowhigh (1)	2	both needed either order both needed either order but opposite order to answer above allow values with voltage symbol up to 12V and down to 0(V) (1) allow 1 0 / on off (1) ignore true and false
	c	(i)	bistable / latch (1)	1	
		(ii)	<u>relay</u> (1)	1	
Total				8	

Question			Answer	Marks	Guidance
12			<p>any three from</p> <p>charge moves or flows around the circuit (1)</p> <p>this means a current passes in the circuit (1)</p> <p>charge builds up or on / is stored on the capacitor (1)</p> <p>voltage / pd / potential difference across or of the capacitor increases (1)</p>	3	<p>charge flow should be during the charging cycle</p> <p>allow ammeter deflects / AW (1) but ammeter deflects then falls to zero / AW (2) ignore just charge increases</p> <p>allow voltage / pd increases (1) ignore reference to voltage of power supply (1)</p>
			Total	3	

Question			Answer	Marks	Guidance
13	(a)	(i)	isolating (1)	1	mark the answer line first, if no answer on the line then mark the answers on list i.e. circled or indicated more than one answer scores 0
		(ii)	<p>shaver not connected directly to / isolated from mains or</p> <p>idea of reduced risk of electrocution / no flow of current to or through user (1)</p>	1	<p>no ecf from 13(a)(i)</p> <p>allow higher level answers e.g. no flow of current to user from earth (connection) is possible (1) allow no risk of electrocution / shock (1) allow blocks flow of AC from one circuit to another (1) allow decouples one circuit from another (1)</p>
	(b)	(i)	vacuum cleaner / CD (player) / microwave (oven) / food mixer or processor or blender / lawn mower / (electric) drill / hair dryer / printer/ electric toothbrush (1)	1	<p>allow brand names e.g. Hoover / Dyson allow tumble dryer / dishwasher allow fan assisted oven but not just oven / cooker</p> <p>ignore toaster unless qualified</p>
		(ii)	<u>generator</u> or <u>dynamo</u> (1)	1	ignore AC / DC
			Total	4	

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