Mark scheme

Static electricity

Physics 0625 · Questions from Paper 3 and Paper 4

Total marks

66

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
4	5	6	5	7	7	7	8	8	9	**66**

Question 1 [4]

1(a)(i)	second box (The balloon loses electrons) ticked	1
1(a)(ii)	positive (charge)	1
	like charge(s) repel	1
1(b)	circle around copper **AND** silver	1

Question 2 [5]

2(a)	friction OR rubbing (with cloth) owtte	B1
	electrons / negative charges move / transfer	M1
	from the acetate OR to the cloth	A1
2(b)	(strips) repel / move away (from each other) owtte	M1
	same charge (on both strips) / <u>both / they</u> have positive charge	A1

Question 3 [6]

3(a)	any named insulator, e.g. cotton, string etc.	B1
3(b)	1 = attract	B1
	2 = repel	B1
	3 = repel	B1
3(c)	(sphere) is rubbed with a cloth	B1
	<u>electrons</u> move off (sphere) owtte	B1
	Total:	6

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Question 4 [5]

4(a)	positively charged / plastic rod is brought close to metal plate	**B1**
	negative charges / electrons (from metal plate) move to top of metal plate / close(r) to rod	**B1**
	earth lead connected to (metal) plate **AND** negative charges / electrons move on to plate	**B1**
	(at the end of the process) earth lead removed (before charged rod removed) **OR** (at the end of the process) metal plate has (net) negative charge	**B1**
4(b)	correct direction – pointing away from negative terminal / clockwise arrow **AND** current flow in opposite direction to flow of electrons	**B1**

Question 5 [7]

5(a)	electrons mentioned	**B1**
	negative charges / electrons move from cloth **or** move to rod	**B1**
5(b)(i)	electrons / negative charge(s) repelled to earth **or** ball charged by induction	**B1**
	ball positively charged	**B1**
	opposite charges attract	**B1**
5(b)(ii)	negatively charged (by rod) **or** ball discharges / becomes neutral	**B1**
	repelled by rod **or** pulled down by gravity / its weight	**B1**

Question 6 [7]

6 **(a)** ignore moving positive charge
<u>electrons/negative charges</u> removed from balloon NOT attracted to hair M1
moved to hair/hair becomes negatively charged/idea of <u>net</u> positive charge on balloon A1 [2]

(b) charge on left: positive/neutral B1
charge on right: negative B1 [2]

(c) stream deflected to right <u>in diagram</u> M1
(negative) charges in water stream attracted by (charges on) balloon A1 [2]

(d) metal (good) conductor/has free electrons o.w.t.t.e. B1 [1]

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Question 7 [7]

7 **(a)** in copper/metals/conductors, electrons (free to move) B1
in nylon/insulators electrons fixed/not free (to move) B1

(b) (negatively charged nylon) rod near to sphere B1
earth/touch (with hand) the sphere B1
remove earth/hand (and remove rod) B1

(c) at least four equally spaced, radial lines from surface M1
at least one outward arrow AND none wrong A1 [7]

Question 8 [8]

8(a)(i)	radial arrow	**B1**
	inward radial arrow	**B1**
8(a)(ii)	positive point charge	**A2**
	positive (charge)	C1
8(b)	electrons / negative charges (move)	**B1**
	out of (plastic) **OR** removed from / lost from (plastic)	**B1**
8(c)	any mention of free / mobile / delocalised electrons	**M1**
	conductors have free / mobile / delocalised electrons **OR** insulators do not have free / mobile / delocalised electrons	**A1**

Question 9 [8]

9 **(a)** **(i)** negative at LH end **and** positive at RH end B1

(ii) (+ve) charge on A attracts electrons/-ve charges/-ve ions
OR unlike charges attract (ignore reference to + charges) B1
electrons move to end X/towards A B1
(unbalanced) +ve charges (left) at end Y NOT repelled to Y B1

(iii) idea that each electron leaves behind an equal unbalanced proton in nucleus/B has no net charge/B is neutral/idea that B has not gained or lost any charges B1

(b) **(i)** nothing OR nothing implied B1

(ii) +ve charge cancelled/neutralised B1
by electrons/negative charges flowing up from earth B1

[Total: 8]

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Question 10 [9]

10(a)(i)	region in which an electric charge experiences a force	**B1**
10(a)(ii)	direction of force on a positive charge	**B1**

10(b)	any **four** from: • ball moves towards positive plate • ball touches positive plate • made of conducting material so becomes positively charged • repelled from positive plate • touches negative plate and loses charge • negatively charged ball attracted back to positive plate and process repeats	**B4**
10(c)	$I = Q / t$ in any form	**C1**
	$t = Q / I$	**C1**
	$(t = 15 / 0.29 =) 52$ s	**A1**

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