Mark scheme

Electromagnetic induction

Physics 0625 · Questions from Paper 3 and Paper 4

Total marks

64

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
5	5	6	6	7	7	7	6	7	8	**64**

Question 1 [5]

1 **(a)** moves/deflects M1
momentary (or equivalent) OR goes back to zero/centre A1

(b) moves/deflects in other direction B1

(c) e.m.f./electromagnetic force/current/voltage/p.d. B1
induced B1
(allow B1 for magnetic field is changed)

[Total: 5]

Question 2 [5]

2(a)	coil of wire connected in series with (sensitive) ammeter	**B1**
	magnet moves relative to coil	**B1**
	meter indicates/measures (induced) current	**B1**
2(b)	Any two from:	**B2**
	speed of movement owtte	
	strength of magnet	
	number of coils/turns per metre	
	Total:	**5**

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Question 3 **[6]**

3	**(a)**	**(i)**	Fig. 10.1	B1	
		(ii)	Fig. 10.3	B1	
	(b)		2 complete cycles, any shape (if full-wave rectified, must be 4 humps)	B1	
			cyclical and equal amplitude above & below axis	B1	
			uniform spacing	B1	
			intention of sinusoidal shape accept sinusoidal full-wave rectification	B1	[6]

Question 4 **[6]**

4	**(a)**	**(i)**	deflection (in one direction)	M1	
			idea of momentary OR goes back to zero again	A1	
		(ii)	idea of same as **(i)** but opposite direction	B1	
	(b)		larger	B1	
	(c)		smaller	B1	
	(d)		nothing OR small oscillations about zero position OR blurred light spot	B1	[6]

Question 5 **[7]**

5	**(a)**		(milli)ammeter **OR** galvanometer **NOT** ampmeter	B1	
	(b)	**(i)**	nothing / stays the same / half-way	B1	
		(ii)	nothing / stays the same / half-way	B1	
		(iii)	nothing / stays the same / half-way	B1	
		(iv)	it / arrow / pointer moves / goes / flicks **OR** current changes	M1	
			left and right **OR** backwards and forwards	A1	
	(c)		generator **OR** dynamo **OR** microphone	B1	

[Total: 7]

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Question 6 [7]

6	(a)	(i)	deflects NOT vibrates OR oscillates	M1
			returns to zero/centre again	A1
		(ii)	induction/induced current or emf	B1
			axle/wire cuts magnetic field	B1
			not when axle out of field	B1
		(iii)	opposite deflection	B1
	(b)		needle/pointer swings from side to side	B1

[Total: 7]

Question 7 [7]

7	(a)	Fig.8.1	nothing seen/no current/no deflection/no voltage	B1
		Fig. 8.2	deflection (of needle)/current in mV/voltage induced	B1
		Fig. 8.3	deflection (of needle)/current in mV/voltage induced (**ignore** size of deflection)	M1
			same direction as Fig. 8.2	A1
	(b)		increase speed	B1
			increase turns (of wire)/more coils (**ignore** longer wire)	B1
			increase magnet strength (**ignore** larger magnet)	B1

[Total: 7]

Question 8 [6]

8	(a)		magnetic flux changes / rod cuts magnetic field	B1
			emf / voltage induced ignore current induced	B1 [2]
	(b)		Mark **(i)** & **(ii)** together	
			deflection increases/to R in **(i)**	B1
			deflection increases/to R in **(ii)**	B1
			correct reason in **(i)** or **(ii)** AND consistent with deflection:	
			in **(i)** or **(ii)** rate of change of flux (linkage) increases	
			in **(i)** more (magnetic) field lines cut/stronger (magnetic) field cut	
			in **(ii)** rod moves faster/field lines cut faster	B1
		(iii)	no deflection AND no (magnetic) field lines cut/no change of flux (linkage)	B1 [4]

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Question 9 [7]

9 **(a)** **(i)** (milliammeter) deflects/shows reading/current OR reading changes OR there is a current B1
change of flux/field (lines) cut OR emf/current induced/produced B1 [2]

(ii) greater deflection/current B1
rate of change of flux (linkage) is greater o.w.t.t.e
e.g. more magnetic field lines cutting coil (per second) OR field cut faster B1 [2]

(b) **(i)** upwards/opposite to magnet's direction of travel ignore towards magnet B1

(ii) current (in coil) causes a magnetic field B1
force caused by overlapping (magnetic) fields B1 [3]

[Total: 7]

Question 10 [8]

10(a)(i)	magnetic field mentioned			**B1**
	coil / wire cuts (magnetic) field **OR** changing (magnetic) field (through coil)			**B1**
	e.m.f. / voltage induced **OR** produced by electromagnetic induction			**B1**
10(a)(ii)	(plane of coil) horizontal **OR** in position shown in diagram coil cutting magnetic field the fastest			**B1** **B1**
10(b)	current in coil	**OR**	energy supplied to / lost from lamp	**B1**
	current in (magnetic) field experiences a force		student must do more work / supply more energy / more energy needed	**B1**
	opposes the change causing it		greater force to do more work	**B1**

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