

Design and Technology

General Certificate of Secondary Education **1953/03**

Electronic Products Paper 3 (Foundation Tier)

Mark Scheme for June 2010

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Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.






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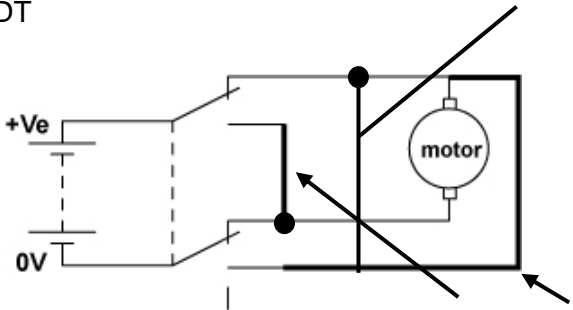
Question			Syllabus Ref	Expected Answers			Marks	Additional Guidance
1	(a)			Component	Name (A-E)	Function (1-5)		
					D	2		
					C	1		
					A	4		
					E	5		
					B	3	[6]	
	(b)	(i)		Relay			[1]	
		(ii)		Part A Coil / solenoid / electromagnet Part B Contacts / switch			[1] [1]	
		(iii)		SPDT			[1]	

TOTAL [10]

Question			Syllabus Ref	Expected Answers	Marks	Additional Guidance
2	(a)			1. 270,000 ohms 2. 1,000,000 ohms	[1] [1]	
	(b)	(i)		1000pF	[1]	
		(ii)		0.001F	[1]	
		(iii)		Needs placing in the correct orientation/needs placing the right way round or answer recognising the polarisation sensitive nature of the capacitor, or reference to not exceeding working voltage.	[1]	
	(c)	(i)		Glass / paper / mica / air / accept plastic or any suitable insulator. Accept just insulator.	[1]	
		(ii)		Aluminium / silver / copper / or other suitable metal. Accept just conductor or just metal.	[1]	
	(d)	(i)		1. Increase the value of resistor R1 . 2. Increase the value of the capacitor.	[1] [1]	R1 needs identifying
		(ii)		Replace R1 with a variable resistor / accept use of a variable resistor, or using a range of resistors or capacitors with a switch.	[1]	

TOTAL [10]

Question			Syllabus Ref	Expected Answers	Marks	Additional Guidance
3	(a)	(i)		AND A B X 0 0 0 0 1 0 1 0 0 1 1 1	[1] [1]	
		(ii)		NOT / INVERTER A X 0 1 1 0	[1] [1]	
		(iii)		NOR A B X 0 0 1 0 1 0 1 0 0 1 1 0	[1] [1]	
		(iv)				

Question			Syllabus Ref	Expected Answers	Marks	Additional Guidance
	(b)	(i)		DPDT	[1]	A correct connection should be awarded 1 mark, only if other connections do not affect its operation.
		(ii)		 <p>1 mark each for each pair of contacts correctly cross-connected</p>	[2]	
		(iii)		A	[1]	

TOTAL [10]

Question			Syllabus Ref	Expected Answers	Marks	Additional Guidance								
4	(a)	(i)		<table><tr><th>Product</th><th>Soldering method</th></tr><tr><td>SMT (surface mount technology) PCB boards for mobile phones.</td><td>Hot air jet soldering / plasma soldering / flow soldering</td></tr><tr><td>Prototype PCB board for an egg timer project.</td><td>Hand held soldering iron</td></tr><tr><td>‘Through-hole’ PCB’s for use in DVD video recorders.</td><td>Molten solder bath / flow / wave soldering.</td></tr></table>	Product	Soldering method	SMT (surface mount technology) PCB boards for mobile phones.	Hot air jet soldering / plasma soldering / flow soldering	Prototype PCB board for an egg timer project.	Hand held soldering iron	‘Through-hole’ PCB’s for use in DVD video recorders.	Molten solder bath / flow / wave soldering.	[1] [1] [1]	
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		(ii)		1. Electrocution 2. Burns	[1] [1]	Do not allow responses relating to fumes or lead or solder spitting.								
	(b)	(i)		Lead is toxic to plants / animals life. Lead is an accumulative poison.	[1]	Allow “Poisonous”								
		(ii)		1. Using lead free solder 2. Recycling / controlled disposal of lead	[1] [1]	Do not accept just ‘don’t use lead’								
	(c)			Dirt present / poor application of heat / soldering iron too cool / lack of flux / corrosion or oxide present / moving the component before solder has frozen. 1 mark for each correct response.	[2]									

Question			Syllabus Ref	Expected Answers	Marks	Additional Guidance															
5	(a)	(i)		<table><tr><th>Type</th><th>Description</th><th>System</th></tr><tr><td>1</td><td>Uses radar, flash guns and a camera to photograph the back of speeding cars as they pass.</td><td>Gatso</td></tr><tr><td>2</td><td>Uses piezo or magnetic sensors in the road and photographs approaching cars as they pass over road markings.</td><td>Truvelo</td></tr><tr><td>3</td><td>Uses number plate scanning to identify a vehicle and calculate its average speed over a set journey.</td><td>Specs/SVDD</td></tr><tr><td>4</td><td>Is portable, accurate and has a longer operating range than similar wireless radar based system.</td><td>Laser gun</td></tr></table>	Type	Description	System	1	Uses radar, flash guns and a camera to photograph the back of speeding cars as they pass.	Gatso	2	Uses piezo or magnetic sensors in the road and photographs approaching cars as they pass over road markings.	Truvelo	3	Uses number plate scanning to identify a vehicle and calculate its average speed over a set journey.	Specs/SVDD	4	Is portable, accurate and has a longer operating range than similar wireless radar based system.	Laser gun	[4]	
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4	Is portable, accurate and has a longer operating range than similar wireless radar based system.	Laser gun																			
		(ii)		Use of infra-red lighting.	[1]																
		(iii)		Motorists have less time to slow down before the reading is taken.	[1]																
	(b)	(i)		Motorists are made aware that they are speeding / no need to take your eyes off the road to check speed.	[1]																
		(ii)		Solar power. Wind power.	[1] [1]																
		(iii)		Download latest software updates.	[1]																

TOTAL [10]

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