

# **Design and Technology**

General Certificate of Secondary Education **1957/01**

Systems and Control Technology Core Paper 1 (Foundation Tier)

## **Mark Scheme for June 2010**

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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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Question			Answer		Mark	Additional Guidance
1	(a)		<b>aluminium</b> [or alloy which includes aluminium] do not allow 'alloy' on its own  <b>steel</b> [ or alloy which includes steel e.g. mild steel]  <b>aluminium/steel/carbon fibre</b> [ or alloy which includes steel/ aluminium do not allow 'alloy' on its own do not allow 'iron'.		[3]	
	(b)		X – bolt / coach bolt Y – nut [must be correct way round or no marks]	(1) (1)	[2]	
	(c)		waist size, hat size [any way round]	(1) (1)	[2]	
	(d)		Tyres/ brake pads/ handle bars/ pedals/ brake levers [any where that rubber/polymer is used]		[1]	
	(e)		Consistency / repeatability [ <b>do not allow accuracy</b> ] saves time / faster, Keeping parts <b>secure/safe</b> when welding (any one)  Safer/ safety	(1)  (1)	[2]	
					[10]	

Question			Answer		Mark	Additional Guidance
2	(a)	(i)	REFERENCE TO BALANCE eg When load is attached the crane is balanced. Does not tip over Balance the load	(1)	[1]	
		(ii)	REFERENCE TO FALLING OVER It allows it to be balanced for different loads / heavier loads [allow word 'weight[s]' to replace 'load[s]']	(1)	[1]	
	(b)	(i)	Anticlockwise (pulley 1) Anticlockwise (winding)	(1) (1)	[2]	
		(ii)	<ul style="list-style-type: none"> <li>• DEcreases the force needed</li> <li>• Takes longer time/longer to lift load / <b>more</b> turns</li> </ul> [allow 'works more easily/ easier to lift'] [Do not allow reference to friction]	(1)  (1)	[2]	
	(c)		Dowel/dowelled		[1]	
	(d)		Jib String Tower	(1) (1) (1)	[3]	

Question			Answer		Mark	Additional Guidance
3	(a)		Comfortable/easier to hold/fits hand (not safety)		[1]	
	(b)		Input  transistor/ circuit/ chip/ I.C.  or named suitable named <b>processing</b> component e.g. AMP/ 555timer/chip [not single component such as resistor, capacitor etc.  Output	(1)   (1)  (1)	     <b>[3]</b>	
	(c)		Electrical Light	(1) (1)	<b>[2]</b>	
	(d)	(i)	(i) The resistance/voltage changes /OR increases  The resistance <b>decreases</b> <b>The voltage decreases across LDR</b> i.e extra mark for knowing <b>the correct change</b>  <b>or correct general statements</b> can be allowed 1 mark  <b>E.G. the LDR will detect light and activate the circuit</b>	(1)   (1)  (1)	     <b>[2]</b>	
		(ii)	Alters current [e.g changes/ different levels etc. ]  biases/alters/ adjusts threshold/trigger point	(1)  (1)	  <b>[2]</b>	
					<b>[10]</b>	

Question			Answer		Mark	Additional Guidance
4	(a)		Any reason relating to safety	(1)	[1]	
	(b)		turn the direction of motion (through 90 degrees) changes/ reduces the speed [of rotation] increase the torque [any two]	(1) (1) (1)	[2]	
	(c)		<b>Axle</b> bent <b>Axle</b> not tightly fitted to the gear <b>Axle</b> diameter too large <b>Holes</b> not aligned/ lined up/ too small <b>Gears</b> do not mesh/ loose on axle <b>Motor</b> incorrect [not lined up] [do not allow any other motor problems]  <b>Friction</b> to high /needs lubrication [any two]	(1) (1) (1) (1) (1) (1) (1)	[2]	
	(d)		Editing quickly 3-D viewing Calculations can be done automatically Sharing/transfer i.e can be E-mailed Money/ time not wasted Less errors Don't allow one word answer i.e just 'faster/ quicker/ cheaper'  Safer <b>if qualified</b> i.e. 'No components can be damaged'	(1) (1)	[2]	
	(e)	(i)	Any <b>related</b> issue e.g. some parts not recyclable e.g. need to separate the materials e.g. some parts do not bio-degrade e.g. components are made from different materials e.g. toxic waste [any two]	(1)	[1]	
		(ii)	Different plastics have different symbols Symbols are moulded into the component/ stuck on/ labelled	(1) (1)	[2]	
					[10]	

Question			Answer		Mark	Additional Guidance
5	(a)	(i)	Lathe		[1]	
		(ii)	Faster/ quicker/ saves time / works 24-7 /less errors/ lower costs/ lower labour costs		[1]	
		(iii)	<ul style="list-style-type: none"> <li>Does not rust</li> <li>Means it is easy to remove the stud</li> </ul>	(1) (1)	[2]	
	(b)	(i)	Injection moulding	(1)	[1]	
		(ii)	Allows moulding direct onto metal screw Better/finer detail Rapid / fast manufacturing Solid moulding	(1) (1) (1) (1)	[1]	
	(c)		Answer must be relating to a specific check Thread is correctly formed  Any <b>dimensional</b> check e.g. Diameter of stud is correct e.g. Length of thread is correct  Metal and plastic are joined Full forming of the stud Check for smooth moulding/ no cracks <b>Not</b> 'correct shape/ right shape/ correct size etc.]		[2]	
	(d)		Less risk of damage to stud Less risk of tampering with the stud Easier/ Quicker/ faster to remove [in sentence, do not allow one word answers] More compact More ergonomic/ more comfortable/ fits hand better Safety (qualified) Less chance of slippage/better grip	(1) (1) (1) (1) (1) (1) (1)	[2]	
					[10]	

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