

Design and Technology

General Certificate of Secondary Education **1957/07**

Systems and Control Technology Paper 7: Mechanisms

Mark Scheme for June 2010

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Question			Spec Ref	Expected Answers	Marks	Additional Guidance
1	(a)	(i)		cam C	[1]	
		(ii)		cam B	[1]	Allow A or B
	(b)			oscillating	[1]	
	(c)			varnish, oil, paint, preservative	[1]	
	(d)			apply wax, add plain bearing, increase size of holes Not oil	[2]	
	(e)	(i)		will operate when no wind; increased torque; can be set to start or stop by timer; remote operation	[2]	Can control it Reliable
		(ii)		No need to use fossil fuels; no cost to operate; safe source of power; no need to make mains electrical connections outside	[2]	

2	(a)			VR = 60/15 [1] = 4 : 1 [1] Note: if correct ratio given with no calculation award 2 marks	[2]	If 1:4 1 Mark
	(b)			chain and sprocket; simple gear train; compound gear train; allow 'gears'; toothed belt	[2]	
	(c)			easier to maintain; lower cost; quieter; more reliable outside; safety – allow belt to slip	[2]	
	(d)			supported to prevent uneven wear on bearing surface 1 Secure fixing 1 Easy removal 1 Annotation 1	[4]	To show adequate support over majority of length of motor

Question			Spec Ref	Expected Answers	Marks	Additional Guidance
3	(a)			torque	[1]	
	(b)	(i)		bevel gear	[1]	
		(ii)		explanation that shows clear understanding of the way <u>chosen</u> mechanism works	[2]	Allow 1 mark for cleaning
	(c)			explanation of the need for lubrication Note: if 'lubrication' given with no explanation award 1 mark	[2]	
	(d)			paint; powder coating; lacquer; galvanizing, zinc, hammerite	[1]	
	(e)			key and keyway; splines; grub screw and flat/recess Components correctly labelled	[3]	

4	(a)			lightweight; non rust; high strength to weight ratio easily extruded	[2]	Not strong
	(b)			modelling: of forces that need to be withstood; predicted maximum height needed; calculating quantities of materials required; electronic transfer of design to manufacturer (2) Note: explained for full marks (2)	[4]	WAYS explained Interrogating database for materials
	(c)			class 3	[1]	
	(d)			Class 3 lever gives greater lifting distance; can be folded into a more compact space when transporting; allows jib to be extended	[2]	Understanding of a situation 1 Mark
	(e)			lower lifting force	[1]	

Question			Spec Ref	Expected Answers	Marks	Additional Guidance
5	(a)			Fine adjustment; powerful movement achievable; compact; rapid adjustment, locking	[2]	
	(b)			reduction of friction; allows higher force to be applied; less chance of stripping Explained for maximum marks	[2]	
	(c)			Vice; car jack; stilson; adjustable spanner	[1]	
	(d)			rotary to linear	[1]	
	(e)			allow stay to pivot Prevent rotation Secure attachment to barrier Appropriate labels	[4]	

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