



National
Qualifications
2024

2024 Practical Metalworking

National 5

Question Paper Finalised Marking Instructions

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General marking principles for Practical Metalworking N5

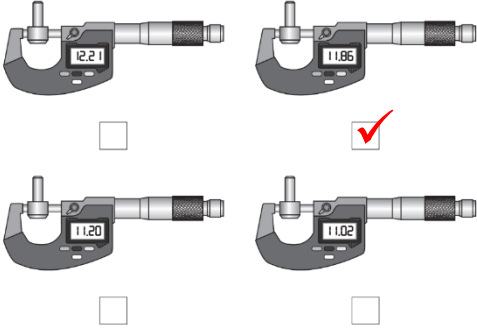
Always apply these general principles. Use them in conjunction with the detailed marking instructions, which identify the key features required in candidates' responses.

- (a)** Always use positive marking. This means candidates accumulate marks for the demonstration of relevant skills, knowledge and understanding; marks are not deducted for errors or omissions.
- (b)** If a candidate response does not seem to be covered by either the principles or detailed marking instructions, and you are uncertain how to assess it, you must seek guidance from your team leader.

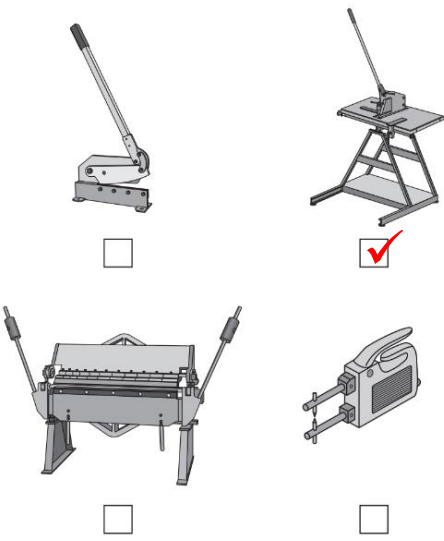
Marking instructions for each question

Question			Expected response	Max mark	Additional guidance		
1.	(a)			3			
							(1 mark)
			Brass			✓	
			Nickel		✓		
			Mild steel	✓			
			Aluminium		✓		
	(b)			3			
				(1 mark)			
Description		Type of Property					
Huge energy is required to break the material. It can resist sudden blows, bends or twists.		Toughness					
Metal resists penetration, cutting or scratching.		Hardness					
Metal can be hammered, rolled or pressed into thin sheets or small bars without cracking or breaking.		Malleability					
Metal is easily broken when struck, with little or no bending at the breaking point		Brittleness					
	(c)	(i)	Scribing block (1 mark)	1	Accept; • Surface gauge Do not accept; • Scriber		
		(ii)	Any one of the following: • To prevent the scribe from digging into the workpiece (1 mark) • To ensure an accurate line is drawn (1 mark)	1			
	(d)		Any one of the following: • The datum prevents cumulative errors being made (1 mark) • The datum line a baseline from which all other measurements are taken from (1 mark)	1			

Question			Expected response	Max mark	Additional guidance
1.	(e)		- Reference to tap (1 mark) - Tap must be at 90° to the workpiece (any appropriate equivalent answer) (1 mark) - Turn tap opposite direction to break thread/stop tap from breaking (1 mark) Then, any one of the following: - The workpiece must be securely supported (any appropriate method) (1 mark) - Excessive force must not be used as this will result in tap breaking (1 mark) - Use of cutting compound (1 mark) - Clear threads as often as possible to prevent tap clogging (1 mark)	4	Also accept; Use of any suitable lubricant
	(f)		Any three of the following: - Draw file (1 mark) - Use of emery cloth (1 mark) - Use of wet and dry paper (1 mark) - Use of polish (1 mark)	3	Do not accept; - Sand paper/grit paper - Steel wool
	(g)		Centre lathe (1 mark)	1	Accept; - Screwcutting lathe Do not accept; - Metalwork(ing) lathe - Metal lathe - Lathe
	(h)		Part A - Saddle/Carriage (1 mark) Part B - Compound slide (1 mark) Part C - Cross slide (1 mark)	3	
	(i)	(i)	Any one of the following: - Irregular (and symmetrical) shaped workpieces can be secured (1 mark) - Square bar can be secured (1 mark) - Workpieces can be set off centre (eccentrically) (1 mark)	1	Accept; The four jaws can be adjusted independently

Question			Expected response	Max mark	Additional guidance
1.	(i)	(ii)	- Hexagonal bar (1 mark) - Round/hex tube (1 mark)	1	Accept; Hex bar
	(j)		Process B - Parallel turning (1 mark) Process C - Chamfering/Taper turning (1 mark) Process D - Facing off (1 mark)	3	
	(k)	(i)	18.29 (1 mark)	1	
		(ii)	Top right (1 mark) 	1	
	(l)		Vernier calipers (1 mark)	1	Do not accept; - Digital calipers - Analogue calipers
	(m)		Any two of the following: (Twist) drill is bent (1 mark) (Twist) drill is blunt (1 mark) (Machine) spindle is bent (1 mark) - Workpiece not secured or (twist) drill not secured (1 mark)	2	
	(n)		Milling machine (1 mark)	1	Accept; Mill

Question			Expected response	Max mark	Additional guidance															
2.	(a)	(i)	Chain thin line: - To show centres of circles/arcs (1 mark) A continuous thick line: - To show the outline of the part (1 mark)	2	Accept; - Centre Line Also accept; - Outline - To show the edge of the part															
		(ii)	Gloves (1 mark)	1																
		(iii)		2																
			<table><tr><th>Steps</th><th>Enter the correct order</th><th></th></tr><tr><td>Mark out the lamp using the correct tools</td><td>3</td><td></td></tr><tr><td>Paint on engineer’s blue</td><td>2</td><td></td></tr><tr><td>Create witness marks</td><td>4</td><td>(1 mark)</td></tr><tr><td>Clean the metal of any dirt and grease</td><td>1</td><td>(1 mark)</td></tr></table>			Steps	Enter the correct order		Mark out the lamp using the correct tools	3		Paint on engineer’s blue	2		Create witness marks	4	(1 mark)	Clean the metal of any dirt and grease	1	(1 mark)
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		(iv)	Any three of the following: - The work is securely clamped to the table/held in (hand) vice (1 mark) - The drill is set to the correct speed (1 mark) - The drill bit is secured in the (Jacobs) chuck (1 mark) - Guards in place/in good working order (1 mark) - Chuck key removed (1 mark) - Emergency stops work (1 mark) - Drill table should be secured (1 mark)	3																

Question			Expected response	Max mark	Additional guidance
2.		(v)	Top right (1 mark) 	1	
	(b)		Folding bars (1 mark)	1	Do not accept; Bending bars
	(c)	(i)	Any one of the following: Cause: - Improving ductility (1 mark) - Improving malleability (1 mark) - Softening the metal (1 mark) - Relieving stress on the metal (1 mark) Effect: - Make it easier to work (with)	1	Candidate response must have cause and effect
		(ii)	To give a visual indication that the correct temperature was reached for annealing (1 mark)	1	Accept; When the soap turns black the aluminium is ready for annealing
	(d)	(i)	Pop rivet (1 mark)	1	
		(ii)	Any one of the following: - Only need access from one direction to secure the two parts together (1 mark) - Ensures strength when joining sheet material (1 mark)	1	Do not accept; - Any response referencing appearance - It's quicker - It's easier

Question			Expected response	Max mark	Additional guidance
2.	(e)	(i)	Use of a magnet to identify mild steel (1 mark)	1	Accept; - Aluminium is not magnetic, and mild steel is magnetic Do not accept: - Use a magnet - Magnet test
		(ii)	Accept any two of the following: - Less damage to the environment (appearance/aesthetics/habitats/ reduced greenhouse gases) because of reduced mining (for raw materials) (1 mark) - Less damage to the environment because of the reduction in landfill sites/landfill sites will not fill up (1 mark) - Up-cycling metal takes less energy than mining/ manufacturing more aluminium (1 mark) - Less damage to the environment from pollution caused by transportation/manufacturing (1 mark)	2	Do not accept; - Save on costs - Reduce waste (must be quantified)
3.	(a)	(i)	Accept any one of the following: - Plasma Cutting (1 mark) - Laser Cutting (1 mark) - Milling (1 mark)	1	
		(ii)	Tempering (1 mark)	1	
	(b)		Accept any one of the following: - Heat resistant gloves (1 mark) - Face mask/eye protection (1 mark) - Heat resistant apron (1 mark) - Protective boots (1 mark)	3	Accept; - Gauntlets Do not accept; - Gloves - Apron - Boots
	(c)	(i)	300mm (1 mark)	1	Accept; 300
		(ii)	50mm (1 mark)	1	Accept; 50
		(iii)	5mm (1 mark)	1	Accept; 5

Question			Expected response	Max mark	Additional guidance
3.	(d)		Accept any one of the following: • Mig welding (1 mark) • Tig welding (1 mark) • Mag welding (1 mark) • Electric arc welding (1 mark) • Gas welding (1 mark)	1	Do not accept: • Spot welding
	(e)		• Degrease/clean the metal (1 mark) • Heat up metal (qualified by change in temperature/colour) (1 mark) Then, any one of the following: • Placed into a fluidiser containing the plastic powder (1 mark) • Allow to cool or reheat to achieve smooth finish (1 mark)	3	

[END OF MARKING INSTRUCTIONS]