Rewarding Learning

General Certificate of Secondary Education
2024

Engineering and Manufacturing

Unit 2

assessing
Production

[GEM21]

TUESDAY 7 MAY, MORNING

MARK SCHEME

General Marking Instructions

Introduction
Mark schemes are intended to ensure that the GCSE examinations are marked consistently and fairly. The mark schemes provide markers with an indication of the nature and range of candidates' responses likely to be worthy of credit. They also set out the criteria which they should apply in allocating marks to candidates' responses. The mark schemes should be read in conjunction with these general marking instructions.

Assessment Objectives
Below are the assessment objectives for GCSE Engineering and Manufacturing.

Candidates must:

AO1 Recall, select and communicate their knowledge and understanding of engineering and manufacturing in a range of contexts;
AO2 Apply skills, knowledge and understanding, including quality standards in a variety of design contexts. Plan and carry out investigations and making tasks involving an appropriate range of tools, equipment, materials and processes; and
AO3 Analyse and evaluate evidence, design proposals and outcomes, make reasoned judgements and present conclusions and recommendations.

Quality of candidates' responses
In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 16–year–old which is the age at which the majority of candidates sit their GCSE examinations.

Flexibility in marking
Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking
Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 16–year–old GCSE candidate.

Awarding zero marks
Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Types of mark schemes
Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

Part 1 Mild steel angle section

			AVAILABLE MARKS
1	**Length of the steel angle (200 mm)**		
	Within a tolerance of +/– 0.5 mm (1 × [3]) Within a tolerance of +/– 1 mm (1 × [2]) Within a tolerance of +/– 1.5 mm (1 × [1]) Outside a tolerance of +/– 1.5 mm [0] (1 × [3])	[3]	3
2	**30 mm × 30 mm chamfer**		
	Linear dimension (30 mm) × 2 off Within a tolerance of +/– 0.5 mm (2 × [3]) Within a tolerance of +/– 1 mm (2 × [2]) Within a tolerance of +/– 1.5 mm (2 × [1]) Outside a tolerance of +/– 1.5 mm [0] (2 × [3])	[6]	6
3	**4 off 10 mm hole locations**		
	(i) Hole locations Holes correctly located within a tolerance of +/– 0.5 mm (4 × [2]) Holes correctly located within a tolerance of +/– 1.5 mm (4 × [1]) If outside tolerance of +/– 1.5 mm [0] (4 × [2])	[8]	
	(ii) Hole diameters Hole diameters 10 mm within a tolerance of +/– 0.5 mm [1] Hole diameters outside a tolerance of +/– 0.5 mm [0] (1 × [1])	[1]	9
4	**4 off 4 mm hole locations**		
	(i) Hole locations Holes correctly located within a tolerance of +/– 0.5 mm (4 × [2]) Holes correctly located within a tolerance of +/– 1.5 mm (4 × [1]) If outside tolerance of +/– 1.5 mm [0] (4 × [2])	[8]	
	(ii) Hole diameters Hole diameters 4 mm within a tolerance of +/– 0.5 mm [1] Hole diameters outside a tolerance of +/– 0.5 mm [0] (1 × [1])	[1]	9

			AVAILABLE MARKS
5	**8 mm × 12 mm chamfer**		
	(i) Linear dimension (8 mm) Within a tolerance of +/– 0.5 mm (1 × [3]) Within a tolerance of +/– 1 mm (1 × [2]) Within a tolerance of +/– 1.5 mm (1 × [1]) Outside a tolerance of +/– 1.5 mm [0] (1 × [3])	[3]	
	(ii) Linear dimension (12 mm) Within a tolerance of +/– 0.5 mm (1 × [3]) Within a tolerance of +/– 1 mm (1 × [2]) Within a tolerance of +/– 1.5 mm (1 × [1]) Outside a tolerance of +/– 1.5 mm [0] (1 × [3])	[3]	6
6	**Rectangular cutout**		
	(i) Linear dimension (130 mm) Within a tolerance of +/– 0.5 mm (1 × [3]) Within a tolerance of +/– 1 mm (1 × [2]) Within a tolerance of +/– 1.5 mm (1× [1]) Outside a tolerance of +/– 1.5 mm [0] (1 × [3])	[3]	
	(ii) Linear dimension (50 mm) Within a tolerance of +/– 0.5 mm (1 × [3]) Within a tolerance of +/– 1 mm (1 × [2]) Within a tolerance of +/– 1.5 mm (1 × [1]) Outside a tolerance of +/– 1.5 mm [0] (1 × [3])	[3]	
	(iii) Linear dimension (20 mm) Within a tolerance of +/– 0.5 mm (1 × [3]) Within a tolerance of +/– 1 mm (1 × [2]) Within a tolerance of +/– 1.5 mm (1 × [1]) Outside a tolerance of +/– 1.5 mm [0] (1 × [3])	[3]	
	(iv) Linear dimension (40 mm) Within a tolerance of +/– 0.5 mm (1 × [3]) Within a tolerance of +/– 1 mm (1 × [2]) Within a tolerance of +/– 1.5 mm (1 × [1]) Outside a tolerance of +/– 1.5 mm [0] (1 × [3])	[3]	
	(v) Linear dimension (10 mm) 2 off Within a tolerance of +/– 0.5 mm (2 × [3]) Within a tolerance of +/– 1 mm (2 × [2]) Within a tolerance of +/– 1.5 mm (2 × [1]) Outside a tolerance of +/– 1.5 mm [0] (2 × [3])	[6]	18

				AVAILABLE MARKS
7	**Radii on steel angle**			
	(i) 30 mm Radius Radii completed to a high degree of precision (1 × [3]) Radii completed to a satisfactory degree of precision (1 × [2]) Radii completed to a poor degree of precision (1 × [1]) Radii not present [0] (1 × [3])		[3]	
	(ii) 20 mm Radius Radii completed to a high degree of precision (1 × [3]) Radii completed to a satisfactory degree of precision (1 × [2]) Radii completed to a poor degree of precision (1 × [1]) Radii not present [0] (1 × [3])		[3]	6
	Quality of finish			
8	**(i) Finish on all part edges** Good quality of finish on the mild steel angle edges [2] Satisfactory quality of finish on the mild steel angle edges [1] Edges unfinished [0] (1 × [2])		[2]	
	(ii) Finish on part faces Good quality of finish on the mild steel angle faces [2] Satisfactory quality of finish on the mild steel angle faces [1] Faces unfinished [0] (1 × [2])		[2]	4

Part 2 Wooden part

AVAILABLE MARKS

9 2 off 8 mm hole locations

(i) Hole locations

Holes correctly located within a tolerance of +/– 0.5 mm (2 × [2])
Holes correctly located within a tolerance of +/– 1.5 mm (2 × [1])
If outside tolerance of +/– 1.5 mm [0]
(2 × [2]) [4]

(ii) Hole diameters

Hole diameters 8 mm within a tolerance of +/– 0.5 mm [1]
Hole diameters outside a tolerance of +/– 0.5 mm [0]
(1 × [1]) [1] 5

10 50 mm × 50 mm Chamfer

Linear dimension (50 mm) × 2 off
Within a tolerance of +/– 0.5 mm (2 × [3])
Within a tolerance of +/– 1 mm (2 × [2])
Within a tolerance of +/– 1.5 mm (2 × [1])
Outside a tolerance of +/– 1.5 mm [0]
(2 × [3]) [6] 6

11 Position of the channel cutout

(i) Linear dimension (50 mm)

Within a tolerance of +/– 0.5 mm (1 × [3])
Within a tolerance of +/– 1 mm (1 × [2])
Within a tolerance of +/– 1.5 mm (1 × [1])
Outside a tolerance of +/– 1.5 mm [0]
(1 × [3]) [3]

(ii) Linear dimension (75 mm)

Within a tolerance of +/– 0.5 mm (1 × [3])
Within a tolerance of +/– 1 mm (1 × [2])
Within a tolerance of +/– 1.5 mm (1 × [1])
Outside a tolerance of +/– 1.5 mm [0]
(1 × [3]) [3]

(iii) Linear dimension (10 mm) (Depth)

Within a tolerance of +/– 0.5 mm (1 × [3])
Within a tolerance of +/– 1 mm (1 × [2])
Within a tolerance of +/– 1.5 mm (1 × [1])
Outside a tolerance of +/– 1.5 mm [0]
(1 × [3]) [3] 9

			AVAILABLE MARKS
12	**Position of the fingers (25 mm)**		
	Within a tolerance of +/– 0.5 mm (4 × [3]) Within a tolerance of +/– 1 mm (4 × [2]) Within a tolerance of +/– 1.5 mm (4 × [1]) Outside a tolerance of +/– 1.5 mm [0] (4 × [3])	[12]	12
13	**20 mm radius**		
	Radii completed to a high degree of precision (1 × [3]) Radii completed to a satisfactory degree of precision (1 × [2]) Radii completed to a poor degree of precision (1 × [1]) Radii not present [0] (1 × [3])	[3]	3
14	**Quality of finish**		
	Fine glass paper finish on all of the part [4] Good quality finish with some tool marks on the part edges [3] Poor quality finish some saw and cross filing marks on the edges [2] Some evidence of finishing on some of the edges [1] No evidence of finishing [0] (1 × [4])	[4]	4
		Total	**100**