

3.3 METAL WORK (445)

The 2013 KCSE examinations for Metalwork consisted of two papers namely Paper 1 (theory) and Paper 2 (Practical Project). The theory was worth 60% while practical was worth 40% of the final mark. The format and weighting of the two papers was the same as in the previous years.

Candidates General Performance

Table 10: Candidates' overall performance for the period 2008 up to 2013

Year	Paper	Candidature	Maximum Score	Mean Score	Standard Deviation
2008	1		60	23.62	6.96
	2		40	35.62	4.57
	Overall	89	100	59.24	9.38
2009	1		60	25.38	9.09
	2		40	35.34	3.38
	Overall	231	100	58.74	13.32
2010	1		60	22.60	9.09
	2		40	15.25	4.32
	Overall	222	100	37.70	12.58
2011	1		60	30.92	9.55
	2	170	40	20.65	4.29
	Overall		100	51.57	12.43
2012	1		60	32.01	10.85
	2	194	40	21.43	5.48
	Overall		100	53.43	15.49
2013	1		60	32.83	10.84
	2	157	40	21.98	5.33
	Overall		100	54.66	15.54

From the above table, the following observations can be made.

- The mean score for the year 2013 improved slightly compared to the year 2012 thus improvement in performance.
- The candidature decreased from 194 in the year 2012 to 157 in the year 2013.

3.3.1 Metalwork Paper 1 (445/1)

The questions which were reported to have been poorly responded to have been analyzed with a view to pointing out candidates' weaknesses and propose suggestions on some remedial measures that would be taken in order to improve performance in future. The questions for discussions include 1 (b), 7(b), 8, 9, 11, 13

Question 1(b)

Explain the term "break-even" as used in business.

(1 mark)

Weaknesses

Most of the candidates confused between break-even with profit margin

Advice to teachers

Teachers should explain clearly to students the difference between terms used in business.

Expected Response

When no profit or loss is made in any sales/business.

Question 7 (b)

With reference to arc welding:

- | | | |
|------|---------------------------------|------------|
| (i) | define the term “tack welding”; | (1½ marks) |
| (ii) | state the use of tacks. | (1½ marks) |

Weaknesses

Most candidates confused between welding and brazing.

Advice to teachers

Teachers should teach the differences of the two processes by emphasizing to the students the burning in brazing and also stress on the differences in heating temperatures.

Expected Responses

- (i) They are short runs at intervals along the joint.
- (ii) They assist in keeping the plates to be welded in perfect alignment or Holding two pieces of metals together.

Question 8

With the aid of labelled sketches, distinguish between parallel turning and facing in lathe work.

(3 marks)

Weaknesses

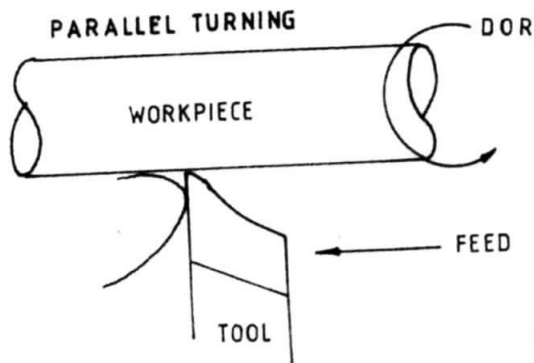
Most candidates could not draw sketches to show the two types of turning.

Advice to teachers

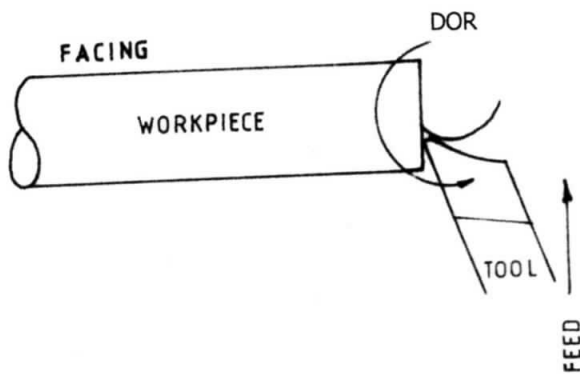
Teachers need to teach by demonstrating to the students the types of turning on a lathe machine

Expected response:

Q 8



Workpiece	= 1/2
Tool	= 1/2
Feed	= 1/2
	<u>= 1 1/2 marks</u>



Workpiece	= 1/2
Tool	= 1/2
Feed	= 1/2
	<u>= 1 1/2 marks</u>

Question 11

Figure 3 shows two views of a machined component drawn in first angle projection.

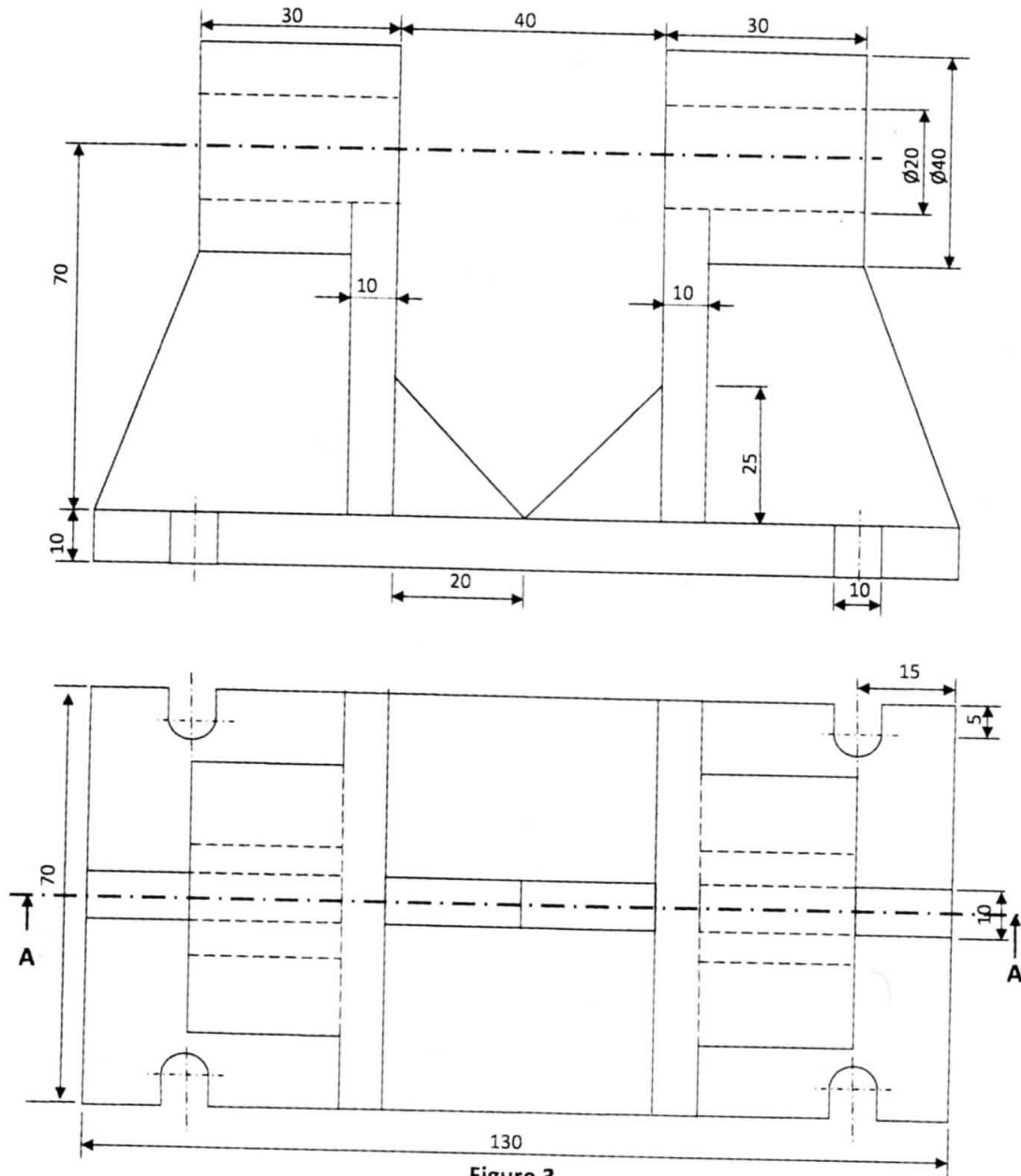


Figure 3

Draw full size, the following views:

- sectional front elevation through A - A.
- end elevation. (Include hidden details).

Weaknesses

(15 marks)

Most candidates could not draw the views of the given component.

Advice to teachers

Teachers should teach the student how to draw by viewing from different directions and give the students enough assignments for them to practice the skill in drawing.

Expected Responses

Q11

SECTION A-A

END ELEVATION

F.E. 9 faces $\times \frac{1}{2}$	= $4\frac{1}{2}$
3 hatching $\times \frac{1}{2}$	= $1\frac{1}{2}$
E.E. 6 faces $\times \frac{1}{2}$	= 3
Centre lines	= 2
Hidden details	= 2
Scale	= 2
Total	= 15 marks

Question 13

- (a) With the aid of sketches, explain the procedure of drilling a hole on a centre lathe machine. (10 marks)
- (b) State and sketch **two** methods of producing a short taper on a lathe machine. (5 marks)

Weaknesses

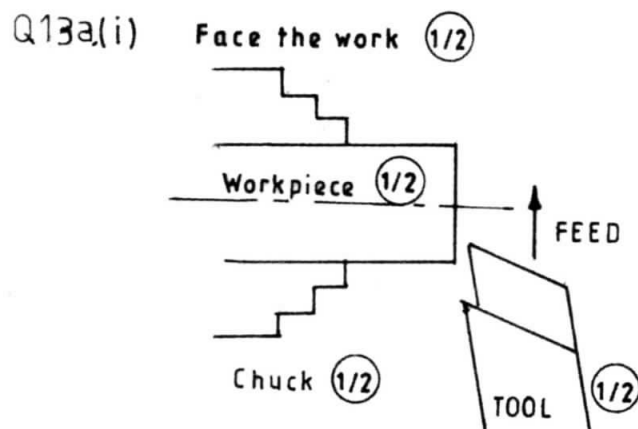
Most candidates did not attempt this question and the few who attempted could not sketch the drilling process

Advice to teachers

Teachers should teach the student all the lathe operations by demonstrating and asking them to draw where necessary.

Expected Responses

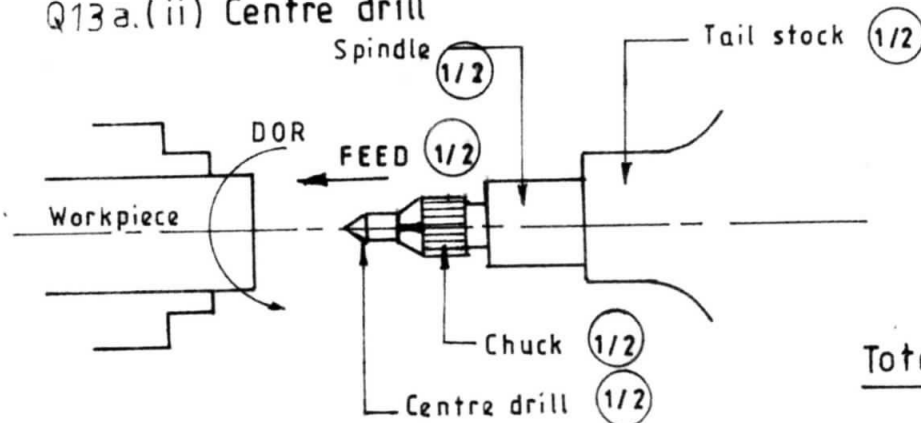
- (a) (I)



- Hold work on the chuck
- face the end using cross slide

II. Centre drill

Q13a.(ii) Centre drill

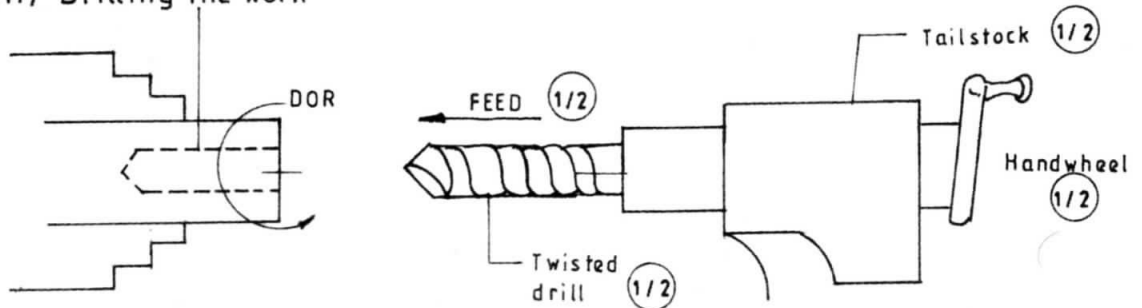


Total = 2½ marks

- use drill chuck to chuck to hold the centre drill
- hold chuck on the spindle of the tailstock.
- lock the tailstock on the machine bed.
- feed the centre drill into the rotating work.

Q13a.

(iii) Drilling the work



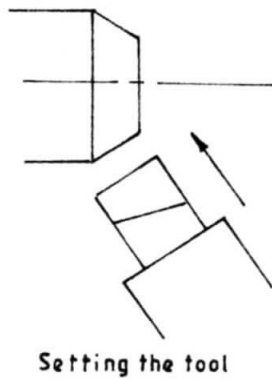
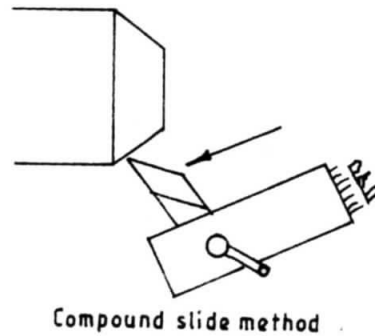
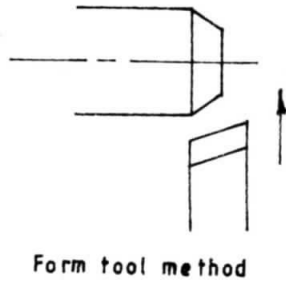
Sketch 3 × 2 = 6
Steps 8 × ½ = 4
Total = 10 marks

- Replace centre drill with twirt drill.
- feed the drill into the rotating work using tailstock wheel

sketches 3 × 2 = 6 marks
steps 8 × ½ = 4 marks
10 marks

(b) Short taper turning methods

Q13b.



Sketching	$2 \times 2 = 4$
Stating	$2 \times 1/2 = 1$
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Total = 5 marks	

3.3.2 Metalwork Paper 2 (445/2)

As in the previous years, the council designed a suitable project for this level together with a comprehensive marking scheme. The subject teacher used the working drawings to supervise the fabrication of the project and the marking scheme to mark the candidates' projects. The marks were then sent to the council through the D.E.Os office.