

### 3.3 METAL WORK (445)

The 2012 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 revised syllabus was tested for the first time but 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 2012**

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

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

- (i) The mean score for the year 2012 improved compared to that of the year 2011. This is an indication that the paper's performance in 2012 improved as compared to 2011.
- (ii) The candidature increased from 170 in the year 2011 to 190 in the year 2012.

#### 3.3.1 Metalwork Paper 1 (445/1)

The questions which were reported to have been poorly performed have been analyzed with a view to pointing out candidates' weaknesses and proposed suggestions on some remedial measures that would be taken in order to improve performance in future. The questions for discussions include 2 a, 9, 11 and 12(a).

##### Question 2 a

State **four** safety precautions to be observed when using bench shears in the workshop.

Candidates were expected to state the safety precautions to be observed when using bench shears in the workshop.

### Weaknesses

Some candidates had problems of mistaking a tin snip for bench shears.

### Advice to Teachers

They need to explain to students the safety precautions for each particular machine or hand tool in the workshop.

### Expected Responses

Safety precautions to be observed when using bench shears:

- Always return hand to its normal position so as not to obstruct workshop users.
- Use to cut the recommended size of materials.
- The shears should be firmly fixed onto the bench
- The jaws of the shears should be sharp enough

### Question 9

Use labeled sketches to show the following operations on a lathe machine:

- a) parallel turning
- b) facing off

Candidates were expected to sketch the stated lathe operations.

### Weaknesses

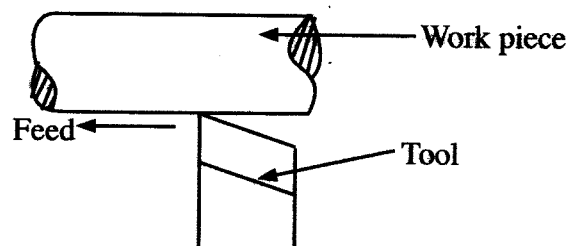
Most candidates had no idea about the stated operations.

### Advice to Teachers

They should teach the new syllabus in totality.

### Expected Responses

- (i) **Parallel turning**



$3 \times \frac{1}{2} = 1\frac{1}{2}$  marks

(ii) **Facing**

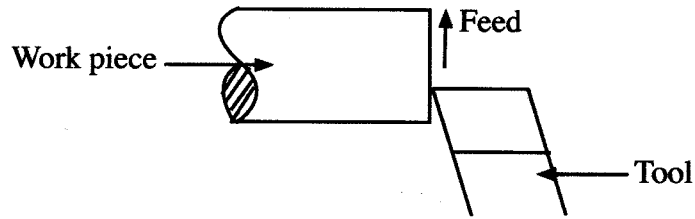


Figure 5

**Question 11**

Figure 1 shows a truncated pipe of diameter 24 mm. Draw the development of part B.

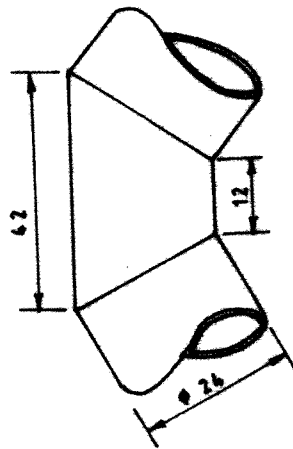


Fig. 1

Candidates were expected to draw the development of part B as shown in the figure.

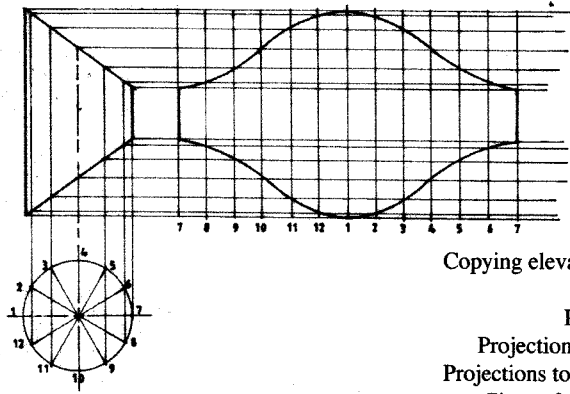
**Weaknesses**

Most candidates had problems in drawing the development.

**Advice**

Teachers are advised to give students more practice on drawing the developments of solids including cylinders, pyramids, cones and prisms.

**Expected response:**



- Copying elevation B - 1
- Plan - 1
- Plan divisions - 2
- Projections to elevation - 2
- Projections to development - 2
- Circumference marked - 2
- Points of intersection - 2
- Joining of points - 3
- 15 marks

**ACCEPT ALTERNATIVE OPENING POINT**

**Question 12 a (ii)**

**Figure 2** shows an arc welding set-up

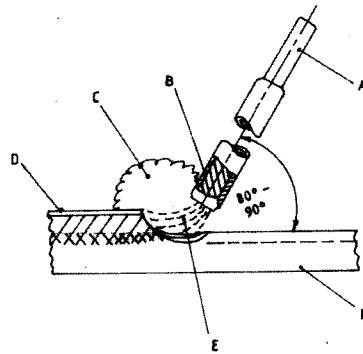


Fig. 2

State the function of each of the parts B and C.

Candidates were expected to state the function of the parts B and C as shown in the drawing.

**Weaknesses**

Most candidates could not state the functions of the given parts

**Advice**

Teachers are advised teach both Arc welding and Gas welding as outlined in the syllabus.

**Expected Responses**

- (i) **The flux has the following functions:**
- Enable the arc to be struck and maintained easily
  - Floats the impurities out of the molten metal to form slag
  - Provides iron powder to increase the rate of depositing
  - It forms a layer that helps the joint to cool slowly.

**(ii) The gaseous shield has the following functions:**

- It helps protect the weld
- It slows down the cooling of the joint.

### **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 teachers 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.O's offices.