

23.0 DRAWING AND DESIGN (449)

The Drawing and Design examination for 2011 consisted of a theory and a practical paper. The former constituted **60%** of the total marks while the latter constituted **40%** of the final mark. This report outlines the candidates' performance in Drawing and Design in the year 2011.

23.1 CANDIDATES' OVERALL PERFORMANCE

Table 34: Candidates' Overall performance in Drawing and Design for the Years 2008, 2009 2010 and 2011.

Year	Paper	Candidature	Maximum Score	Mean Score	Standard Deviation
2008	1	19	60	20.42	10.51
	2		40	26.16	5.87
	Overall		100	46.58	15.44
2009	1	313	60	26.31	13.12
	2		40	20.44	7.53
	Overall		100	46.75	18.49
2010	1	307	60	27.93	12.09
	2		40	22.22	6.49
	Overall		100	50.15	14.79
2011	1	428	60	31.52	10.17
	2		40	24.17	7.00
	Overall		100	55.68	15.21

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

- The number of candidates increased from 307 in 2010 to 428 in 2011.
- Both the mean and standard deviation increased from **50.15** to **55.68** and **14.79** to **15.21** respectively.

23.2 Paper1 (449)

The following analysis examines individual questions where poor performance was recorded in the paper. The questions include **1(a), 2(a), 4(a), 7, 11, 12** and **14**.

Question 1(a)

State **two** requirements to be observed to avoid confusing the dimension lines with outlines in a drawing. (1 mark)

Candidates were expected to state two requirements to be observed to avoid confusing dimension lines with outlines on a drawing.

Weakness

Most candidates were unable to differentiate between the two lines.

Comment

Teachers are advised to teach all types of lines and emphasize their role in drawing

Expected responses

- i. Correct thickness of the lines must be maintained
- ii. Care must be taken in positioning
- iii. Dimension lines should always have arrow heads showing the extent of the dimension

Question 2(a)

State what an industrial training centre in Kenya is. (1 mark)

Candidates were expected to state what an Industrial Training Centre is.

Weakness

Most candidates were not able to state what an Industrial Training Centre is.

Comment

Teachers should be encouraged to teach all the topics in the syllabus including the introductory ones that most of them take for granted. These topics include Occupational information.

Expected responses

Industrial Training Centres are Government or NGO institutions which offer marketable skill at Artisan and/or Craft levels.

Question 4(a)

Give the composition of each of the following alloys:

- (i) brass;
- (ii) Stainless steel. (2 marks)

Candidates were expected to give the composition of brass and stainless steel alloys.

Weakness

Some candidates lacked the mastery of alloys.

Comment

Teachers are advised to teach broadly the topic of engineering materials

Expected responses

Brass is an alloy of copper and zinc
Stainless steel is an alloy of zinc and chromium

Question 7

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

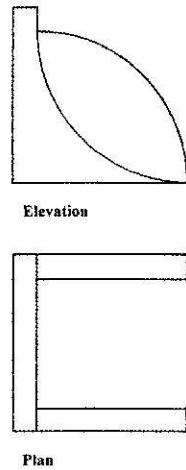


Figure 3

Sketch in good proportion, the oblique view of the block.

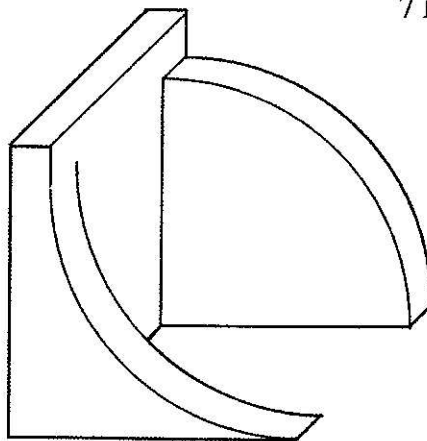
(3 marks)

Candidates were expected to sketch in good proportion the oblique view of a block whose two views were given in first angle orthographic projection.

Expected response

6 Faces (6x¹/₂) = 3

7 Ms



Weakness

Candidates were unable to sketch in oblique.

Comment

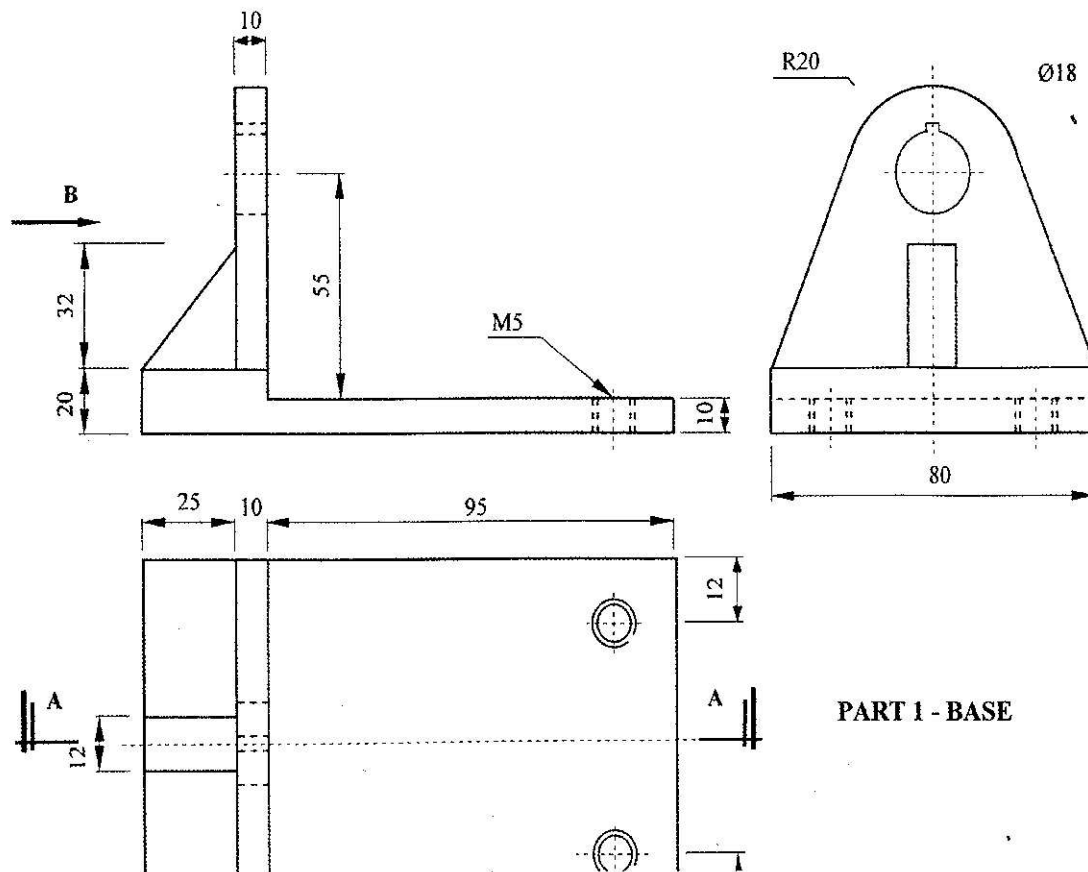
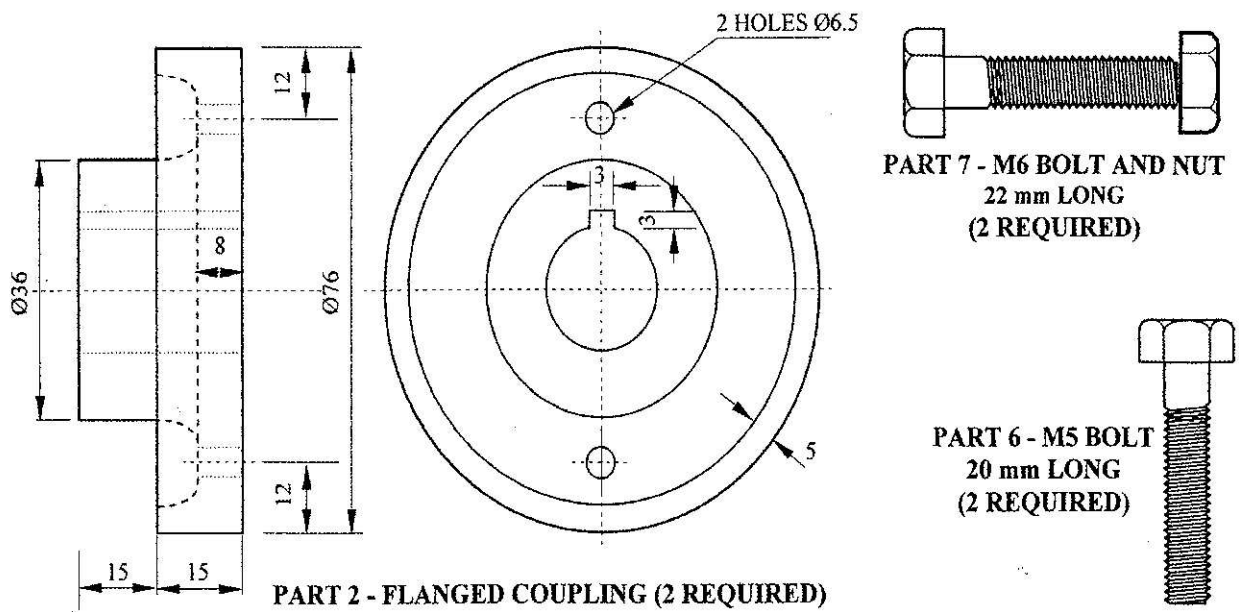
Teachers are advised to teach all aspects of pictorial drawings emphasizing the angle at which to draw the receding sides.

Question 11

Figure 7 shows part of a coupling bracket drawn in first angle projection.

Assemble the parts and draw FULL SIZE, the following:

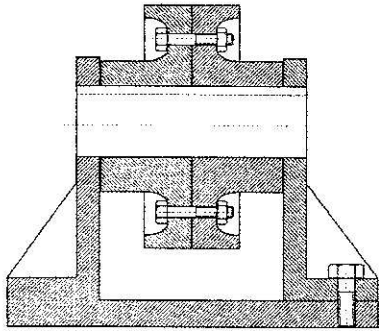
- (a) Sectional front elevation along the cutting plane A-A.
- (b) End elevation in the direction of arrow B.
Do not show the hidden details.



Candidates were expected to assemble parts of a coupling bracket drawn in first angle projection and draw a sectional view and other views in the given directions of viewing.

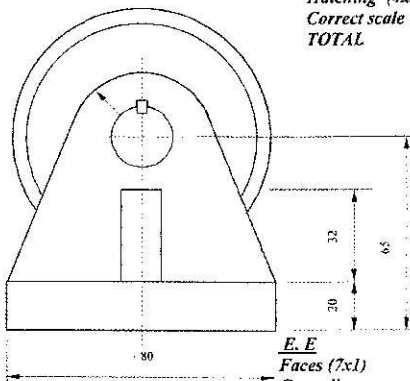
Expected Responses.

11 ms



SECTION A - A

<u>SECTIONAL F. E</u>	
Faces (9x1)	= 9
Bolts and nuts	= 3
Hatching (4x1)	= 4
Correct scale	= 1
TOTAL	= 17



<u>E. E</u>	
Faces (7x1)	= 7
Centerlines	= 1
Leading dimensions(4x1)	= 4
Direction B	= 1
TOTAL	= 13

Weakness

Most candidates had problems assembling the component and drawing the required views.

Comment

Teachers are advised to give students more practice in assembly work emphasizing on the correct sectioning of the cut portions which indicates the internal construction of a given component. This aspect in drawing is very vital as it enables the students to visualize how a given component is constructed internally.

Question 12

Figure 8 shows two views of a funnel drawn in third angle projection. The body of the funnel is conical with a wired edge and a cylindrical spout.

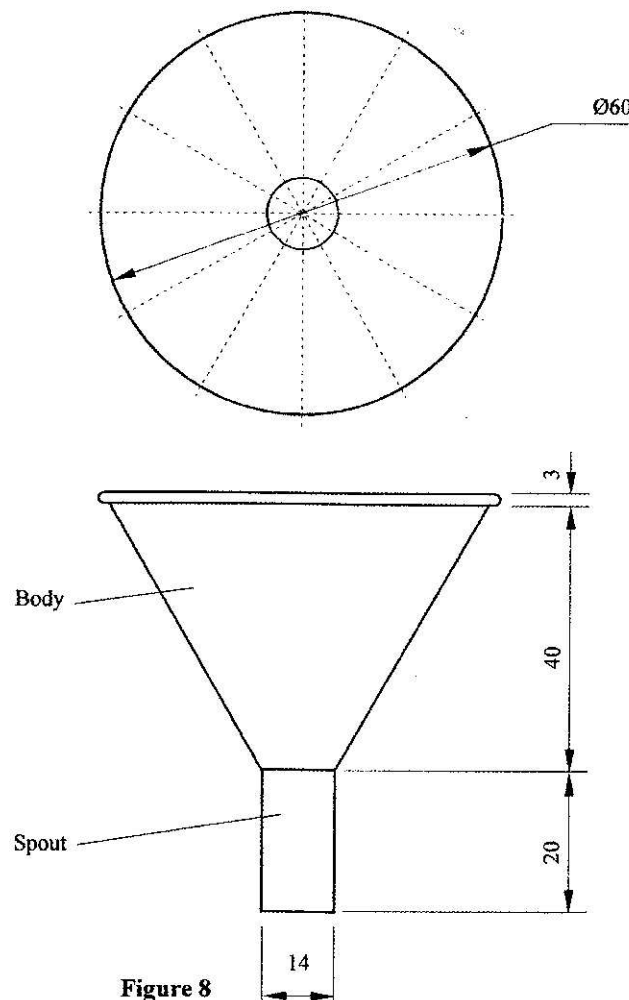


Figure 8

Draw the development of:

- (a) the body with a 3 mm wire edge;
- (b) the spout (allow 5 mm seam and ignore the thickness of the material). (15 marks)

Candidates were expected to draw the development of a funnel drawn in third angle projection

Weakness

Some candidates were unable to complete the development of the funnel.

Comment

Teachers are advised to give students more practice on interpenetration of solids and their developments.

Expected Responses

Q12 (MS)

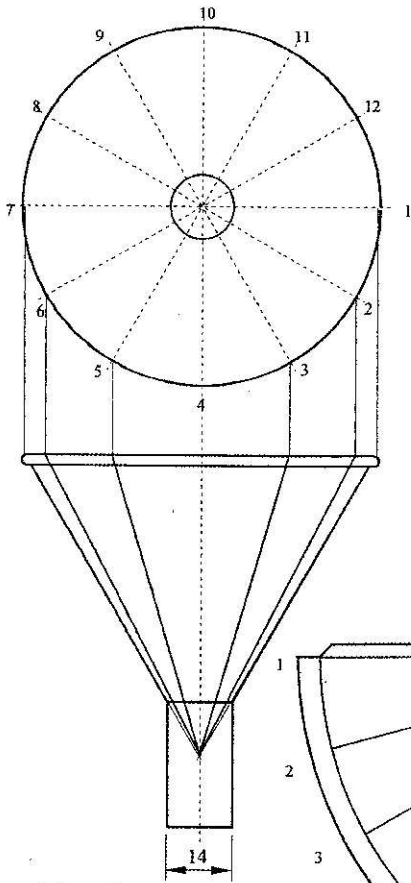


Figure 8

BODY

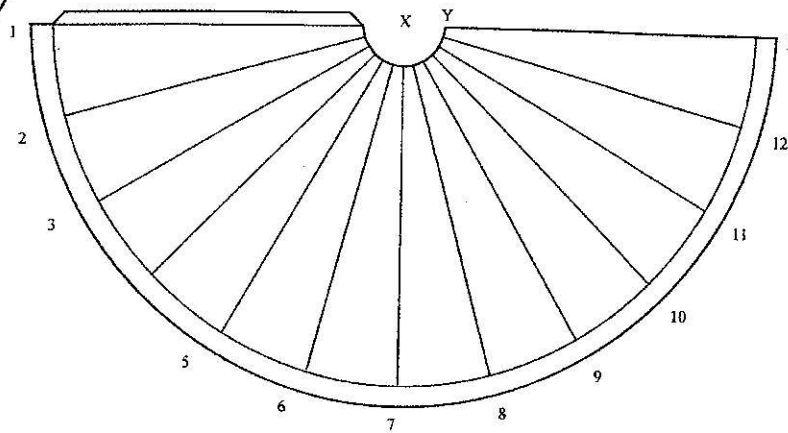
- Drawing the plan* = 1/2
- Drawing the cone* = 1
- Determination of height* = 1
- Determination of circumference* = 1
- Dividing the plan into 12 parts* = 1
- Transfer of divisions* = 1
- Height of truncated part* = 1
- Drawing arc for spout opening* = 2
- Provision of wire edge* = 1
- Provision of flap* = 1

SPOUT

- Drawing the plan* = 1/2
- Determination of circumference* = 1
- Dividing the plan into 12 parts* = 1
- Stepping the circumference* = 1
- Determination of height* = 1

TOTAL

= 15 MARKS



Question 14

Figure 10 shows a plan of a guard house.

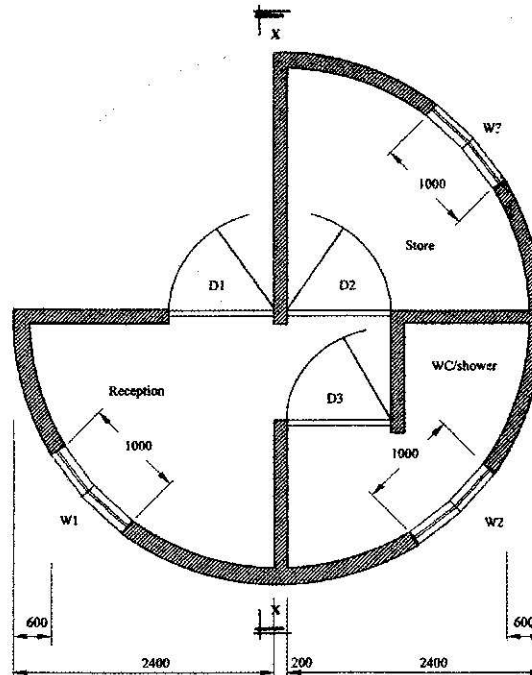


Figure 10

Draw section X-X to a scale of 1:50.

(15 marks)

Specifications

- Foundation: Concrete strip 600 x 200
- Walling: 200 mm blockwork
- Flooring: Ring beam 300 x 200
- Flooring: Concrete on hardcore
- Flooring: Screed on 100 mm concrete
- Roof: Pitch 30° covered with concrete tiles on 50 x 25 battens on 100 x 50 rafters.
- Doors: D1 steel casement 2000 x 900
- Doors: D2 and D3 framed timber 2000 x 900
- Windows: W1 steel casement 1600 x 1000
- Windows: W2, W3 and W4 1000 x 500

Candidates were expected to draw a section of a guard house whose plan and specifications were given in the question.

Weakness

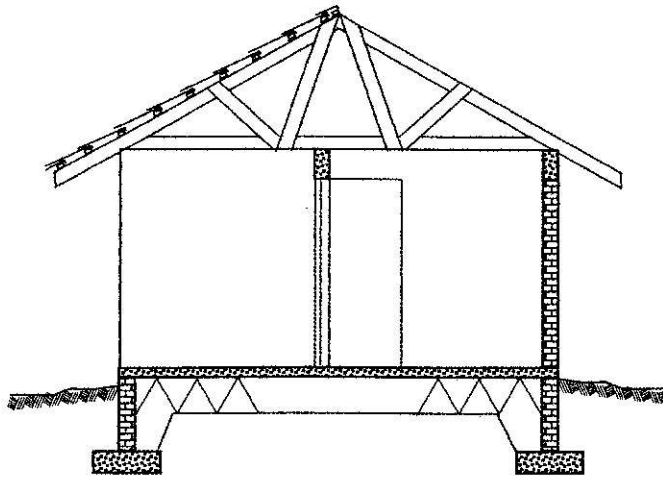
Most candidates were unable to use the correct scale while some confused the elements given in the specifications.

Comments

Teachers are advised to give student a lot of questions for practice to expose them to building drawing with emphasis on sections of the components as given in the specifications.

Expected Responses

Q14 (ms)



<i>Tiles</i>	<i>= 1</i>
<i>Battens</i>	<i>= 1</i>
<i>Rafters</i>	<i>= 1</i>
<i>Ring beam</i>	<i>= 1</i>
<i>Wall</i>	<i>= 1</i>
<i>Concrete floor</i>	<i>= 1</i>
<i>Hard core</i>	<i>= 1</i>
<i>Foundation (2x1)</i>	<i>= 2</i>
<i>Ground level</i>	<i>= 1</i>
<i>Door opening (2x1)</i>	<i>= 2</i>
<i>Scale</i>	
<i>height</i>	<i>= 1</i>
<i>width</i>	<i>= 1</i>
<i>pitch</i>	<i>= 1</i>

TOTAL = 15 MARKS

Teachers to emphasize sections of the following components of buildings:-

- Foundation
- Walling
- Flooring
- Ring beam
- Roof components
- Details of different types of doors
- Details of different types of windows

23.3 Paper 2 (449/2)

This paper is always composed of one design question which must be attempted by all the candidates. In the year 2011, the question required the candidates to design a ladder for a gardener.

- It should have provision for height adjustment
- It should be able to be collapsible.
- It can be adjusted to desired heights.
- It can be folded and stored when not in use.

In their responses, the candidates were expected to present rough sketches of two possible designs. In the second requirement, the candidates were to select one of the two possible designs and refine it into an exploded pictorial drawing. The third requirement called for the candidates to make detailed sketches of suitable mechanisms to cater for each features cited above.

Weaknesses

The following weaknesses were observed in candidate's work.

- Wrong interpretation of the design problem.
- Inability to sketch neat, proportional and appropriate drawing to represent specific features.
- Failure to present clear and detailed mechanisms.
- Limited skills to present ideas in exploded form
- Inability to identify appropriate materials and joints required to assemble various part of the ladder.

Advice to Teachers

Candidates require a lot of practice in sketching exploded views and presenting various ideas in drawing form.

Candidates also need sufficient exposure to various designs in order to develop the desired concepts.

Teachers should insist on neatness, line work and proportionality in all the drawing assignments given to their students. Teachers should also ensure that the entire syllabus is covered including topics like materials and methods of joining different parts of objects.