22.0 DRAWING AND DESIGN (449)

The Drawing and Design (449) examination was reintroduced in the year 2008 after a lapse of two years. The format for the Drawing and Design examination was the same as in the previous years. It consisted of a theory paper worth ***60%*** of the overall mark and a practical paper worth ***40%.***

22.1 CANDIDATES' GENERAL PERFORMANCE

The table below shows candidates' performance in Drawing and Design (449) in the year **2008**. Statistics for the years **2003**, **2004** and **2005** are also included for comparison.

Table 27: Candidates' Overall Performance in Drawing and Design for the Years 2008, 2005, 2004 and 2003

Year	Paper	Candidature	Maximum Score	Mean Score	Standard Deviation
	1		60	30.26	11.84
	2		40	23.36	5.98
2003	**Overall**	**1,537**	**100**	**52.62**	**15.67**
	1		60	24.57	9.86
	2		40	21.12	7.56
2004	**Overall**	**1,285**	**100**	**45.69**	**14.00**
	1		60	27.72	10.60
	2		40	23.29	5.94
2005	**Overall**	**1,324**	**100**	**51.00**	**14.00**
	1		60	20.42	10.51
	2		40	26.16	5.87
2008	**Overall**	**19**	**100**	**46.58**	**15.44**

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

22.1.1 There was a remarkable decline in the mean score for ***paper 1 (449/1)*** from ***27.72*** in the year **2005** to ***20.42*** in the year **2008**.

22.1.2 The mean score of ***paper 2 (449/2)*** improved from ***23.29*** in the year **2005** to ***26.16*** in the year **2008**.

22.1.3 The overall mean score for the subject declined from ***51.00*** in the year **2005** to ***46.58*** in the year **2008**.

22.1.4 There was a decline in candidature from ***1,324*** candidates in the year 2005 to only ***19*** candidates in the year 2008.

22.2 PAPER 1 (4491)

The following analysis examines individual questions where poor performance was recorded in the paper. The questions discussed include questions ***1, 5, 6 7, 8*** and ***13***.

Question 1

(a) State the use and **one** advantage of each of the following drawing papers:

(i) grid
(ii) tracing

(b) State the title and role of a person with the following qualification in a design office:
(i) degree in civil engineering;
(ii) diploma in civil engineering.

The candidates' knowledge on various types of drawing paper and why they are used was tested in part (a) of the question. In part (b) of the question, candidates were required to recognize the title and role of the persons whose qualifications were given.

Weaknesses

Most of the candidates did not have the expected knowledge in related drawing and occupational information to be able to give satisfactory responses.

Expected Responses

(a) (i) ***Grid paper:*** provides initial setting of a drawing by tracing. It saves time.
(ii) ***Tracing paper:*** used for copying or developing an existing drawing. It saves time.

(b) (i) ***Engineer:*** designs structures and components. Makes engineering and management decisions
(ii) ***Technician:*** implements management and engineering decisions. Draughts and details drawings

Question 5

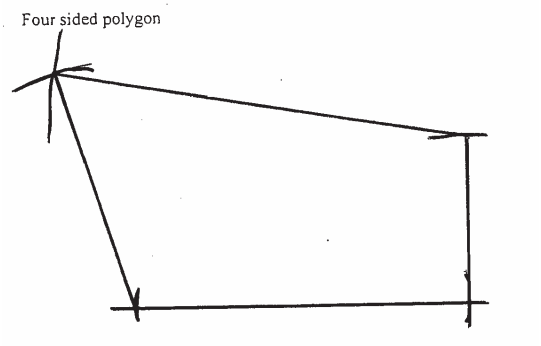
Construct a four sided polygon ABCD with side to length ratios of 2:1 : 2.5:1.5 and a perimeter of 210 mm given that angle ABC is 90°. Measure the smallest angle.

Candidates were expected to use the information given to construct the required polygon.

Weaknesses

The main weakness portrayed by the majority of the candidates was that they used calculations instead of constructing as instructed in the question.

Expected Responses



Question 6

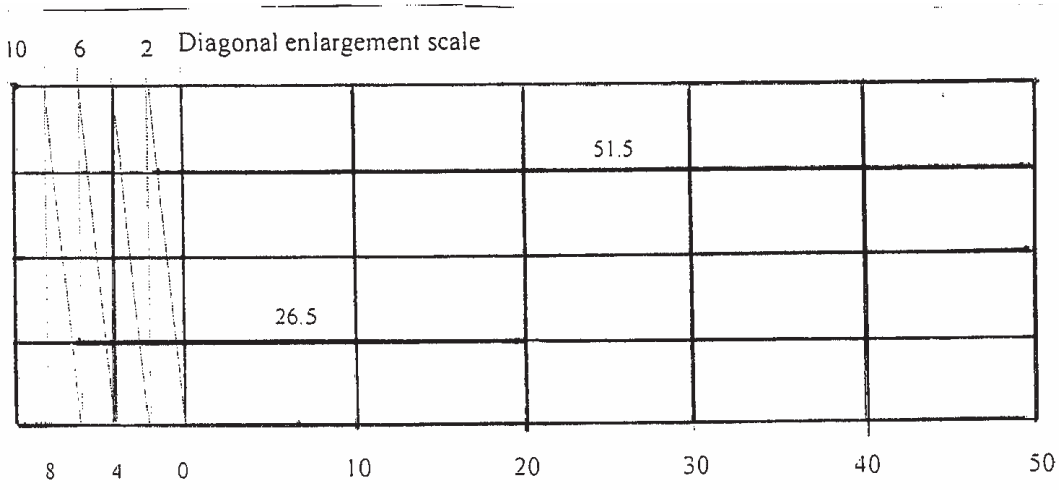
Construct a diagonal enlargement scale of 2:1 to measure to an accuracy of 0.5mm up to 60mm. Show the readings of 51.5 and 26.5 mm on the scale.

This question required the candidates to construct a diagonal scale given the ratio, accuracy and longest side.

Weaknesses

A number of candidates picked divisions off the ruler contrary to construction method which was expected in this question. They also overlooked the fact that it was an enlargement scale according to the ratio given.

Expected Response



Question 7

(a) Figure 3 shows an elevation of a template.

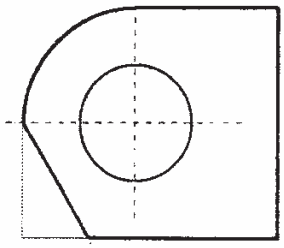


Figure 3

Measure and dimension the:
(i) circle;
(ii) radius;
(iii) angle of the slanting face.

(b) On the perspective grid provided, sketch a two point perspective of the block shown in figure 4.

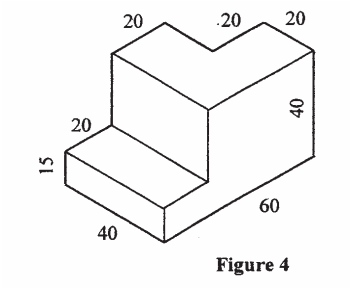


Figure 4

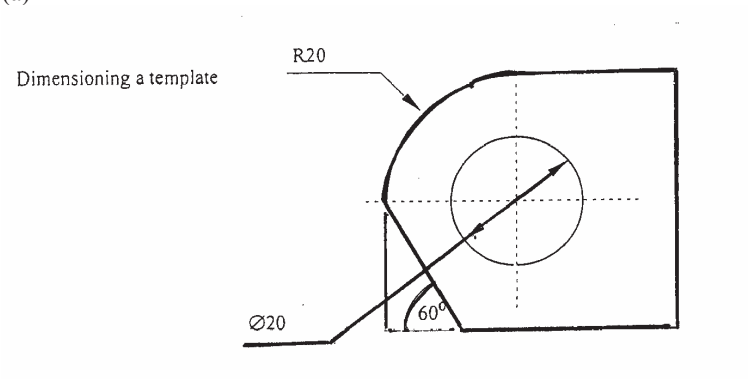
Candidates were expected to take some measurements and show them correctly in the given figure in part (a) of the question. In the second part of the question, the candidates were required to come up with a two-point perspective from a given isometric view.

Weaknesses

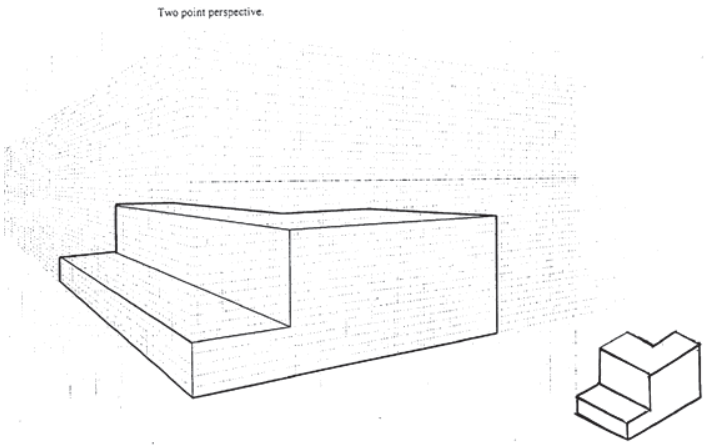
Most of the candidates displayed a lot of weaknesses in dimensioning especially circles, and arcs. They also lacked subject mastery in perspective drawings.

Expected Responses

(a)



(b)



Question 8

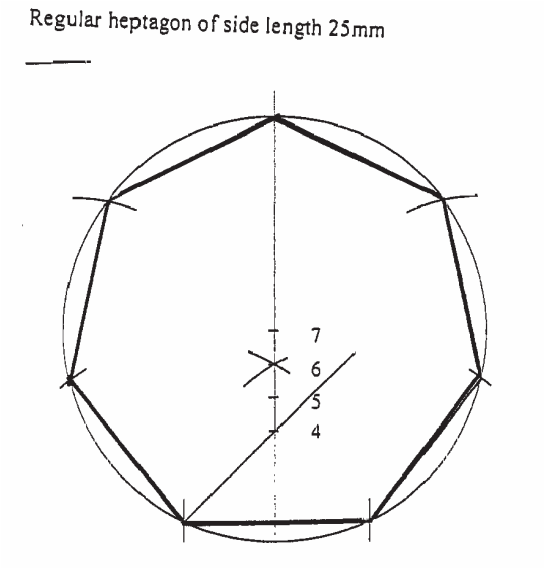
Construct a regular heptagon (seven-side polygon) whose sides are 25mm.

The candidates were required to construct a seven-sided polygon given the length of one side.

Weaknesses

Most of the candidates were not accurate in stepping out the length of the sides along the circumference. A few candidates had no idea of how a heptagon is constructed.

Expected Response



Question 13

Figure 9 shows an isometric view of a machined block.

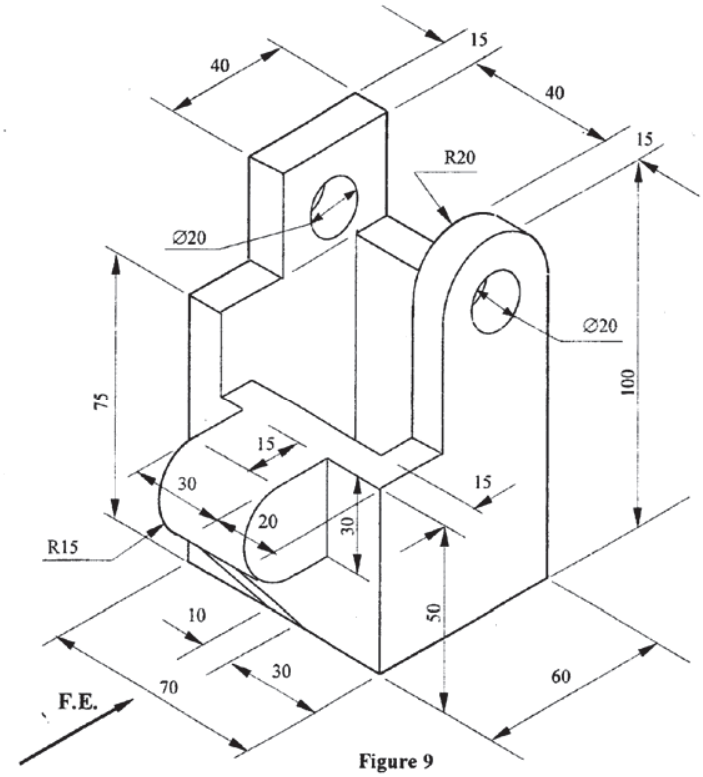


Figure 9

Draw FULLSIZE in third angle projection the three orthographic views of the block.

Candidates were required to draw the orthographic views of a block presented in isometric projection.

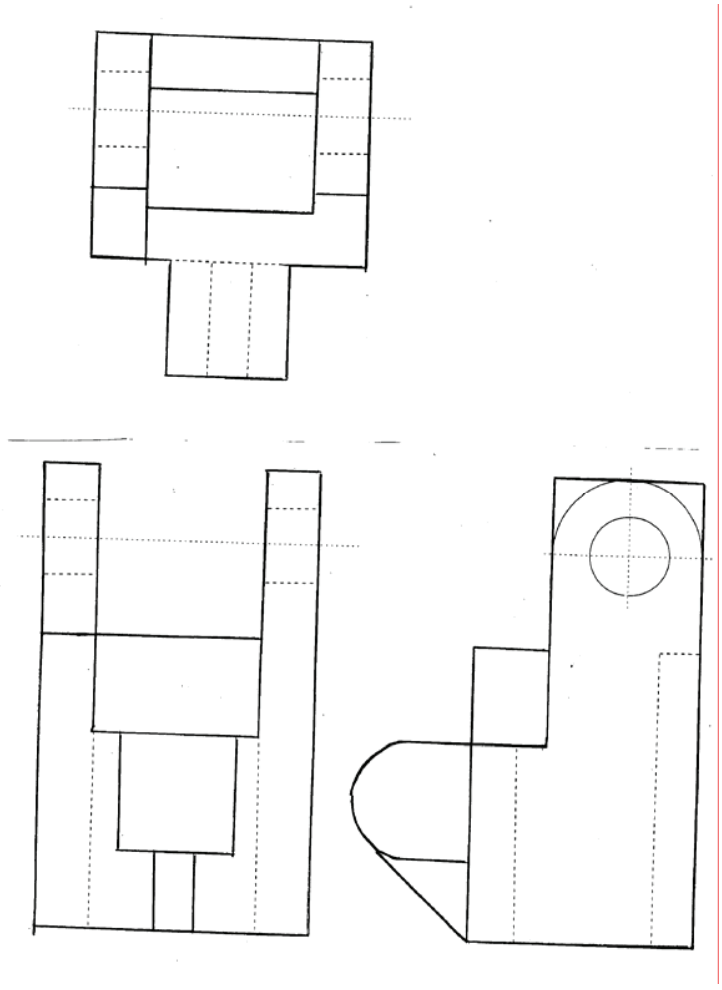
Weaknesses

Three main weaknesses portrayed in the candidates' responses were poor or wrong projection of views, poor and untidy line work and confusion of first and third projection angles.

In the expected responses, the candidates should have observed the following:

- All the orthographic views to be presented in third angle projection.
- Use one of the conventional methods in orthographic projection.
- Use of correct scale (full size) as specified in the question.
- Each view to have all the required details including centre lines and hidden details.
- Correct line work with clear distinction between various types of lines.
- Neatness in each view presented.

Expected Response



22.3 PAPER 2 (449/2)

This paper is always composed of one design question which must be attempted by all the candidates. In the year 2008, the question required the candidates to design a suitable ironing board with the following features:

- It should be easily adjustable to any desired height.
- It should be collapsible to allow for storage in limited space.
- Be stable when in use and have provision for holding the iron box.
- It should be portable.

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 a pictorial drawing. The third requirement called for the candidates to make detailed sketches of suitable mechanisms to cater for each feature cited above.

22.3.1 Weaknesses

The following weaknesses were observed in candidate's work.

- Wrong interpretation of the design problem.
- Inability to sketch neat, proportional and appropriate drawings 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 parts of the ironing board.

22.3.2 Advice to Teachers

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

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

22.3.2.3 Teachers should insist on neatness 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 joining methods.