

### 3.7 DRAWING AND DESIGN (449)

The Drawing and Design examination for the year 2021 was tested in two papers: Paper 1 and Paper 2. Paper 1 was a theory paper which constituted 60% of the final mark while paper 2 was a practical paper which constituted 40% of the final mark. The format and weighting of the papers was the same as in the previous years.

#### 3.7.1 Candidates Overall Performance

The table below shows candidates' overall performance for the six-year period, from 2016 to 2021.

*Table 13: Candidates overall performance in the years 2016, 2017, 2018, 2019, 2020 and 2021*

Year	Paper	Candidature	Maximum scores	Mean Score	Standard Deviation
2016	1	612	60	38.61	11.00
	2		40	28.32	5.77
	<b>Overall</b>		<b>100</b>	<b>66.92</b>	<b>14.91</b>
2017	1	715	60	34.95	10.47
	2		40	29.56	4.94
	<b>Overall</b>		<b>100</b>	<b>64.51</b>	<b>13.86</b>
2018	1	742	60	36.8	11.37
	2		40	30.81	5.47
	<b>Overall</b>		<b>100</b>	<b>67.61</b>	<b>15.45</b>
2019	1	899	60	36.77	11.42
	2		40	31.27	5.57
	<b>Overall</b>		<b>100</b>	<b>68.04</b>	<b>15.24</b>
2020	1	1037	60	36.00	10.77
	2		40	31.30	5.82
	<b>Overall</b>		<b>100</b>	<b>67.45</b>	<b>15.00</b>
2021	1	1309	60	37.12	10.94
	2		40	29.79	5.28
	<b>Overall</b>		<b>100</b>	<b>65.97</b>	<b>15.50</b>

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

- (i) The candidature increased from 1037 in the year 2020 to 1309 in 2021.
- (ii) The mean score dropped slightly from 67.45 in 2020 to 65.97.
- (iii) However, the standard deviation improved from 15.00 in 2020 to 15.50 in 2021.

#### 3.7.2 Drawing and Design Paper 1 (449/1)

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 need to be taken in order to improve performance in future. The questions for discussions include 5(a), 7, 9, 10 and 14.

**Question 5 (a)**

Use sketches to show **four** ways of dimensioning arcs in drawings.

**Weakness**

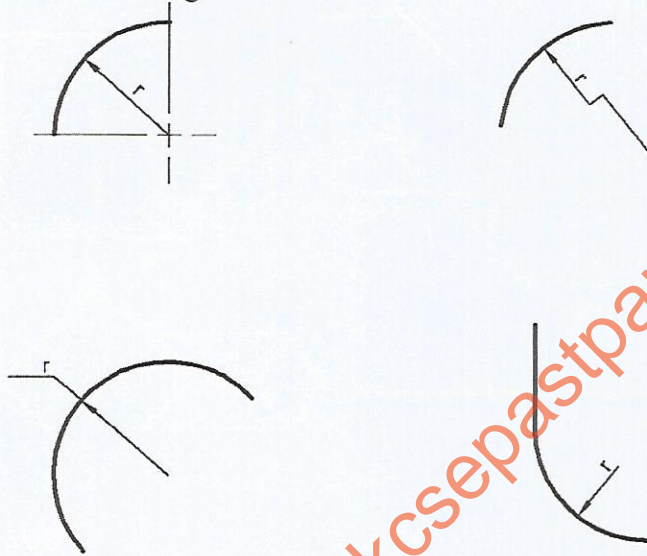
Majority of the candidates could not show four ways of dimensioning arcs.

**Advice to teachers**

Teachers are advised cover the syllabus adequately give the students adequate exercises for practice.

**Expected responses**

Ways of dimensioning arcs:

**Question 10**

Explain the importance of each of the following terms as used in the design process:

- a) Research
- b) Evaluation

**Weakness**

Some candidates lacked the technical terms to use in explaining the terms.

**Advice to teachers**

Teachers are advised to adequately cover the syllabus including the topic of Design.

**Expected responses**

- a) The importance of research in the design process is to collect information relevant to the design problem.
- b) The importance of evaluation is to help the designer know whether the project objectives have been met or not. It is done to establish whether the design brief has been satisfied.

### Question 14

Figure 7 shows two intersecting square tubes A and B drawn in 1<sup>st</sup> angle projection.

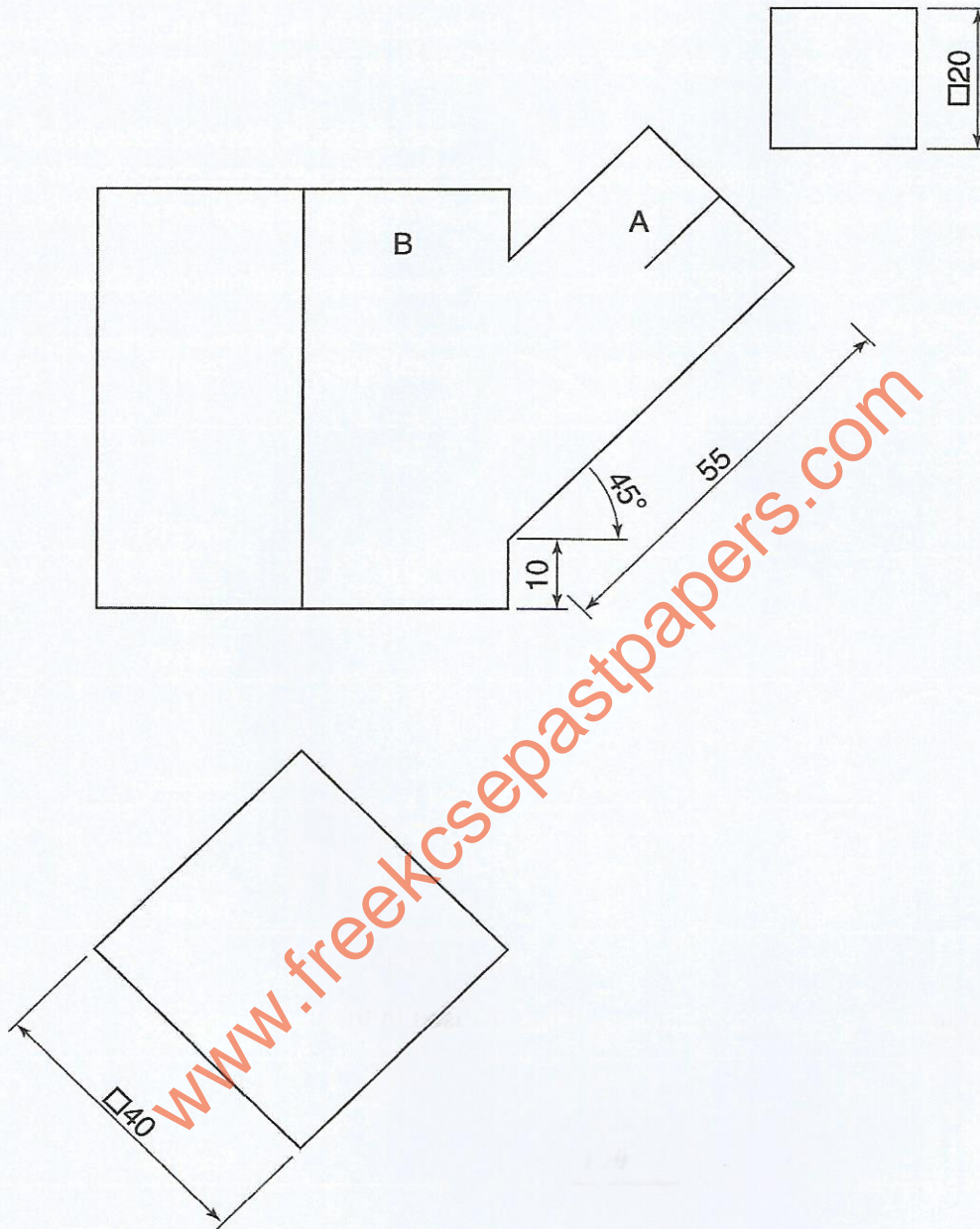


Figure 7

(a) Copy the figure and complete each of the following:

(i) Front elevation

(ii) Plan

(b) Draw the development of tube B.

(15 marks)

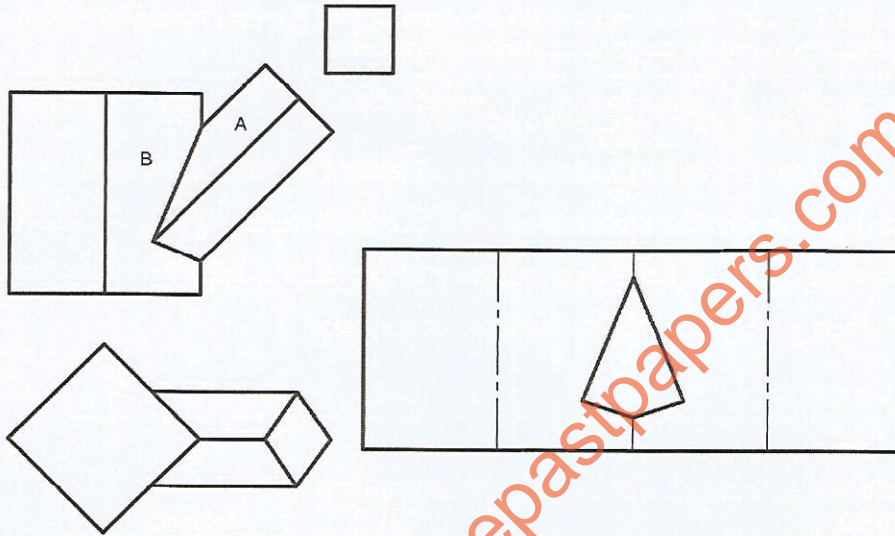
## Weakness

Some candidates could not complete the front elevation and plan of the intersecting solids as given in the question.

## Advice to teachers

Teachers are advised to use models to explain the concept of intersecting solids and also give students a lot questions for practice in drawing the required details of the solids.

## Expected response



M/S

Correct figure drawn = 2mks

F.E

Four Faces @1 = 4mks

Plotting the line of intersection = 1mk

PLAN

Four Faces @1 = 4mks

DEV.

Development = 1mk

Shape of Hole = 2 mks

Folding Lines = 1mk

**Total** 15mks

### 3.7.3 Drawing and Design Paper 2 (449/2)

This paper is always composed of one design question which must be attempted by all the candidates. In 2021, the paper required the candidates to design a trolley with the following considerations:

1. It should be easy to move on a level ground.
2. It should be possible to move goods on a staircase using the device without damaging the edges of the staircase.
3. It should have a firm grip on the ground.

**The tasks which the candidates were to carry out were as follows:**

- (a) Make free-hand pictorial sketches of two possible designs.
- (b) Select **one** of the designs in (a) above and make a refined labelled pictorial drawing.
- (c) Make detailed exploded sketches of the mechanism used in considerations (1) to (4) above.
- (d) Name **two** types of materials used in the design and state where each is used.
- (e) State **two** methods of joining the parts and state where each is used.

#### Weaknesses

- Some candidates did not address all the considerations required.
- Some candidates lacked skills to produce proportional sketches of possible designs.
- Some candidates failed to use the appropriate mechanisms for each of the considerations.
- Some candidates were not specific when naming the materials to be used in the design while a few failed to state the reasons for the choice of material.

#### Advice to teachers

- Give students a lot of practice and expose them to a variety of mechanisms.
- Give the students more practice in pictorial drawings and sketches.
- Always insist on neatness, line work and proportionality in all the drawing assignments given to students.
- Insist on strict adherence to the instructions given in the questions.
- Ensure that the entire syllabus is covered including topics like materials, their properties and methods of joining different parts.