

PRINCIPAL EXAMINER'S REPORT



BOTSWANA
EXAMINATIONS
COUNCIL

JCE DESIGN AND TECHNOLOGY 2024

PAPER 1: MULTIPLE CHOICE

General Comments

The performance of the candidates was lower compared to that of the previous year with a mean of 17.04. As usual, the performance varied across the items with some having very high proportions of candidates getting the item correct while others had very low proportions. There were some items which showed misconceptions by the candidates, while some clearly showed lack of content mastery on the part of the candidates.

Where misconceptions and lack of content knowledge are evident, such information should be used to improve the teaching and learning. Generally, Multiple-Choice items have a guessing factor that is considered to be the lowest proportion of being able to get the item correct without knowing the answer. For a Multiple-Choice item with four options, the guessing factor is 25% and any item which has the proportion of candidates who got it correct lower than the guessing factor is a cause for concern. Candidates should be encouraged to always read the question for understanding before they select an answer. The report is mainly in table format showing the number of candidates at each of the options. The key for reading the table:

N number of candidates that selected the option as their answer

Key the option that was taken as the answer for the item

Comments on Individual Questions

Question 1

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 1066 | C | A simple First Aid item testing the recall and thus majority of candidates got it right. |
| B | 1123 | | |
| C | 8878 | | |
| D | 1264 | | |

Question 2

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 1593 | C | A safety item correctly answered by majority of candidates. |
| B | 4372 | | |
| C | 5650 | | |
| D | 717 | | |

Question 3

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 2048 | A | A misconception of the working properties of materials. |
| B | 6106 | | |
| C | 3367 | | |
| D | 811 | | |



Question 4

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 4056 | B | An item on the use of metals which shows lack of knowledge on the part of the candidates depicted by the low number of candidates who got the item correctly. |
| B | 2088 | | |
| C | 2963 | | |
| D | 3225 | | |

Question 5

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 2419 | B | A communication item on construction techniques which shows lack of knowledge by the candidates. |
| B | 1992 | | |
| C | 5814 | | |
| D | 2107 | | |

Question 6

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 1364 | C | Correct identification of a material based on the description given. |
| B | 3959 | | |
| C | 4584 | | |
| D | 2425 | | |

Question 7

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 6942 | A | Correct identification of a material using the diagram provided. |
| B | 2011 | | |
| C | 659 | | |
| D | 2720 | | |

Question 8

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 1066 | C | Correct choice of an abrasive used for the process of smoothening. |
| B | 1123 | | |
| C | 8878 | | |
| D | 1264 | | |

Question 9

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 1464 | D | Correct choice of finish based on the material used. |
| B | 556 | | |
| C | 900 | | |
| D | 9412 | | |



Question 10

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 1331 | B | Most of the candidates correctly identified the method of construction. |
| B | 8680 | | |
| C | 1041 | | |
| D | 1280 | | |

Question 11

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 3283 | D | A correctly answered item seeking understanding of the design process. |
| B | 2004 | | |
| C | 2206 | | |
| D | 4839 | | |

Question 12

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 3035 | C | This is a technology-based item seeking application of mechanisms required to give desired results. |
| B | 1021 | | |
| C | 2459 | | |
| D | 5817 | | |

Question 13

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 3877 | C | Only a few candidates were able to identify the correct software used in the depicted scenario. |
| B | 4730 | | |
| C | 864 | | |
| D | 2861 | | |

Question 14

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 1638 | D | Misconception of the design process led to the low positive response. |
| B | 5536 | | |
| C | 1884 | | |
| D | 3274 | | |

Question 15

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 312 | C | Correct identification of the structure. |
| B | 377 | | |
| C | 5393 | | |
| D | 6250 | | |



Question 16

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 2597 | C | Lack of knowledge of design terms exhibited by the candidates. |
| B | 5815 | | |
| C | 1990 | | |
| D | 1930 | | |

Question 17

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 1859 | D | Demonstration of basic knowledge of electric components by the candidates. |
| B | 2577 | | |
| C | 2466 | | |
| D | 5430 | | |

Question 18

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 1126 | A | The function of the electronic component is to act as a switch in an electronic circuit. |
| B | 5698 | | |
| C | 3479 | | |
| D | 2029 | | |

Question 19

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 6307 | A | The design and manufacturing process well understood by the candidates. |
| B | 1848 | | |
| C | 1176 | | |
| D | 3001 | | |

Question 20

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 3788 | D | A primary woodworking tool not correctly identified by the candidates. |
| B | 3686 | | |
| C | 2657 | | |
| D | 2201 | | |

Question 21

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 2105 | C | Even though the name of the tool was not known, its use was correctly inferred looking at it. |
| B | 3155 | | |
| C | 4993 | | |
| D | 2079 | | |



Question 22

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 3202 | C | A demonstration of understanding of marketing principles well grasped. |
| B | 1411 | | |
| C | 6034 | | |
| D | 1685 | | |

Question 23

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 3028 | B | A correct naming of the fitting. Option A and C were the strongest distractors. The misconceptions should be addressed. |
| B | 4885 | | |
| C | 2827 | | |
| D | 1592 | | |

Question 24

| Option | N | KEY. | Comment |
|--------|-------|------|--|
| A | 299 | C | Demonstration of knowledge in description of a woodworking process largely because wood is common. |
| B | 468 | | |
| C | 11236 | | |
| D | 329 | | |

Question 25

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 2361 | D | An old fitting not commonly known by the candidates, hence the low correct responses. |
| B | 1744 | | |
| C | 2671 | | |
| D | 5556 | | |

Question 26

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 1942 | B | A correct naming and identification of a process used when working with plastics. |
| B | 7286 | | |
| C | 2021 | | |
| D | 1083 | | |

Question 27

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 1340 | C | Correct identification of the electronic component. |
| B | 516 | | |
| C | 8862 | | |
| D | 1614 | | |



Question 28

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 1876 | D | A fair knowledge of resistant materials in as far as properties are concerned. |
| B | 2142 | | |
| C | 3796 | | |
| D | 4518 | | |

Question 29

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 938 | B | Understanding of the principles of energy conservation. |
| B | 5577 | | |
| C | 1096 | | |
| D | 4721 | | |

Question 30

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 2119 | B | Demonstration of knowledge of tools used when working with wood. |
| B | 6662 | | |
| C | 1245 | | |
| D | 2306 | | |

Question 31

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 2420 | C | Demonstration of labelling of parts of saws. |
| B | 2955 | | |
| C | 4911 | | |
| D | 2045 | | |

Question 32

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 1576 | C | Most candidates were able to identify the correct safety property to be considered when handling food. |
| B | 1433 | | |
| C | 7874 | | |
| D | 1448 | | |

Question 33

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 4334 | C | A good number of candidates were able to match the tool with its use. |
| B | 1544 | | |
| C | 4527 | | |
| D | 1926 | | |



Question 34

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 1720 | C | Most candidates were able to state the correct view. |
| B | 3011 | | |
| C | 5669 | | |
| D | 1930 | | |

Question 35

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 4444 | B | Misunderstanding of dimensioning techniques shown by many candidates from a topic which is not well taught. |
| B | 2174 | | |
| C | 1866 | | |
| D | 3846 | | |

Question 36

| Option | N | KEY. | Comment |
|--------|------|------|---|
| A | 1557 | D | Most candidates were able to identify the diagram showing a transparent material. |
| B | 1337 | | |
| C | 3544 | | |
| D | 5892 | | |

Question 37

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 1667 | D | Correct identification of the method of working on wood. |
| B | 2747 | | |
| C | 2656 | | |
| D | 5259 | | |

Question 38

| Option | N | KEY. | Comment |
|--------|-------|------|---|
| A | 826 | B | Most candidates were able to name the common tool used in the workshop. |
| B | 10056 | | |
| C | 494 | | |
| D | 952 | | |

Question 39

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 1889 | C | A scientific concept not well understood by the candidates as regard air movement. |
| B | 1904 | | |
| C | 2729 | | |
| D | 5767 | | |



Question 40

| Option | N | KEY. | Comment |
|--------|------|------|--|
| A | 1130 | C | A lot of the candidates were able to interpret the statement that described torsion. |
| B | 1158 | | |
| C | 5760 | | |
| D | 4011 | | |

PAPER 2: WRITTEN THEORY

General Comments

In general, this year's cohort showed a slight improvement on the top achievers, for the middle and the low achieving ones the performance was comparably the same.

Comments on Individual Questions

Section A

- 1 Most candidates stated the general methods of keeping the workshop tidy instead of being specific to the method shown.
- 2 Most candidates stated "rubber gloves" instead of surgical gloves.
- 3 Candidates responded positively on giving the correct/specific coated paper but failed to give the characteristics of epoxy resin and gave products of leather instead.
- 4 Most candidates were able to access both parts of the question.
- 5 Positive responses stated by almost all candidates. Candidates were not able to sketch the mechanism stated graphically as they sketched the same diagram/illustration and labelled the load, effort, and pivot.
- 6 Most candidates responded well to both parts of the question by sketching the correct diagram of the circuit using correct symbols. They were able to correctly state the function of the switch.
- 7 Candidates stated the missing devices required in the process.
- 8 Most statements regarding the situation given were not clear as they included the problem or were just statements of the problem.
- 9 Candidates answered correctly as they were able to state the correct advertising media.
- 10 The question was poorly answered. They failed to state the correct tools.

Section B

- 11 Candidates were able to state the specific material for the required parts, state the correct tools, and graphically illustrate the process. Candidates, however, failed to show the correct process of cutting out the slot which includes drilling first and cutting out. Candidates also failed to identify two problems arising from the use of the holder.
- 12 Well attempted as candidates were able to give correct/specific materials, suitable joints, but failed to sketch the named joint. Most candidates failed to give suitable fixings for the adjustment of the mechanism. Part (e) of the question was not answered correctly as candidates were giving marking processes but failed to show the measuring tool. The sketches presented were a mixture of 2D and 3D.
- 13 Most candidates stated acrylic as the answer, which unfortunately is not suitable as it scratches easily, but for the handle the candidates stated the correct materials for the handle. Candidates were able to state the correct name of the method which can be used. Most candidates were either

sketching the development in 3D or sketching the scoop/dustpan. The abrasives were correctly stated.

- 14** Most candidates were able to give 3D sketched ideas with four (4) compartments. Materials and construction were shown with annotations. Candidates only failed to correctly dimension the compartments and the overall dimensions of the product. Materials and suitable finishes were correctly stated.

PAPER 3: COURSEWORK

General Comments

This report outlines the observations made during the external moderation of the 2024 Design and Technology Paper 3, conducted from November 4 to November 29, 2024. It explores the approaches taken by Centres toward portfolio development and product manufacturing skills. Additionally, it discusses project handling and compares the internal and external application of the assessment criteria.

Comments on Project Work

Theme Analysis: Candidates managed to present relevant illustrations with understandable explanations. The examination of area of interest was done but methods were not covered in some Centres because of the templates used which limited students' creativity.

Situation: Real life situations were presented and related to the examined areas of interest.

Problem: Statements provided were clearly derived from the design situations, except in a few cases where the statements of the situation were repeated or had multiple problem statements

Design Brief: Most of the statements presented correctly outlined design intentions to address the identified problems.

Specifications: The statements addressed the design intentions and provided a good guide to the design activity. However, a number of candidates could not justify their statements .

Exploration of Ideas

Different possible solutions were presented to address the identified problems. Relevant existing ideas/products were presented but the analysis was only inclined to function leaving out other factors for analysis such as materials and construction methods. Appropriate initial ideas were generated with good sketching techniques but the justifications for chosen ideas were not clearly stated.

Development of Chosen Idea

Different possible shapes/forms were covered with relevant alternative materials and construction methods. However, most candidates did not clearly give informed decisions on final choices from these alternatives. Candidates were able to present good pictorial drawings but could not apply the appropriate rendering techniques.

Working Drawing

Most of the orthographic projections presented were not in conformity with the conventional methods. Some working drawings were in freehand, which was not according to the expected standard.

Production Plan

Candidates provided reference points for their detailed production plans which clearly showed the production sequential stages. Materials listed were sufficient with relevant sizes and most tools for product manufacturing.

Presentation

Commendable graphical presentations with audible written communication were displayed. Candidates were able to bind portfolio pages together and logically presented stages with pages numbered accordingly.

Suitability For Purpose

Products addressed the identified problems and were in line with the intent under the design brief. They also showed relevance to the specifications.

Manufacturing Skills

Manufacturing skills were presented with applicable construction methods. Products were mostly appealing and had commendable application of finishes. It is worth noting that the number of candidates who could not complete projects had remarkably decreased.

Use of Materials

Suitable and economically chosen materials were used.

Evaluation

Candidates appropriately assessed their products against the design brief and specifications. Products functions were objectively observed and, in a few Centres, pictures were used to substantiate the testing activities. Modifications and future improvements were suggested.

General Observation

Display

Most Centres were prepared for external moderation. However, their projects were displayed in dusty rooms that needed to be cleaned while moderators waited.

Centre Marking

Internal marking was within the required standard and most Centre marks consistently showed good application of the assessment criteria. However, there were a few Centres whose marks had some discrepancies due to,

- Individual marking or misinterpretation of the assessment criteria.
- Lack of Standardisation