



*Let the mind manage the body
Que l'esprit gère le corps*

**MAURITIUS
EXAMINATIONS
SYNDICATE**

NCE 2023 GRADE 9

Technology Studies

Component 1: Design & Technology

Subject code: N550

EXAMINER'S REPORT

March 2024

General Comments

The examiner's report is produced to offer constructive feedback on candidates' performance. It provides useful guidance for future candidates, on how Educators can improve their teaching and on how performance could be improved. The report should be read alongside the question paper. A copy of the question paper can be downloaded from the MES website.

The NCE assessment for the year 2023 covered the whole syllabus and the assessment was scheduled in October 2023

The duration of the paper is one hour fifteen minutes and its weighting to the overall assessment in Technology Studies is 50%. The design of the assessment is based on three Assessment Objectives. Approximately 50% of the total marks assess candidates' Knowledge and Understanding (AO1), another 40 % on Application Skills (AO2) and approximately 10 % is for Analysis and Evaluation (AO3).

The paper consists of Section A (25 marks) and Section B (25 marks). Most candidates attempted all the questions in the question paper.

Key messages

- Candidates need to read and understand the instructions on the cover page.
- Candidates need to read the questions carefully before attempting to answer.
- The marks allocated to each question or part of a question give an indication of the level of details required from the candidates.
- Candidates need to improve their drawing skills and master the techniques of using drawing instruments to draw objects in either 2D or 3D.

Paper Overview

Section A

Section A consists of 5 questions, including objective type questions namely MCQ items, fill-in the blanks, matching, true and false and very short answer questions. This section covers core knowledge and understanding of design and technology. To do well in Section A, candidates need to have a broad knowledge of materials and drawings. They should also demonstrate application of their knowledge gained.

Comments on specific questions

QUESTION 1 : Multiple Choice

A significant number of candidates (90%) scored 4 to 5 marks. The majority of candidates followed the instructions properly. The use of diagrams and photographs for certain items have helped candidates in identifying the correct answer and hence resulted in scoring better grades. In certain rare cases, candidates did not follow the instructions given, but their answers were consistent (using ticks or crosses) and marks were awarded.

It is important to note that candidates are expected to circle the letter corresponding to the correct answer when responding to Multiple-Choice Questions. When candidates wish to revise their answers, Educators are encouraged to advise them to:

1. cross out the letter encircled.
2. replace their crossed-out answer by encircling a new letter.
3. indicate, using an arrow, the final letter chosen.

An example is shown below.

(iii) A pulley is used to transmit motion.

C	linear	B	oscillating
C	reciprocating	D	rotary ←

Or

(iii) A pulley is used to transmit motion.

C	linear	B	oscillating
C	reciprocating	D	rotary ← <i>Answer</i>

Item (i)

Most candidates responded correctly to this item and opted 'coping saw' as the correct answer. In certain cases, candidates answered 'hand file' which was a common mistake.

Item (ii)

The majority of candidates correctly identified the 'set square' as the correct drawing equipment.

Item (iii)

This item was well attempted by most candidates. They answered ‘manhole cover’ as the correct answer.

Item (iv)

Many candidates failed to identify ‘rotary’ as the correct answer. In many cases, candidates opted for ‘reciprocating’ or ‘oscillating’ which were wrong.

Item (v)

A significant number of candidates were able to identify ‘D’ as the correct eco label representing carbon footprint.

QUESTION 2: True or False

Candidates generally followed the instructions given by using ‘ticks’ in the spaces provided. In very rare cases, the letter ‘T’ or ‘F’ were used consistently and marks were awarded for correct answers. A majority of candidates scored three marks or above.

Item a

Most candidates have been able to correctly recognise that ‘Compasses are used to draw circles.’

Item b

Many candidates failed to differentiate between the use of a try square and an engineer’s square. Both tools are used to draw perpendicular lines but a try square is used on wood whereas an engineer’s square is used on metal. Hence, ‘A try square is used to draw perpendicular lines on metals’ is a **false** statement.

Item c

The majority of candidates have easily identified ‘bamboo stems and fibres are examples of eco materials’ as a **true** statement.

Item d

Most candidates identified ‘hardwood trees have needle-like leaves’ as a **false** statement. In certain cases, candidates failed to identify the characteristics of softwood and hardwood trees.

Item e

Most of the candidates responded correctly to this item. Candidates have easily identified ‘copper is a good conductor of electricity’ as a **true** statement.

QUESTION 3: Fill in the blanks

Most candidates understood the requirements of the question and selected the words from the list given. Approximately 65% of the candidates managed to score 4 to 5 marks. However, a few candidates had difficulty in identifying or selecting proper words given from the list.

Item a

A majority of candidates responded correctly to ‘biodegradable materials’ as the most appropriate materials which decay naturally. Few candidates have chosen ‘teak’ or ‘mild steel’ as answers, which were not the correct answer.

Item b

Most candidates recognised ‘aluminium’ as the correct answer. A small proportion of candidates have opted ‘mild steel’ as answer. It seems that candidates were not familiar with materials, properties and their uses.

Item c

Most candidates responded correctly to this item. They have been able to identify ‘teak’ as an expensive timber.

Item d

This item was well answered by the majority of the candidates. Few candidates have given ‘snips’ as answer which were not accepted. Although snips rust over time it was not the most appropriate answer.

Item e

The majority of candidates have been able to identify ‘snips’ as the correct tool to cut sheet metals.

QUESTION 4: Matching

This question is based on tool technology and requires candidates to recall the names of the hand tools and their corresponding drawings. Candidates were expected to have a sound knowledge of hand tools. Approximately 80% of the candidates scored 4 to 5 marks. In a few cases, candidates have identified 'screw driver' as 'Centre punch'.

QUESTION 5a – Very Short Answer

Most of the candidates attempted this item but only half of the population scored 5 or 6 marks. Candidates were required to demonstrate an understanding of mechanical tools. Some candidates were not able to differentiate between gear and cam, and answered randomly. This showed that they had no knowledge on mechanical components.

QUESTION 5b – Sketching

The majority of candidates demonstrated a good knowledge of different types of hammers both in 2D and 3D. Few candidates produced high standard sketches with rendering techniques shown. Many candidates were awarded marks for their neat and proportionate sketch. Some candidates have sketched hammers but failed in terms of proportion, details/shapes and quality. Few candidates produced sketches of mallets and other hand tools for which no marks were awarded. Very few candidates did not attempt this part of the question.

Section B

Section B consists of Question 6 based tone shading, Question 7 on design problem and Question 8 on orthographic and isometric projection.

To do well in Section B candidates must have an in-depth knowledge and understanding of the:

- application of the appropriate rendering techniques to enhance an object;
- use of the design process to solve a problem;
- use of drawing instruments to draw objects either in 2D or 3D.

QUESTION 6 - Rendering

Very few candidates have been able to score full marks for this question. Responses were either from coloured pencils or pencils. It was noted that some candidates have applied one colour and its tones properly. Few candidates have not applied tones. Few candidates applied hatching

lines on the given shaped block which resulted in no marks. In some cases, candidates have not respected the given direction of light, hence full marks were not awarded. Approximately 40% of the population did not score any mark including those not attempting the question at all.

QUESTION 7 – Design Problem

Candidates demonstrated a commendable understanding of the design process, showing creativity and a thoughtful approach in developing a smartphone holder either in 2D or 3D. The majority of the ideas were presented as desktop, wall mounted or freestanding devices. Only few candidates accurately identified/justified appropriate material and safety considerations for a smartphone holder. In certain cases, candidates have applied rendering or enhancement technique to their idea. In many cases, sketches were of poor quality and ideas of a low level of creativity by displaying poor knowledge and application of proportionality, material thicknesses and realistic forms.

Candidates' consideration of materials for the phone holder were correctly answered in most cases by opting for the different specific materials such as acrylic, pine, teak, PVC, copper, stainless steel, rubber, silicone and others. A few candidates used generic terms such as wood, metal, plastic and smart materials for which marks were not awarded.

Most candidates' analysis addressed potential risks associated with the chosen material, finishes and the holder, such as no sharp or pointed corners, no toxic finish/material, resistance to heat generated by mobile phone, holding mobile phone securely. However, only a few candidates demonstrated a comprehensive approach to user safety or to smart phone safety.

QUESTION 8

This question assessed the ability of a candidate to use the appropriate drawing instruments to draw objects either in 2D or 3D and also to be able to read and interpret the drawings. Only the most able candidates gained marks with some very well drawn responses. The standard of work was the same as that of the previous year. A significant number of candidates did not attempt the question.

(a) Orthographic Projection

Candidates were required to complete the front and top view of a 3D shaped block in the space provided. The majority of candidates respected the space provided to draw the front and top views. The candidates who carefully studied the isometric view, read the necessary dimensions and drew accurately achieved the best results. Few candidates did not attempt the question.

Some candidates visualised the views but were unable to use the correct dimensions to draw the views. They were not awarded full marks. No marks were awarded for freehand sketching of the views. In certain cases, candidates have drawn the orthographic at the back of the answer sheet for which they were not penalised. Few candidates had difficulty to draw the inner details of the front view. Very few candidates were able to complete the two views but with poor quality lines. In many cases, candidates did not insert any dimension at all. In some cases, candidates who have inserted one major dimension although not fully according to convention on the front view, have been awarded one mark.

In many cases, candidates failed to outline the outer shape for both the front and top view which resulted in no marks. In the top view, candidates failed to draw hidden for which they were penalized.

(b) Isometric Projection

Candidates were asked to complete a full-size isometric drawing of a bracket given in orthographic projection. The most abled candidates successfully interpreted the orthographic views and were able to draw an isometric drawing of the bracket to the given dimensions with a good level of neatness and accuracy. Many candidates were able to draw the front view in isometric but failed to draw all the receding lines thus failed to complete the isometric drawing for which they were penalised. Many candidates produced high standard isometric drawings but in different viewing direction, for which marks were awarded according to mark scheme.

Very few candidates sketched an isometric drawing for which marks were not awarded. Few candidates misinterpreted the dimensions given but produced a high standard drawing for which they have been partly penalised.

CONCLUSION AND RECOMMENDATIONS:

Candidates need to read the instructions properly before attempting the questions. They should try to focus on the key elements of each question. Open-ended questions are a challenge for most candidates and they should practice more questions related to design process, drawing shaped blocks with drawing equipment either in 2D or 3 D. Demonstrations are encouraged as it promotes observation skills in the learning of Design & Technology.

While carrying out demonstrations in the workshop, it is important that the attention of the candidates be drawn to the safety precautions to be taken in the workshop. Candidates need to improve their knowledge and understanding of the practical processes and techniques required to work the resistant materials such as wood, metal and plastic. To achieve this, candidates need to be able to match tools and equipment to specific purposes.

Research has shown that learning is promoted by doing hands-on activities and this helps to develop the acquired skills which helps learners develop their analytical and thinking skills.

Educators are reminded that time should be devoted to demonstration and practical classes wherever possible as theoretical classes only are not sufficient.

Pictorial projection: Emphasis should be laid on the quality of line (construction and outline) and neatness. Candidates should have access to proper drawing equipment during their course of study. They should be encouraged to use the crate method to solve problems related to dimensions. Candidates should be able to visualise objects in 2D and 3D. They should master the different projections used for drawing objects in 3D such as isometric projection at 30° on both projection lines whereas receding lines in oblique projection are at 45° .

Tone shading techniques: Candidates should be encouraged to use pencils or coloured pencils with different intensity of tones. They should also be encouraged to apply flat and uniform shading. Pre-printed shaped blocks should be provided to students for more practice.

For Material Technology: Educators should encourage their students to get familiar with tools through drawings, pictures, charts, videos and hands on activities in workshop. Moreover, students should be encouraged to practise intensively their sketching and specially sketching of tools. Students should be encouraged to practise sketches both in 2D and 3D. Educators are encouraged to do more demonstration sessions/classes.

Educators should emphasize the proper classification, properties of materials and the appropriate use of hand tools. Educators should lay emphasis on the use of hand tools through hands on experience and demonstration.

It seems that candidates are not familiar with cutting tools. More demonstrations, workshop practicals and hands-on activities are to be encouraged. Educators should encourage candidates to be more familiar with this type of question and choose the most appropriate words from the given list. Educators must make sure that the set of objectives of each chapter are met and the content of the chapter are discussed fully in class.

For the Design Process: Students should be exposed to more design problems based on a similar format on a regular basis and more intensive practice needed for sketching ideas both in 2D and 3D.

Candidates need to improve their drawing skills. They must try to provide clearly drawn sketches when attempting questions that begin with the statement.

The design process should be included at regular intervals from the start of the year to prepare the candidates to develop such analytical skills. It is recommended to enhance sketching through project work, especially for generation of ideas. This will also enhance the presentation and allow candidates to write proper annotations as well as to sketch proportionately in 2D and 3D.

Orthographic Projection: Educators should encourage their students to make use of drawing equipment such as boards, T squares, set squares ($30^\circ/60^\circ$ and $45^\circ/45^\circ$) etc... Educators should make the students familiar with the different types of set squares and when/how to use them. Educators may provide preprinted sheets for orthographic/isometric to familiarize students which the NCE question paper format. Educators should encourage their students to use different types of pencils for construction lines and outlines. Candidates should be encouraged to use construction lines appropriately.