

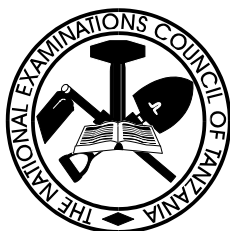
THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



**STUDENTS' ITEM RESPONSE ANALYSIS
REPORT FOR THE FORM TWO NATIONAL
ASSESSMENT (FTNA) 2015**

071 CIVIL ENGINEERING

THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



**STUDENTS' ITEMS RESPONSE ANALYSIS REPORTS
ON THE FORM TWO NATIONAL ASSESSMENT
(FTNA) 2015**

071 CIVIL ENGINEERING

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CONTENTS

FOREWORD.....	iv
1.0 INTRODUCTION	1
2.0 ANALYSIS OF THE STUDENTS' ITEMS RESPONSE IN EACH QUESTION	2
2.1 SECTION A:	2
2.1.1 Question 1: Multiple Choice Question	2
2.1.2 Question 2: True and False	3
2.2 SECTION B:.....	5
2.2.1 Question 3: Building Construction	5
2.3 SECTION C.....	10
2.3.1 Question 4: Carpentry and Joinery	10
2.3.2 Question 5: Brickwork and Masonry.....	14
2.3.3 Question 6: Painting and Signwriting.....	21
2.3.4 Question 7: Plumbing	23
2.3.5 Question 8: Land Surveying	28
3.0 ANALYSIS OF THE STUDENTS' PERFORMANCE PER TOPIC	31
4.0 CONCLUSION AND RECOMMENDATIONS	32
4.1 CONCLUSION	32
4.2 RECOMMENDATIONS	33
Appendix.....	35

FOREWORD

The Civil Engineering Subject Report on The Form Two National Assessment (FTNA) for 2015 was written in order to provide feedback to secondary school students, teachers, educational specialists, policy makers, and other stakeholders on the students' performance in the subject. The report highlights the factors that made the students fail to score high marks in the questions. Such factors include failure to identify the task of the question, inability to follow instructions and lack of knowledge on the concepts related to the subjects. On the other hand the report also highlights the factors that made the students manage to score high marks in the same questions. Each factor is well elaborated by using the attached sample answers that have been extracted from the students' scripts.

The Form Two National Assessment marks the end of two years, out of four years, of Secondary Education. It is a comprehensive evaluation which among other things exposes the effectiveness of the general education system and specifically the mode of education delivery in Tanzanian Secondary Schools. The National Examinations Council of Tanzania presumes that the feedback that is provided in this report will enable various education stakeholders in the public or private sectors, to take appropriate measures in enhancing the students' performance. The report has been concluded with recommendations to the on-going secondary school students and teachers; and other stakeholders including the Ministry of Education, Science, Technology and Vocational Training.

Moreover, The National Examinations Council of Tanzania will appreciate comments and suggestions from different groups of stakeholders such as teachers, students, parents and the general public. It is our hope that the comments from the stakeholders will be useful in improving future analysis reports.

Finally, The Council would like to thank all the Examinations Officers, and all those who participated in processing and analysing the data used in this report.



Dr. Charles E. Msonde
EXECUTIVE SECRETARY

1.0 INTRODUCTION

The Form Two National Assessment (FTNA) 2015, 071 Civil Engineering consisted of three (3) sections namely A, B and C. Section A, consisted of two questions; question 1 was a multiple choice question which comprised of eight (8) items, (i) to (viii) drawn from various topics. Question 2 consisted of five TRUE and FALSE statements which required the students to write the word TRUE for the correct statement and FALSE for the incorrect one. The statements, (i) to (v) were derived from various topics in the field of Civil Engineering. Section B consisted of one question, (number 3), derived from the Building Construction subject. The question was compulsory and comprised of four (4) short answer items. The questions were drawn from various topics according to the syllabus as follows: Introduction in building construction; Construction materials; Uses of tools in brickwork and masonry and Timber walls (wooden partition wall). Students were required to attempt all questions in section B.

Section C comprised of five areas of students' specializations and the section had four questions which were question numbers 4, 5, 6, 7 and 8. Each question had four (4) short answer items drawn from the various topics suggested for Form Two level in each respective Trade of Specialization. The students were required to select one question from this section. Question number 4 was drawn from the Trade of Carpentry and Joinery. Question number 5 from Brickwork and masonry, Question number 6 from Painting and Signwriting, Question number 7 was from Plumbing and Question number 8 was drawn from Land Surveying.

A total of 687 students sat for Civil Engineering National Assessment 2015, where two hundred and sixteen (216) students equivalent to 31.4 percent passed this assessment with average marks of 30 to 78, while four hundred and seventy one (471) students (68.6%) failed by obtaining poor marks ranging from 0 to 29.

This report aims at providing feedback to the educational stakeholders on the performance of students on each question. The report presents the analysis of the students' performance by indicating the task they were required to do on each question and how they responded. The relevant explanations for the student's failure are given for each question. Some

sample answers have been extracted from the students' scripts and attached to show the performance in the tested topics.

2.0 ANALYSIS OF THE STUDENTS' ITEMS RESPONSE IN EACH QUESTION

2.1 SECTION A:

2.1.1 Question 1: Multiple Choice Question

In this question the students were required to choose the correct answer from the given alternatives. The question consisted of eight (8) items, (i) to (viii) which were drawn from various topics within the syllabus.

A total of 687 students attended the assessment and all of them attempted this question. The percentage of students who scored 0 mark out of sixteen (16) allotted marks was 5.1 percent, 39.4 percent scored from 2 to 4 marks, 41.2 percent scored from 6 to 8 marks and 14.3 percent scored from 10 to 16 marks. The majority of students presented poor responses in items (i), (iii), (vi) and (viii).

In item (i) the students were required to choose the correct statement showing the primary objective of the building. The majority opted for B, 'to provide shelters for living organism', which was not correct, while the correct answer was option D, 'to provide shelter to the inmates'. The students indicated lack of knowledge on the subjective matter. In item (iii) students failed to choose the correct method for sub-surface soil investigation. Most of the students chose option B, 'reclaimed soil', which was incorrect instead of option C, 'probing', which was the correct answer. The wrong choice of options in this item signifies lack of knowledge on the methods of soil investigation. In item (vi) students failed to choose the correct dressing of stone shape and size; the majority chose option B 'toothing', which was an incorrect answer instead of D, 'dressing'. Those students' seem to have had inadequate knowledge and lacked basic skills on the uses of stones as building materials.

In item (viii) students failed to choose the correct response D which stated 'Construction Engineering'. They instead chose option C, 'Architectural engineering, which was incorrect. The failure of students to choose the correct option shows lack of knowledge on the general roles of members in

the building team. Figure 1 indicates the performance of this question percentagewise.

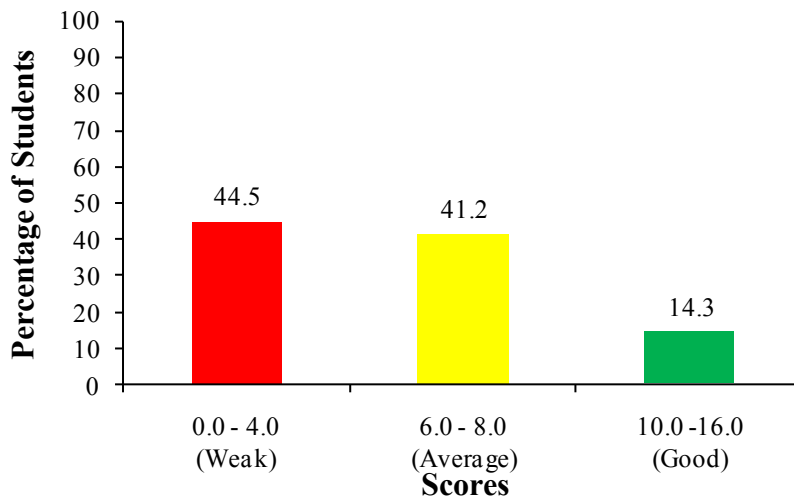


Figure 1: Bar chart showing the percentage of students in categories of scores in question 1.

2.1.2 Question 2: True and False

The question was derived from various topics from form one up to the level of form Two. The students were required to write TRUE for the correct statement and FALSE for the incorrect one. Most of the students performed well in this question. The question was answered by 687 students which was equivalent to 100 percent of those who sat for the Assessment. Only 2 students, equivalent to 0.3 percent scored 0 marks. About 19.5 percent scored from 2 to 4 marks out of 10 allotted marks and 79.9 percent scored from 6 to 10 marks. The analysis in the student's scripts shows that the students who scored 0 marks lacked knowledge on the topic of building construction. Extracts 2.1 and 2.2 illustrate the sample of a student who omitted this question without any trial and those who attempted and scored full marks respectively. Figure 2 illustrates the percentages of students' performance in three categories of weak, average and good.

Extract 2.1

2. For each of the following statements, write **TRUE** if the statement is correct or **FALSE** if the statement is not correct.
- (i) Building construction is the art of constructing building.
 - (ii) The basic purpose of foundation is to support the load of the super structure only.
.....
 - (iii) Black cotton soil is very good for foundation bed.....
 - (iv) No timbering is required for shallow trenches in soil.....
 - (v) A header course increases the lateral strength of the wall.

Extract 2.1 shows a sample of the response by a student who omitted this question; he/she presented the work without any trial.

Extract 2.2

2. For each of the following statements, write **TRUE** if the statement is correct or **FALSE** if the statement is not correct.
- (i) Building construction is the art of constructing building. **TRUE**.....
 - (ii) The basic purpose of foundation is to support the load of the super structure only.
FALSE.....
 - (iii) Black cotton soil is very good for foundation bed. **FALSE**.....
 - (iv) No timbering is required for shallow trenches in soil. **FALSE**.....
 - (v) A header course increases the lateral strength of the wall. **TRUE**.....

Extract 2.2 shows a sample of the response by a student who scored full marks after being able to recall the facts of the given statements.

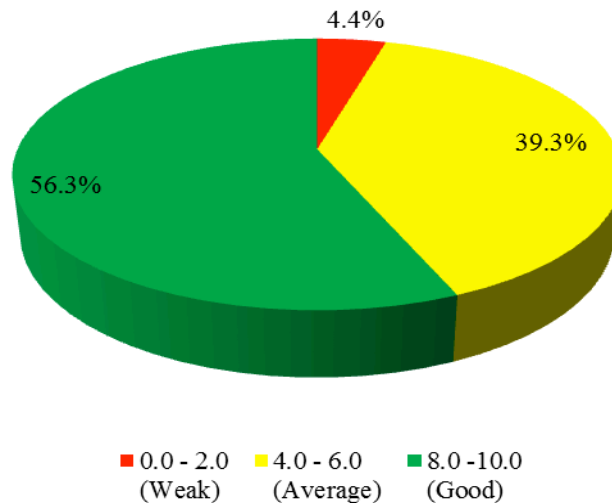


Figure 2: Pie chart showing the percentage of students in the three categories of scores in question 2.

2.2 SECTION B:

2.2.1 Question 3: Building Construction

This question was derived from Building Construction subject and it was comprised of four (4) short answer items. The questions were drawn from the following topics: Introduction to building construction; Construction materials; Uses of tools in brick masonry and timber walls (wooden partition wall). All those topics were compulsory.

The students were required to attempt all parts of the question. In part (a) they were required to explain three requirements of a good residential building, (b) to mention any six materials used in the construction of a building, (c) to describe the uses of the given tools in brick masonry; tools included (i) mason's square, (ii) brick hammer, (iii) lines and pins, (iv) spirit level, (v) plumb rule or bob, (vi) trowel and (d) to give three advantages and three disadvantages of the wooden partition wall.

The question was attempted by 686 (99.9%) students. Among them 9.5 percent scored 0 marks, 63.4 percent scored from 01 to 08 marks out of 30 allotted marks, 24.8 percent scored from 09 to 15 marks while 2.2 percent scored from 16 to 23. No one scored full marks in this question.

The students' performance in this question was average. Most of the students failed to give the correct meaning or relevant explanations on the given parts of the question, thus few students scored above average. Figure 3 indicates the general performance of the question while extracts 3.1 and 3.2 are illustrations of the weak and good sample responses respectively.

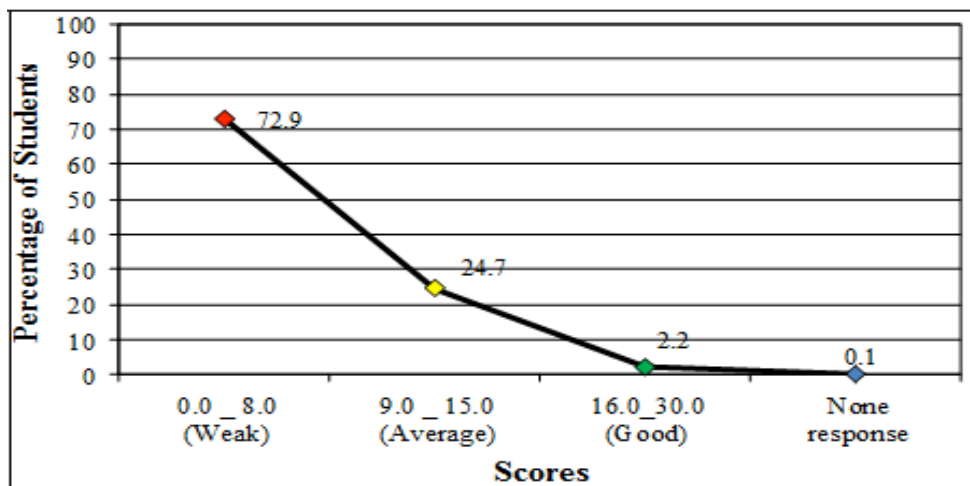


Figure 3: Line graph showing the percentage of students against categories of scores in question 3.

Extract 3.1

3. (a) Explain three requirements of a good residential Building.

- (i) Building it is the reason of construction in the branch
- (ii) Artecho of framing walls is the bond with the gravity
- (iii) There are reproduction with the join the timber law.

(b) Mention any six materials used in the construction of building.

- (i) Copper
- (ii)
- (iii) Zinc
- (iv) Cast iron
- (v) capacity join
- (vi) Magnetism.

(c) Describe the following tools as used in brick masonry.

(i) Masons square

- There are types of mason in the plumbing of

(ii) Brick hammer

- There are reproductive with the things in the plumbing material.

(iii) Lines and pines. - It is the structure with the special or reproductive with the given

(iv) Spirit level. - It is the responsibility of known

(v) Plumb rule or bob. - It is the test of job

(vi) Trowel. - There are trowing of material

(d) Give three advantages and three disadvantages of wooden partition wall.

Advantages

- (i) It is the weight wooden in the walls
- (ii) It is the long with upper of plaster on the walls
- (iii) There are taken with the plaster

Disadvantages

- (i) It is the form of material with the material
- (ii) The organization of material in the wall
- (iii) It is the material in the wall

Extract 3.1 shows a sample of a student's response who failed to give correct responses; he/she wrote irrelevant things.

The performance in this question was average. Some students gave the correct answers in the many parts of the question and scored high marks as shown in extract 3.2.

Extract 3.2

3. (a) Explain three requirements of a good residential Building.

- i) Good ventilation and proper lighting - Should have large windows to allow circulation of air inside the building.
- ii) Good appearance - It should have good appearance.
- iii) Weather and fire resistant - Should be able to resist fire and other weather conditions. Also should be able to resist different stresses from inside and outside of bricks.

(b) Mention any six materials used in the construction of building.

- i) Cement.
- ii) Lime
- iii) Sand i.e. clay.
- iv) Water
- v) Bricks or blocks
- vi) Timber or woods

(c) Describe the following tools as used in brick masonry.

(i) Masons square

It is used for setting right angles of a building.

(ii) Brick hammer

It is used in conjunction with bolster chisel for accurate cutting of bricks.

(iii) Lines and pines

Maintains are tools which maintain and the alignment of brick courses.

(iv) Spirit level

It is used for checking alignment of brickwork.

(v) Plumb rule or bob

Are tools which ensure that brick walls are vertical.

(vi) Trowel

Used for picking up mortar and spread it evenly before laying bricks.

(d) Give three advantages and three disadvantages of wooden partition wall.

Advantages

- (i) It is not expensive. It is cheap in terms of materials
- (ii) It is simple to build and easy.
- It can be done fast

Disadvantages

- (i) It is not fire resistant. So it cannot resist fire in case of fire accidents.
- (ii) It can decay easily and it is not strong and durable.
- (iii) It can be attacked by fungi and white ants

Extract 3.2 shows a sample of a response of a student who presented a good response in most parts of the question and managed to score high marks.

2.3 SECTION C

2.3.1 Question 4: Carpentry and Joinery

This question was set from the topics of Joints, Timber, Tools and Equipment. It was comprised of four parts namely (a), (b), (c) and (d). In part (a) the students were required: (i) to give the meaning of timber preservation, (ii) to give three requirements of a good preservative and (iii) to mention the methods of application of preservatives; part (b) to explain by the aid of sketches the single and double notched joints and state from what classification the notched joint is obtained. In part (c) (i) the students were required to give the uses of a variety of tools used in carpentry work: mortise gauge, bevel, boring tool, pincers, pointed awl and bead plane while in (ii) were required to describe six types of fastenings as used in wood work; the asked fastenings were wire, pin, screws, dowels, sockets and wedges. In part (d) the students were required to explain the functions of the given parts of the circular saw machine which are arbor, table, rip fence, mitre gauge and safety guard.

A total of 97 students attempted this question of which 66 percent scored a zero mark while the remaining 44 percent scored from 1 to 8 marks and no student managed to score above 8 marks. The general students' performance in this question was extremely poor, because most of the students were not able to respond according to the demand of the question. Some students copied part of the question and wrote it as an answer. This is illustrated in Extract 4. Figure 4 depicts the poor performance of candidates in this question where all students scored below average.

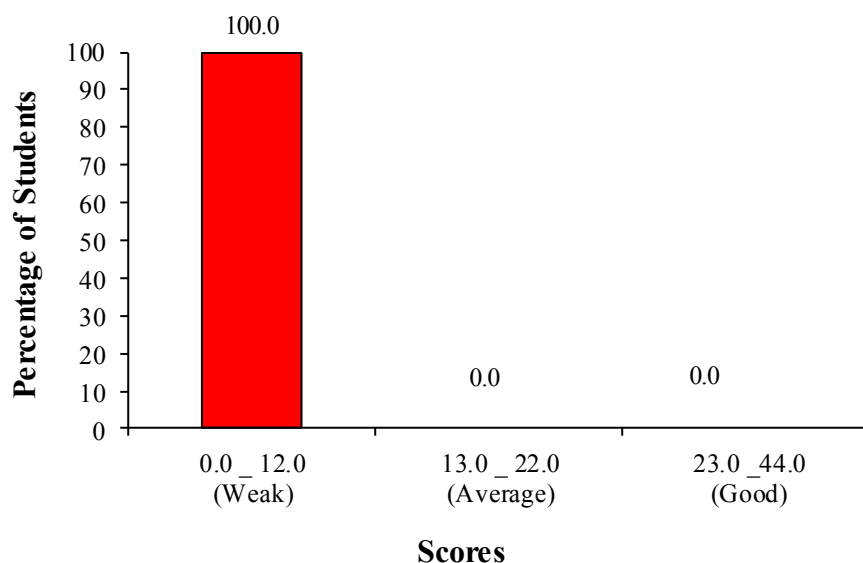


Figure 4: Bar chart showing the percentage of students concentrated in the category of weak scores.

Extract 4

4. (a) (i) What is timber preservation?

is simple required for shallow trenches in preservation.

(ii) Give three requirements of a good preservative.

dressing.

wheel loader.

aggregate.

(iii) Mention four methods of application of preservatives.

Safety guard

Pointed awl

Mortice gauge

Bead plane

(b) With the aid of sketches, explain the single and double notched joints and state from what classification the notched joint is obtained.

.....

.....

.....

.....

.....

(c) (i) Give the uses of the following tools:

Mortice gauge

Bevel

Boring tools is the fact of material in the area

Pincers

Pointed awl

Bead plane is the ~~wood~~ wood plane of the workshop.

(ii) Describe the following fastenings as used in wood work.

Wire is the materials used in the construction.

Pin

Screws.....
.....
Dowels.....
.....
Sockets.....
.....
Wedges.....
.....
(d) Explain the function of the following parts of circular saw machine:
(i) Arbor.....
.....
(ii) Table. <i>is the aloud of workshop.</i>
.....
(iii) Rip fence. <i>is the fence aloud workshop</i>
(iv) Mitre gauge.....
(v) Safety guard.....

Extract 4 shows a sample of a student's response who copied parts of the question and wrote them as an answer. This indicates that the student had very poor knowledge on carpentry and joinery materials, tools and equipment.

2.3.2 Question 5: Brickwork and Masonry

This question was set from the Brickwork and Masonry subject covering three topics namely; bricks, bonding and foundations. The question was divided into four parts, (a), (b), (c) and (d). The students were required in part (a) (i) to define 'queen closer' and give reason of its provision, (ii) to explain four principles of good bond in brick work. In part (b) the students were required (i) to give the significance of 'closer' in brick work, (ii) to sketch the 'king' and 'queen closer', (iii) to give reasons for brick work to be kept wet for two weeks after use of cement mortar and (iv) to explain the reason for bricks to be laid with frog upward.

Part (c) required the students to define the given technical terms as used in brick work and masonry works. The terms asked were; perpends, facing, backing, hearting and bats. In part (d) (i) the students were required to

explain the purpose of providing a building foundation, (ii) to explain reasons for the foundation structure to be always laid below ground level, (iii) to differentiate between ultimate bearing capacity and safe bearing capacity of the soil and (iv) to mention the precautions needed to be taken to prevent dampness in the building.

A total of 352 students attempted this question out of which 21.3 percent scored a zero mark, 52.8 percent scored from 01 to 12 marks, 17.9 percent scored from 13 to 22 marks, 6.8 percent scored from 23 to 35 marks out of 44 allotted marks. These percentages are illustrated in figure 5. Generally, most of the students performed averagely as they were able to recall some knowledge from foundation and bonding topics and the techniques applied on the prevention of dampness from entering the building.

The poorly performed part of this question was part (d) (iv) where the majority of students were not able to differentiate dampness from wetness as applied in concrete technology in the area of concrete bleeding. Dampness is the penetration of moistures or water from the ground towards the inside the of building and wetness of a concrete is the amount of water used as mixing ratio to avoid flow of water from mixed concrete. Extract 5.1 is a sample from a script of a student who scored 00 marks and Extract 5.2 illustrates the best response of a student who scored high marks.

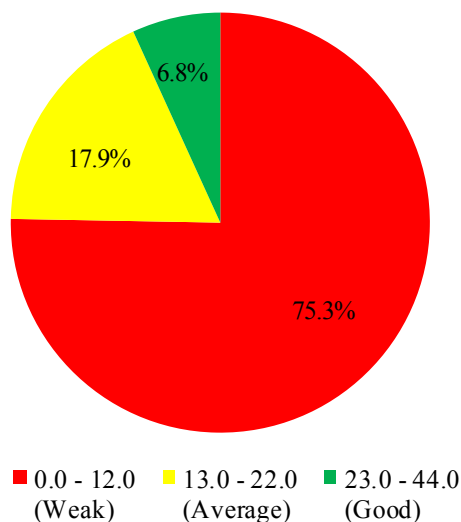


Figure 5: Pie chart showing the percentage of students in three categories of scores in question 5.

Extract 5.1

5. (a) (i) What is queen closer and why is it provided?

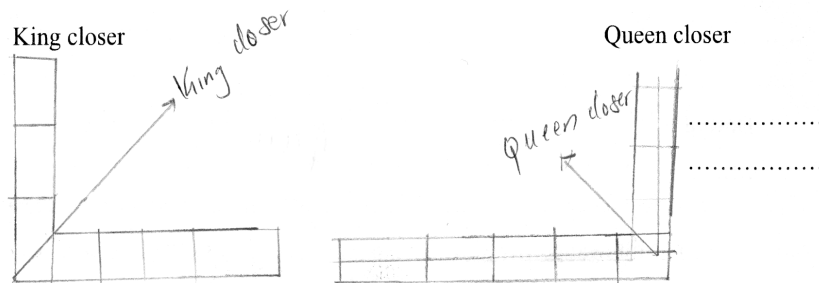
Queen closer is the corner in the wall with joint
one bond and another bond with alternate with
the sharing mortar either cement mortar or soil
mortar. The queen closer provide this to
form this the one, water, bricks, brick, sand
cement and Timber also can be used.

to the masonry, he is Scientific advance
Skills for design and building the wall.....

(b) (i) What is the significance of a closer in brickwork?

It used brick and bricks to construct
also water and cement used

(ii) Give oblique sketches of the King closer and Queen closer:



(iii) Why brickwork should be kept wet with water for two weeks when cement mortar is used? because the cement mortar it take more time to attract with brick so it take long time

(iv) Why the bricks should be laid with frog upward?

because

(c) Define the following technical terms as used in brickwork and masonry works:

(i) Perpend. is the piece of brick which used to cover the space of wall which are small.

(ii) Facing is the space of the top of the wall

(iii) Backing is the process of combining with water and cement to form mortar cement

(iv) Hearting is the process of heat anything in order to make physical or chemical substance

(v) Bats is the external corner of the wall
Wall

(d) (i) What is the basic purpose of providing a building foundation?
to show the deep foundation
bricks
Cements
water

(ii) Why is the foundation structure always lay below ground level?
is because that the ground level is very
good to digging foundation while is the water
is used the more scientific advanced skills

(iii) Differentiate between ultimate bearing capacity and safe bearing capacity of a soil.
is the soil which are not safe for building while
during the foundation while safe bearing
capacity of a soil is the soil which are
safe to doing building activities when
foundation activities take place.

(iv) Mention precautions need to be taken to prevent dampness in building:
to cover the dampness with stones and brick
to give the education the people to know the position of
to stay away on the space with the dampness occur

Extracts 5.1 is a sample of a poor response presented by a student who attempted all parts of this question and wrote irrelevant answers.

Some students had reasonable knowledge on foundation and bonding topics, and the techniques on the prevention of dampness from entering the building, thus produced good responses in many parts of the question. Extract 5.2 shows a sample presentation of a good response from the student's script.

Extract 5.2

5. (a) (i) What is queen closer and why is it provided?

Queen closer is the closer is the closer obtained by removing a half stretcher side.

- It provided in bonding to increase stability of the building, and in English bond and Flemish bond.

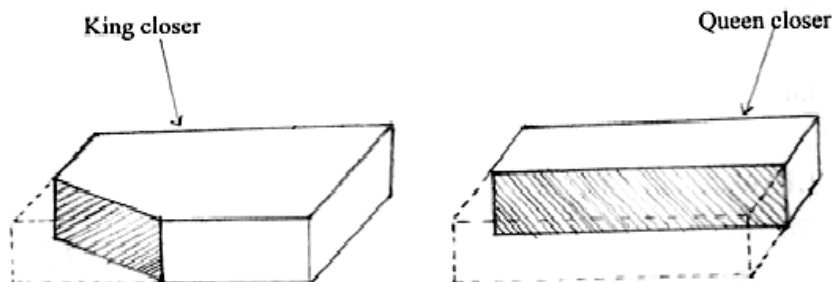
(ii) Explain four principles of good bond in brickwork.

- It should be strong enough
- It should be fire resistance, weather resistance etc.
- It should be thermal and sound insulator
- It should not allow dampness entering inside the building.

(b) (i) What is the significance of a closer in brickwork?

Closers are used in bonding to provide overlapping of brick to avoid vertical joints.

(ii) Give oblique sketches of the King closer and Queen closer:



(iii) Why brickwork should be kept wet with water for two weeks when cement mortar is used? Brick should be kept wet with water for two weeks in order to make it strong and hard.

(iv) Why the bricks should be laid with frog upward?

The brick should be laid with frog upward in order to increase strength of the bond and joints.

(v) Bats. Are the way where ~~of~~ bricks are cut to provide a part of them which can be used in bonding.

(d) (i) What is the basic purpose of providing a building foundation?

The basic purpose of providing a building foundation is to provide a strong base which can transmit all loads i.e. dead loads and imposed loads to the soil in order to prevent the building not to collapse.

(ii) Why is the foundation structure always lay below ground level?

The foundation structure lay below the ground level because the foundation is needed to transmit all loads to the soil and make the building stable, so if foundation will lay above the ground level it will collapse due to low bearing capacity of the soil.

(iii) Differentiate between ultimate bearing capacity and safe bearing capacity of a soil.

→ The safe bearing capacity is the load that the soil can carry without any problem and safely.

(iv) Mention precautions need to be taken to prevent dampness in building:

The dampness can be prevented by the following ways:

- Providing damp proof courses
- Providing membrane damp proofing
- Cavity wall construction.

Extract 5.2 is a sample of a response of a student who scored high marks because he/she had reasonable knowledge on the topics of foundation and bonding and mentioned the techniques applied on the prevention of dampness from entering the building.

2.3.3 Question 6: Painting and Signwriting

The question was set from the topics of safety, paints and painting materials, water paints and texture finishes. The question comprised of four parts, (a) to (d). In part (a) (i) the students were required to explain the purpose of surface finishes and (ii) to differentiate between colour washing and distempering. In part (b) the students were required to explain the given defects in painting; which are (i) blistering, (ii) bloom, (iii) flashing and (iv) running. In part (c) they were required to list six safety precautions or rules that a painter should adhere-to and in (d) (i) they were required to list five types of vehicles which are commonly used in oil paints and (ii) to mention four constituents of paint.

A total of 32 students specializing in Painting and Signwriting attempted this question. The students scored below average, among them 34.4 percent scored 00 marks, while 65.6 percent scored from 01 to 09 marks out of the 44 allotted marks. The distribution of scores is presented in Figure 6.

Most of the students wrote wrong responses in all parts of the question. Some of them gave wrong responses in only some parts of the question while other parts were left unanswered. The general students' performance in this question was poor. The analysis of students' responses shows that most of them had inadequate knowledge on the areas of composition and application of paint. Extract 6 shows a sample of a response by a student who wrote irrelevant materials in his/her script.

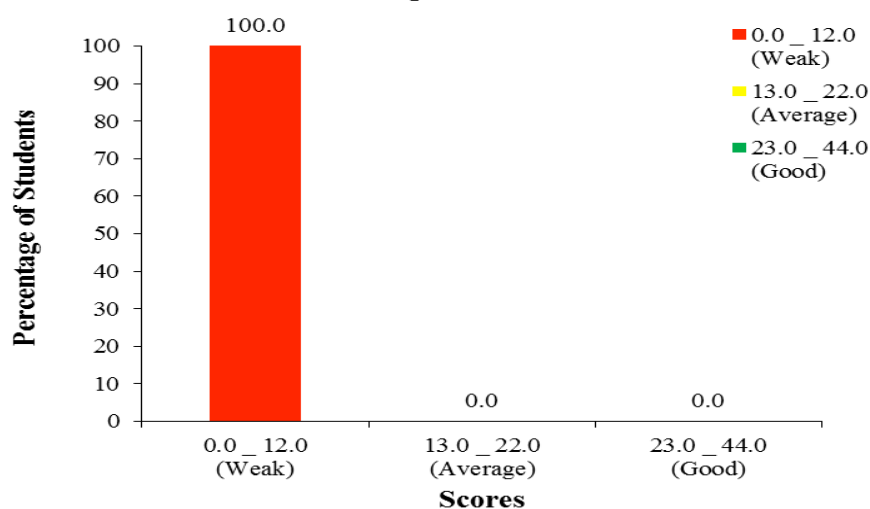


Figure 6: Bar chart showing the percentage of students against scores. All students failed, by scoring below average.

Extract 6

6. (a) (i) What is the purpose of the surface finishes?

There are different types of surface finishes. As an example, water-based emulsion paint is used for interior wall painting.

- (ii) Differentiate between colour washing and distempering.

Colour washing is a technique where a thin layer of paint is applied to a surface. Distempering is a technique where a thin layer of white paint is applied to a surface.

- (b) Explain the following defects in painting:

(i) Blistering: This defect occurs when air or moisture gets trapped under the paint film. It is often caused by poor surface preparation or the use of incompatible materials.

(ii) Bloom: This defect occurs when a white, powdery substance appears on the surface of the paint. It is often caused by the use of low-quality pigments or the presence of moisture.

(iii) Flaking: This defect occurs when the paint film peels off the surface. It is often caused by poor adhesion or the use of incompatible materials.

(iv) Running: This defect occurs when the paint flows down the surface, creating a drip. It is often caused by the use of too much paint or the application of paint to a vertical surface.

(v)

.....

(vi)

.....

(d) (i) List five types of vehicle which are commonly used in oil paints.

living are painting work back paint

.....

.....

.....

.....

(ii) Mention four constituents of paint.

(i) everaporation oil paint

(ii) everaporation types paint

(iii) everaporation water paint

(iv) everaporation living paint

Extract 6 shows a sample of a response of a student who presented irrelevant information hence scored a zero mark.

2.3.4 Question 7: Plumbing

This question was attempted by students who opted for Plumbing as their Trade of specialization and it was prepared from three topics in Plumbing, namely; Safety, Plumbing materials and Plumbing tools. The question was divided into four parts (a), (b), (c) and (d). The students were required in part (a) (i) to mention the two basic principles of accident precautions in the plumbing system, (ii) to mention five steps to be followed when treating an unconscious person who is affected by an electric shock. In (b) (i) to name four non-ferrous metals used by plumbers, (ii) to define the term alloys and (iii) to name six common alloys. In part (c) the students were required to give the uses of the following tools: (i) bradawl, (ii) centre punch, (iii) reamer, (iv) shavehook, (v) tinsnips and (vi) plugging chisel. In part (d) they were required to provide a simple sketch of the given symbols as used

in plumbing system: (i) stop valve, (ii) safety valve, (iii) water meter, (iv) water pump, (v) intercepting trap and (vi) gas meter.

A total of 102 students attempted the question, out of which 12.8 percent scored 00 marks, 50.9 percent scored from 01 to 12.5 marks and 36.3 percent scored from 13 to 22.5 marks out of 44 allotted marks. Figure 7 presents the distribution of students' scores.

Most of the students attempted partially this question and scored half of the allotted marks. The analysis on the responses presented shows that the students lacked basic knowledge and skills on plumbing tools and equipment since they were not able to identify the basic tools and equipment for basic plumbing operations. Extract 7 represents a poor response from one of the sampled scripts.

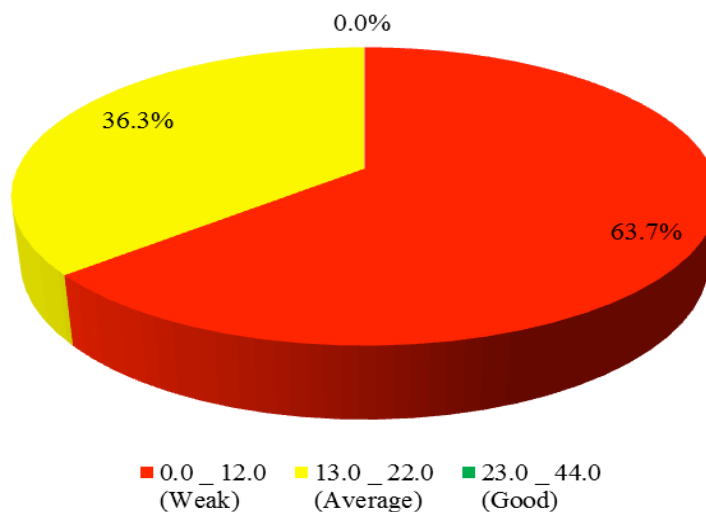


Figure 7: Pie chart showing distribution of students' scores in percentage.

Extract 7

7. (a) (i) Mention the two basic principles of accident prevention on the plumbing system.

have a system of water

have a ~~pipe~~ pair of water

fill to water meter

(ii) Mention five steps to be taken when treating an unconscious person who got electric shock.

(i) it is switch the electric shock

(ii) it is remove of draw a stick

(iii) it is going to see a doctor.

(iv)

(b) (i) Name four non-ferrous metals used by plumbers.

(i) pipe wrench (ii) water meter
(iii) Safety valve (iv) Stop valve

(ii) Define the term alloy.

is the back cotton soil alloy.

(iii) Name six common alloys.

(c) Give the uses of the following tools:

(i) Bradawl

uses to burn a pair

(ii) Centre punch

it used to find the centre

(iii) Reamer

it used to finish the work

(iv) Shavehook

it used to shave

(v) Tinsnips

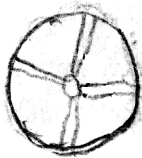
used to connect a pipe

(vi) Plugging chisel

it used to plug the chisel

(d) Draw the following symbol as used in plumbing system.

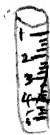
(i) Stop valve



(ii) Safety valve



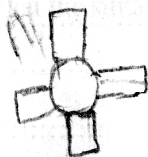
(iii) Water meter



(iv) Water pump



(v) Intercepting trap



(vi) Gas meter



Extract 7 is a sample of a response by a student who failed to comprehend the demand of the question and tried to draw the real pictures of objects such as stop-valve, safety valve, water-pump etc. instead of drawing the symbols used in plumbing system.

2.3.5 Question 8: Land Surveying

The question on land surveying was prepared from the following topics: Introduction, Surveying Instruments, Chain Surveying, Chain and Compass Traversing and Levelling. The question comprised of four parts, (a) to (d). In part (a) (i) the students were required to define the terms surveying and levelling, (ii) to mention four suggestions to be kept in mind while using the surveying instruments, (b) (i) to define an error, (ii) to explain three sources of error and (iii) to explain briefly the types of error in chain surveying. In part (c) the students were required to differentiate the given technical terms: (i) base line and check line, (ii) main station and tie station, (iii) chainage and offset and (d) (i) to describe suitability and unsuitability of chain in surveying operations and (ii) to state the instrument used to determine the length of the line in chaining.

This question was attempted by 104 students specializing in the trade of Land Surveying. 10.6 percent of the students scored 0 mark, 81.7 percent scored from 1 to 11 marks and 7.7 percent scored from 13 to 22 marks out of 44 allotted marks. The scores against percentages of students have been presented in Figure 8.

The question was performed poorly as only 3.8 percent of the students scored above average and the remaining below average marks. The analysis on the responses of the students shows that most of the students who attempted this question produced irrelevant answers due to lack of knowledge on the topics tested. Extract 8 is a sample response of a poorly performed work.

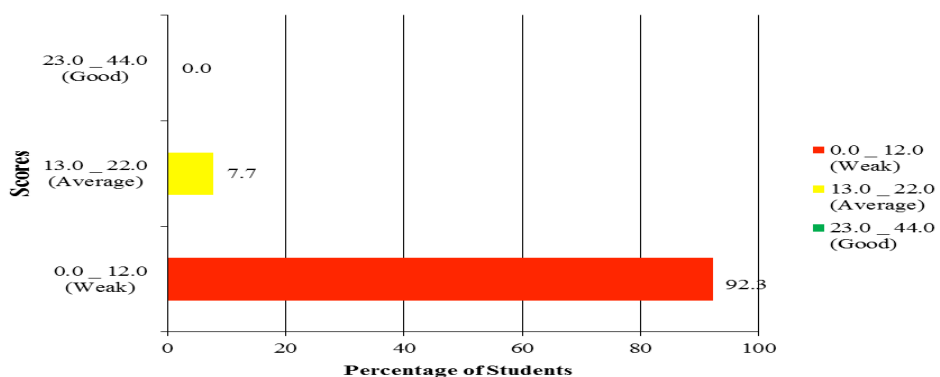


Figure 8: Bar chart showing the score of students percentagewise.
Extract 8

8. (a) (i) Define the term surveying and leveling.

Is the branch of study science deal the with that surveying to the leveling of that construction building.

— Is the brach of study science deal with the building material and to the level.

(ii) Mention four suggestions to be kept in mind while using the surveying instruments.

(i) ATTENDANCE

(ii) ENGINEER

(iii) SURVEYING ENGINEER

(iv) ROAD

(b) (i) Define an error.

Is the material of the error with that people together

(ii) What are three sources of error?

(i)

(ii)

(iii)

(iii) How many types of error in chain surveying? Briefly explain each type.

Is the people help of the that with to error of 1 do workshop into surveyor.

- Anything to the surveying are can build "with all" together.
- What come in Tanzania there are can help people together to surveyor.
- When come in Tanzania into with just at person help work-ship to the student.

(c) Differentiate between the following terms:

(i) Base line and Check line.

Base line - Is the surveyor of the line together, can work Base line and Check line with first on base the error.

(ii) Main station and Tie station.

Is anything station of the person to the that work all. Tie station of the person together.

(iii) Chainage and Offset.

Is the mains are can speak to the surveyor we work ship together.

(d) (i) What the suitability and unsuitability of chain?

Because, I do workship to the suitability and other we in of chain of the maps.

(ii) What are the instrument for chaining which are used to determine the length of the line?

Because, I do work to length of the line together first anything build to the determine and the line.

Extract 8 represents a sample of a response by a student who provided irrelevant answers to all parts of the question.

3.0 ANALYSIS OF THE STUDENTS' PERFORMANCE PER TOPIC

The Form Two National Assessment (FTNA) 2015 for Civil Engineering subject had six parts. The compulsory part comprised of the general issues and the Building construction; other five parts comprised of the trades of specializations. Each candidate had to attempt only one trade of specialization.

The general part covered the following topics: Introduction, Site investigation, Bonding, Walls and Materials. These topics were well performed indicating that the general concepts of building construction were well known to students. They also had adequate knowledge of the general principles of construction.

Each of the five specializations had a number of topics covered to the level of form two as analysed in each specialization here-under:

In Carpentry and Joinery the topics tested were: Timber, Joints, Tools and equipment and Plants and machines. Generally, those topics were poorly done as all candidates scored below pass mark. Students could not recall the basic uses and maintenance of surfaces, tools and machines. The analysis on the students' responses show that the students lacked basic knowledge and practical skills on the application and use of hand-tools and equipment.

In Brick work and masonry the topics were: Site investigation, Bonding, Foundations and Walls. Those topics were fairly done for some of the candidates managed to score above the pass mark (30%). The analysis on the students' responses shows that most students faced difficulties in the topics of Site investigation and Foundation probably because of inadequate practical skills.

In Painting and signwriting, the topics tested were: Safety, Water paints, Texture finishing, Paints and Painting materials. All the topics except Safety were poorly done, as all students scored below 30%. The responses presented by the students show that they lacked exposure and practical skills on manipulating with paints and painting materials.

In Plumbing the topics were Safety, Plumbing materials and tools. Generally the students performed averagely. A good number of students

were able to explain technical issues on the materials and tools asked. Students demonstrated skills on safety precautions although they failed to recall all the details concerning plumbing tools and the use of conventional symbols in plumbing drawings probably because of lack of practice and poor free hand sketching skills.

In Land Surveying the topics were Introduction, Levelling, Surveying instruments and Chain surveying. The students performed well in the topic of Introduction probably because the topic gives an overview of the general Land Surveying Industry. The performance in the topics of levelling and chain surveying was average; most of the candidates were not able to recall some practical issues on chain surveying, probably because of inadequate practice on the field.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 CONCLUSION

The General performance of students in Civil Engineering in Form Two National Assessment (FTNA) for the year 2015 was poor.

The analysis of the students' performance shows that out of eight questions, five had poor performance; one was averagely performed while two (2) questions were performed well. The students performed well in questions 1 and 2, performed averagely in question 7 and performed poorly in questions 3, 4, 5, 6 and 8. The poor performance in these questions is an indicator that the students had inadequate knowledge and practical skills on the topics covered at the level of form two in the specialization subjects of Carpentry and Joinery, Brickwork and Masonry, Painting and Signwriting and Land Surveying.

The analysis of students' performance per question as indicated percentagewise shows that questions in Carpentry and Joinery, Brickwork and Masonry, Painting and Signwriting and Land Surveying were poorly performed. Students who managed to score a pass mark (30%) or more were ranging from 00 to 27.1 percent of all students. In questions 1 and 2 the performance was good as the students who attained the pass mark or more were ranging from 55.5 to 95.6 percent. Question 7 was averagely

done with 36.3% of the students attaining a pass mark or more as shown in the Appendix.

It is therefore expected that the feedback provided in this report will enable teachers, students, parents, guardians, policy makers and other stakeholders to take appropriate measures to improve the teaching and learning process in Civil Engineering subjects for better performance in future Civil Engineering Assessments.

4.2 RECOMMENDATIONS

(a) The students should:

- (i) Search and read different sources of knowledge concerning Civil Engineering so as to get adequate practical skills on the field and on the use of hand tools.
- (ii) Read carefully the instructions on each section of the question so that they can understand the requirements of the question before attempting it.

(b) Teachers should:

- (i) Conduct tests and assignments at all levels in line with the national (NECTA) assessment format.
- (ii) Conduct adequate practice during the course so as to improve the students' practical skills on the field and enable them relate theories with practice.
- (iii) Search and read different sources of information and knowledge concerning Civil Engineering so as to get the updates in the world of science and technology.

(c) The Ministry of Education, Science, Technology and Vocational training should:

- (i) Provide technical schools with training material in order to improve the performance of technical subjects.

- (ii) Prepare and supply text books for technical subjects in order to improve the teaching and learning environment.
- (iii) Employ more qualified technical teachers for technical schools.

Appendix

Analysis of Candidates' Performance Questionwise in Civil Engineering subject

S/N	Topic	Question Number	Percentage of Students who Scored 30% or More	Recommendations
1	Introduction, Site investigation, Materials, Foundation and Bonding	2	95.6%	Good
2	Introduction, Site investigation, Materials, Foundation and Bonding	1	55.5%	Good
3	Safety, Plumbing, materials and tools	7	36.3%	Average
4	Introduction, Walls, Materials and tools	3	27.1%	Weak
5	Bonding and Foundation	5	24.7%	Weak
6	Introduction, Levelling, Surveying instruments and Chain surveying	8	7.7%	Weak
7	Safety, Water paints, Finishing texture, Paints and painting materials.	6	0.0%	Weak
8	Timber, Joints, Tools and equipment, Plants and machine	4	0.0%	Weak

