THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL OF TANZANIA

FORM TWO NATIONAL ASSESSMENT

073 **CIVIL ENGINEERING SURVEY**

Time: 2:30 Hours. **Year: 2024**

Instructions

1. This paper consists of sections **A**, **B** and **C** with a total of **ten (10)** questions.
2. Answer **all** questions.
3. Section A carries **15** marks; section B carries **70** marks and section C carries **15** marks.
4. All writing must be in **black** or **blue** ink and drawings must be in **pencil**.
5. Cellular phones and unauthorized materials are **not allowed** in the examination room.
6. Write your **Assessment Number** at the top-right hand corner of every page.

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**EXAMINER'S INITIIALS**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		
CHECKER'S INITIALS		

SECTION A (15 Marks)

Answer **all** questions from this section

1. For the item (i)-(x), Choose the correct answer from among the given alternatives and write its letter in the box provided

(i) Identify a set of important tools which are required for compass surveying.

A. Compass, Arrows, Metallic tape, Picks axe and Plumb bob

B. Compass, Ranging rods, Metallic tape, Arrows and Plumb bob

C. Compass, Ranging rods, Metallic tape, Square and Plumb bob

D. Compass, Ranging rods, Linear tape, Hammer and Plumb bob

(ii) When tape is used to conduct chain survey in the field, systematic errors may occur. Which factor might be the source of the error?

A. Misreading of the tape

B. Variation in tension to the tape

C. Miscounting of tape lengths

D. Poor straightening of the tape

(iii) Suppose you are a surveyor and you are planning to make linear measurements in a certain plot. Which method will you use?

A. Direct measurement

B. Indirect measurement

C. Precise measurement

D. Electrical measurement

(iv) Linear and chaining surveying is conducted at a small area for correct and accurate measurements. Which among the following is the acceptable shape of the area?

A. Trapezium

B. Triangle

C. Rectangle

D. Parallelogram

(v) A surveyor surveying the site was taking linear measurements of a line AB by using a tape of 30 m long. After completing the survey, the tape was extended to 30.023 m long due to expansion. Determine the distance of a line AB which is supposed to be 125.510 m long if the tape did not expand.

A. 125.550 m

B. 125.600 m

C. 125.606 m

D. 125.625 m

(vi) Which one of the following are temporary adjustments for the prismatic compass?

A. Centering, levelling, focusing the prism

B. Centering, focusing the prism, adjustment of sight vane

C. Adjustment of needle, focusing the prism, adjustment of levels

D. Centering adjustment of needle, adjustment of pivot point

(vii) The reference meridian used by surveyors to measure bearings that passes through the geographical South Pole, North Pole and any point on the surface of the earth is known as

A. Grid meridian

B. True meridian

C. Arbitrary meridian

D. Magnetic meridian

(viii) Before surveying the school area, reconnaissance was conducted. Which sketch was prepared during reconnaissance?

A. Reference sketch

B. Offset sketch

C. Check line sketch

D. Index sketch

(ix) The notebook in which measurements are noted is known as the field book. How should it be arranged?

A. Single line and double line

B. Single line and three line

C. Double line and three line

D. Double line and triple line

(x) In chain surveying a problem arises if chaining is free but vision is obstructed. To solve this problem reciprocal ranging is resorted and chaining is done. Which of the following methods is used in a reciprocal ranging?

A. Indirect method

B. Direct method

C. Stepping method

D. Rise and fall method

2. Match the descriptions of hazards encountered in land surveying in **List A** with correct types of hazards in **List B** by writing a letter of the corresponding response below the item number in the table provided.

List A	**List B**
(i) When surveyors work in outdoor environments they may be exposed to slips, trips, falls, and uneven ground that increase the risk of injury. (ii) Mishandling of surveying devices such as total stations, GPS devices, or device failure can lead to injuries or accidents. (iii) Surveyors working near roads or highways are at risk of being struck by passing vehicles. (iv) Surveying involves assessing existing slabs or groundwork such as bridges posing a risk of collapse or slab failures.	A. Communication hazards B. Psychological hazards C. Traffic hazards D. Physical hazards E. Equipment hazards F. Structural hazards G. Weather condition

(v)	Incorrect information can lead to misunderstanding, errors in data collection, or delays in emergency response.	

Answers:

(i)	**(ii)**	**(iii)**	**(iv)**	**(v)**

SECTION B (70 Marks)

Answer **all** questions from this section.

3. Briefly explain the meaning of the following terms as used in civil engineering surveying:

   (a) Surveying (b) Levelling (c) Chaining

   (d) Plane Surveying (e) Reconnaissance

4. A surveyor conducted chain survey for a water supply project. During the survey of a water pipeline from water source to village storage tank, the distance was found to be 6600 m. If PVC pipes of diameter 75 mm and length 6 m were used:

   (a) Describe the two methods of measuring the distance directly.

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   (b) (i) Determine the total number of pipes which are used to cover the entire distance.

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(ii) If the cost of one pipe of 6 m long is Tsh. 60,000/= what is the total cost of pipe used?

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5. During surveying practices, the field data are entered in the field book and later these data should be worked on. Suggest five precautions which should be taken while entering data in the field book.

(a) .....

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(b) .....

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(c) .....

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(d) .....

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(e) .....

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6. (a) In taking measurement in the field by using chain, the chain can be adjusted when is found too long or too short under normal circumstances. How can you adjust the chain when is either too long or too short? Give four ways in each case.

(i) Adjustment when the chain is too long.

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- .....
- .....
- .....
- .....

(ii) Adjustment when the chain is too short.

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(b) During data collection, the surveyor established the data in the given table. Calculate the area of each figure.

Table 1: Surveying Data

S/N	***Figure***	***Chainage (m)***	***Base (m)***	***Offsets***	***Mean (m)***	***Area (m2)***
1.	*AJG*	*0 - 100*	*100*	*0 & 50*	*25*	
2.	*JGFM*	*100 – 300*	*200*	*50 & 250*	*150*	
3.	*MFEP*	*300 – 650*	*350*	*250 & 210*	*230*	
4.	*PED*	*650 – 950*	*100*	*210 & 0*	*105*	
5.	*ABK*	*0 – 180*	*180*	*0 & 160*	*80*	
6.	*BKNC*	*180 – 490*	*310*	*160 & 180*	*170*	

(i) .....

(ii) .....

(iii) .....

(iv) .....

(v) .....

(vi) .....

7. Summarize the ten procedures you will follow to plot chain survey data.

(i) .....

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(ii) .....

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(iii) .....

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(iv) .....

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(v) .....

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(vi) .....

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(vii) .....

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(viii) .....

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(ix) .....

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(x) .....

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8. How do the following terms are interrelated as far as survey is concerned?

(a) Back sight and Height of instrument.

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(b) Datum and benchmark

9. (a) Mention two duties of each of the following persons during chaining process:
   (i) A leader
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   (ii) A follower
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   (b) Differentiate the stepping method from indirect method as used in chaining on sloping ground.
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10. Analyse five differences between prismatic and surveyor's compass instruments.
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