



08:30 – 11:30 AM

Names:

Index number

QUESTIONS and ANSWERS BOOKLET

ACADEMIC YEAR: 2020-2021

Read carefully the instructions on page (i) 8. (ii)

NESA-2021-00001 NESA-2021-00002 NESA-2021-00003 NESA-2021-00004 NESA-2021-00005

[illegible]



TVET NATIONAL EXAMINATION, RTQF LEVEL 5, 2020-2021

INSTRUCTIONS TO CANDIDATES: PART I (Answer Booklet)

1. A candidate should fill in the actual names and the index number on the cover of this questions and answer booklet on the provided place (Black Box).
2. It is illegal for a candidate to write any of his/her names, index number or a school name inside the answer booklet.
3. A candidate should check if all pages of the answer booklet are complete. No candidate should remove or tear any pages or part of it from the answer booklet.
4. A candidate should answer in the language in which the examination is set. (See page **(ii)**)
5. A candidate should sign on the sitting plan when submitting the answer booklet. He/she has also to check if the answer booklet is well sealed.
6. No extra paper is allowed in the examinations room. If a candidate is caught with it his/her results will be nullified.
7. No candidate is allowed to write answers not related to the subject being sat for, otherwise it will be considered as a cheating case.
8. Write your answers on the 12 lined pages (From page 1 of 12 to page 12 of 12).
9. Use the last non-lined pages as draft.
10. Results for any candidate who is caught in examination malpractices are nullified. The cheating can be recognized during examinations administration, marking exercise or even thereafter.

TVET NATIONAL EXAMINATION, RTQF LEVEL 5, 2020-2021

OPTION/TRADE: LAND SURVEYING

SUBJECT: Surveying Measurement Adjustment

DURATION: 3 hours

INSTRUCTIONS TO CANDIDATES: PART II (Question Paper)

The paper is composed of two (2) Sections as follows:

Section I: Attempt all the Twelve (12) questions (60 marks)

Section II: Attempt any Four (4) questions out of Six (6) (40 marks)

Allowed materials:

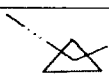



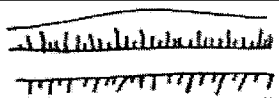
- Ruler or square
- Calculator

Note:

Every candidate is required to carefully comply with the provided assessment instructions.

Section I : Attempt all the Twelve (12) questions**(60 marks)**

- 01.** Choose and complete with the correct answer from the parenthesis () in statement below:
..... is the simplest method of surveying in which only linear measurements are made in the field area. **(Compass surveying; Chain surveying; Plane table surveying).** **(5 marks)**
- 02.** Andrew, a Land Surveyor has been given a task for measuring the horizontal and vertical distances of a residential house. Distinguish these measurements conducted by him. **(5 marks)**
- 03.** The Reduced Bearing (RB) of $200^{\circ}50'$ Whole Circle Bearing (WCB) is(choose in the following: **S $20^{\circ}50'$ W; N $20^{\circ}50'$ W; S $50^{\circ}20'$ W).** **(5 marks)**
- 04.** Angles observed upwards directly from the graduated circle of a theodolite instrument are named..... or plus angles. **(angles of elevation; minus angles; angles of depression).** Select one (1) which is correct from parenthesis and fill the gap. **(5 marks)**
- 05.** List the principles of measurement in surveying. **(5 marks)**
- 06.** A man travels from a point A to West and reaches a point B. The distance between the points A and B is 139.6m. Calculate the latitude and departure of the line. The Whole Circle Bearing (WCB) is $279^{\circ}45'00''$. **(5 marks)**
- 07.** Boundary line, Road bridge, Cutting, Lake, Traverse station, Benchmark, Canal, Embankment, Cultivated land and Main station/Control point (station) are conventional symbols used in surveying measurement. Choose and complete the appropriate name of symbol in the table below. **5 marks**

Nº	Name of symbol	Conventional Symbols
1	
2	
3	
4	
5	

08. One Trainee of TVET School was given a task for measuring the horizontal distance between two (2) points using a digital theodolite. The measured distance will be: (Choose the correct answer)

(a) (Low Reading - Upper Reading) x100

(b) (Upper Reading-Low Reading) x100

(c) (High wire-Low wire) x1000

(5 marks)

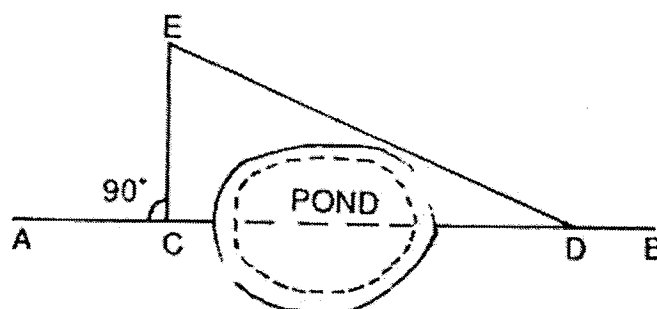
09. The distance measured between two (2) points using a chain, a Land surveyor has counted 30 links and the length of one link is 0.2 m. Determine that distance.

(5 marks)

10. A rule adjust the departures and latitudes of traverse courses in proportion to their lengths. (Transit; Compass;)

(5 marks)

11. During the chaining carried out by a surveyor, survey line is obstructed by a pond:



If the chainage of C= 50m and the distance CE= 40m,

Find the chainage of D considering the angle CED= 30°.

(5 marks)

12. Enumerate any four (4) obstacles which a Surveyor can meet in chain surveys.

(5 marks)

Section II: Attempt any Four (4) questions out of Six (6) (40 marks)

13. A survey line was measured with a steel tape which was exactly 30m long at 18°C and found to be 452.343m. The temperature at the field was 32°C. Calculate the true length of survey line if the coefficient of expansion of the tape per °C= 0.0000117. **(10 marks)**

14. (a) The table below is indicating the terms used in surveying measurement and classification of measurements. Match by writing the letter in column II to make a relationship between the terms given in column I and their meanings and examples in column III: **(7.5 marks)**

Column I	Column II	Column III
A. Accuracy	The degree of closeness or conformity of repeated measurements of the same quantity to each other.
B. Precision	Computing the distance between two (2) points through Upper and Lower readings on staff with a dumpy level.
C. Error	The degree of conformity of measurement relative to its true value.
D. Mistake	Determining the distance between two (2) points by making a direct measurement using a graduated tape.
E. Direct measurement	Are caused by the misunderstanding of the problem, carelessness or poor judgment of the observer.
F. Indirect measurement	

- (b) Respond by true (T).or False (F). The "angular misclosure" for an interior angle traverse is the difference between the sum of the observed angles (Σ observed angles) and geometrically correct total $\{(n-2) \times 180^\circ\}$ for the polygon. **(2.5 marks)**

15. The following are the observations made on the same angle:

Times (ni)	Observed Angles (DMS)	Times (ni)	Observed Angles (DMS)
1 st	47°26'13"	6 th	47°26'18"
2 nd	47°26'10"	7 th	47°26'15"
3 rd	47°26'16"	8 th	47°26'12"
4 th	47°26'09"	9 th	47°26'15"
5 th	47°26'18"	10 th	47°26'14"

Determine:

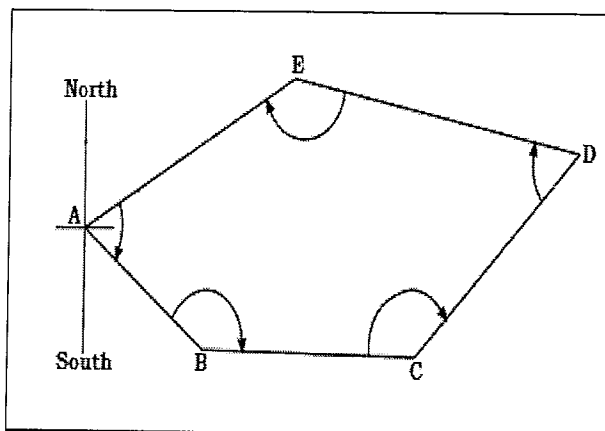
- (a) the most probable value of the angle;
 (b) the range;
 (c) the standard deviation;
 (d) the standard error of the mean. **(10 marks)**

16. The table below indicates the different corrections; signs and formula used for measuring tape. Fill the missing in: **(10 marks)**

s/n	Correction	Sign	Formula
a)	.....	.....	$(c/\ell)L$
b)	Temperature (C_t)	\pm	.....
c)	.....	.....	$[(P-P_0)/AE]L$
d)	Sag (C_g)	-	.....
e)	.....	.....	$(1 - \cos \theta)L$
f)	Alignment (C_m)	.....	.....

17. The figure below shows an activity of angles observation, a Land Surveyor has conducted in a land parcel ABCDEA with a theodolite instrument as follows:

EAB= $44^{\circ}35'38''$; ABC= $155^{\circ}34'48''$; BCD= $154^{\circ}10'25''$; CDE= $44^{\circ}14'50''$; DEA= $141^{\circ}24'34''$:



- (a) Find the sum of observed angles in land parcel ABCDEA;
 (b) Find an error of the survey and adjust the field angles in land parcel ABCDEA. **(10 marks)**
18. A distance measured in units of meters is observed 10 times as 256.828, 256.832, 256.831, 256.833, 256.825, 256.833, 256.830, 256.827, 256.830, and 256.831.
- Determine the arithmetic mean;
 - Find the residuals;
 - Compute the variance and standard deviation;
 - Compute the standard deviation of the mean. **(10 marks)**

