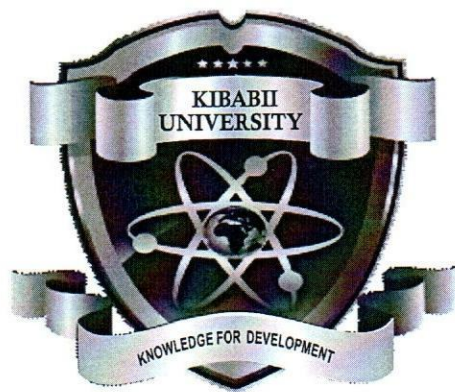


26



*(Knowledge for Development)*

**KIBABII UNIVERSITY**  
**UNIVERSITY EXAMINATIONS**  
**2020/2021 ACADEMIC YEAR**

**FOURTH YEAR 1ST SEMESTER**  
**MAIN EXAMINATIONS**

**FOR THE DEGREE OF BACHELOR OF SCIENCE AGRICULTURE AND  
BIOTECHNOLOGY**

**COURSE CODE: SAB 412**

**COURSE TITLE: ENGINEERING SURVEYING**

**DATE: 12<sup>TH</sup> JULY 2021**

**TIME: 2PM – 4 PM**

---

**INSTRUCTIONS TO CANDIDATES**

Answer Question ONE and any other TWO Questions.

TIME: 2 Hours

This paper consists of 2 printed pages. Please Turn Over



KIBU observes ZERO tolerance to examination cheating

**QUESTION ONE = 30 MARKS (Compulsory)**

a) Briefly explain the two types of coordinate reference systems in GIS. (4 Marks)

- i) Geographic coordinate systems (GCS)
- ii) Projected coordinate systems (PCS)

b) Convert the location of Bungoma town in western Kenya below from DMS (degrees, minutes and seconds) to DD (Decimal Degrees). (5 Marks).

DMS Lat	0° 34' 10.2900" N
DMS Long	34° 33' 30.1536" E

c) Give a brief explanation on the below terms used in engineering survey (3 Marks).

- i) Map projection
- ii) Cartesian co-ordinate system
- iii) Control network
- iv) Consistency.

d) Outline key fundamental applications of engineering surveying in a new agricultural farm that is being set up. (3 marks)

e) State the advantages of an automatic level over a tilting level (4 Marks)

f) Elaborate the two tests and adjustments necessary for an automatic level (4 Marks)

g) A distance of 220.450 m was measured with a steel band of nominal length 30 m. On standardization the tape was found to be 30.003 m. Calculate the correct measured distance, assuming the error is evenly distributed throughout the tape. (3 Marks)

h) Elaborate the main sources of errors in angle measurements in surveying (4 Marks)

**QUESTION TWO = 20 MARKS**

- a) Briefly explain the two main types of error in surveying (6 Marks)
- b) Describe three key sources of the above errors (6 Marks).
- c) Illustrate and explain slope distance correction in surveying using a diagram (5 Marks).
- d) Explain the meaning of the terms random error and systematic error, and show by example how each can occur in normal surveying work. (3 Marks)

**QUESTION THREE = 20 MARKS**

- a) Briefly describe the below terms (6 Marks)

Levelling

Bench Mark

Backsight

Height of Instrument

Foresight

Turning Point

- b) Highlight the key steps in differential levelling (8 marks)

c) Determine the level of BM<sub>2</sub> from the below readings obtained during a differential levelling field exercise. Kindly show the stepwise calculation and confirm if the error in the measurements are acceptable (4 Marks)

Point	BS	HI	FS	Elev
BM				100.00
Setup 1	12.64	112.64	3.11	
TP1				
Setup 2	10.88	120.41	2.56	
TP2				
Setup 3	9.72	127.57	3.10	
BM2				

**QUESTION FOUR = 20 MARKS**

a) Explain the main objective in profile levelling surveying with a specific example in a new horticultural farm establishment. (3 Marks).

b) Outline the key steps in Profile surveying (8 Marks)

c) A profile leveling along the center line of a proposed street starting at elevation 140.000 m with percentage grade = -1.5%. The street starts at station 0+00 up to station 2+10 using 100-m stationing. Compute elevations of all full and plus stations along with the amount of cut and fill. BM#1= 140.506 BM#2=138.510 (9 Marks)

**QUESTION FIVE = 20 MARKS**

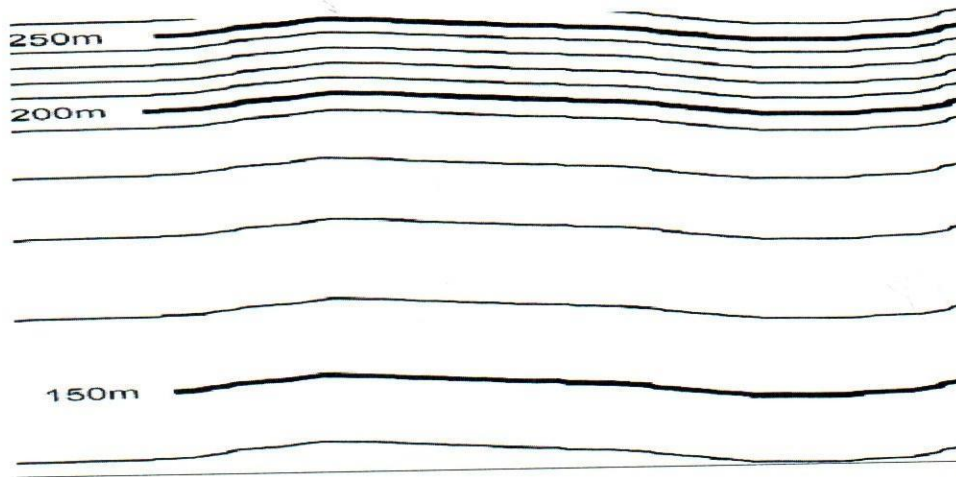
a) Briefly describe the below (3 Marks)

Map

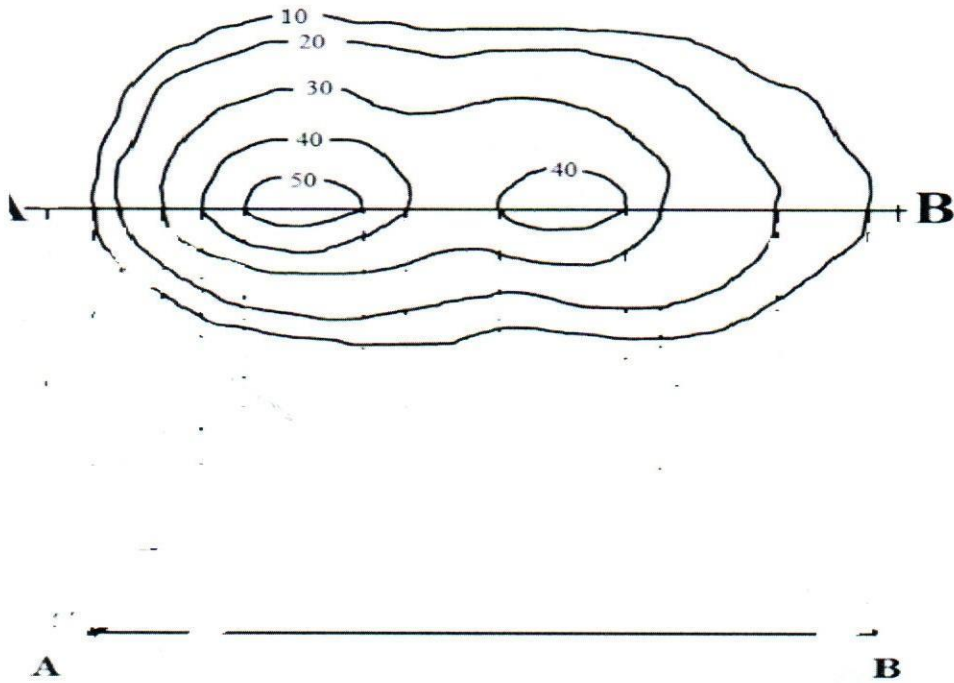
Contour

Map scale

b) Kindly interpret the below contour map at the various points. (6 Marks)



c) Use the contour map provided and generate a topographical profile. (8 Marks)



d) Describe the major landforms from the contour map. (3 Marks)

e) Indicate the most likely course of a stream and determine in which direction it is flowing. (4 Marks).