JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

UNIVERSITY EXAMINATIONS   FOR THE DIPLOMA IN CONSTRUCTION MANAGEMENT (TVET)

1ST YEAR 2ND SEMESTER 2023/2024 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TDC 2122

COURSE TITLE: ENGINEERING SURVEYING I

EXAM VENUE: STREAM: Dip CONSTRUCTION MGT

DATE: ../04/2024   EXAM SESSION:

DURATION: 2 HOURS

Instructions

1. **Answer ALL questions in Section A (Compulsory) and ANY other three questions in Section B**
2. **Candidates are advised not to write on question paper**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

SECTION A: COMPULSORY   (40 Marks)

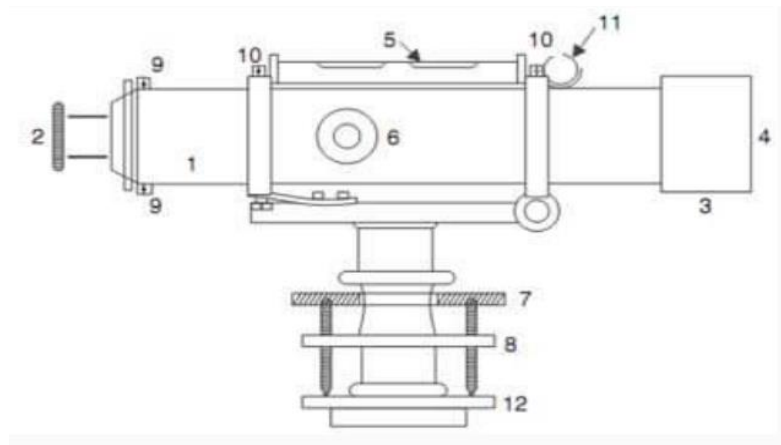This section has two questions. Answer all questions in this section

QUESTION ONE   (10 Marks)

a) Define the following (**5 Marks**)

 i.   Engineering Surveying

 ii.   Survey Station

 iii.   Survey Instrument

 iv.   Instrument Station

 v.   Survey line

b) The diagram below is a schematic diagram of a levelling instrument called a dumpy level.

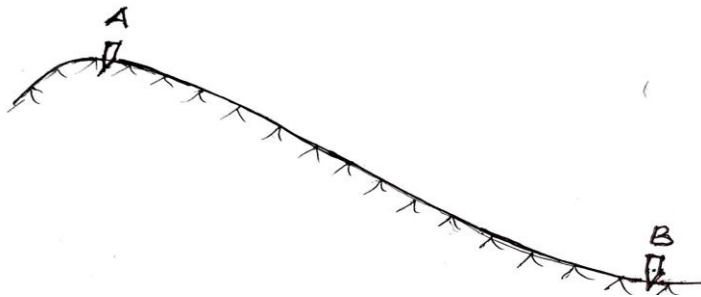Name the parts listed underneath   (**5 Marks**)

- 2.......................
- 5......................
- 6.....................
- 7......................
- 12.....................

QUESTION TWO   (30 Marks)

a) Briefly discus why you need to study survey in your profession (**3 Marks**)

b) List the four basic measurements in engineering surveying   (**4 Marks**)

c) The figure below shows two pegs A and B along a hill slope. Use it to answer the questions below

i. Briefly explain how you can determine the **horizontal distance** between stations A and B accurately using a tape   (**5 Marks**)

ii. List other survey equipment which you may need   for the exercise in i)

(**2 Marks**)

iii. Using a level instrument briefly explain how you can determine **the vertical linear distance** between stations A and B   (**3 Marks**)

d) The diagram below shows a contour map of a mountain in Kenya. Use the diagram and further information provided below to answer the questions that follow
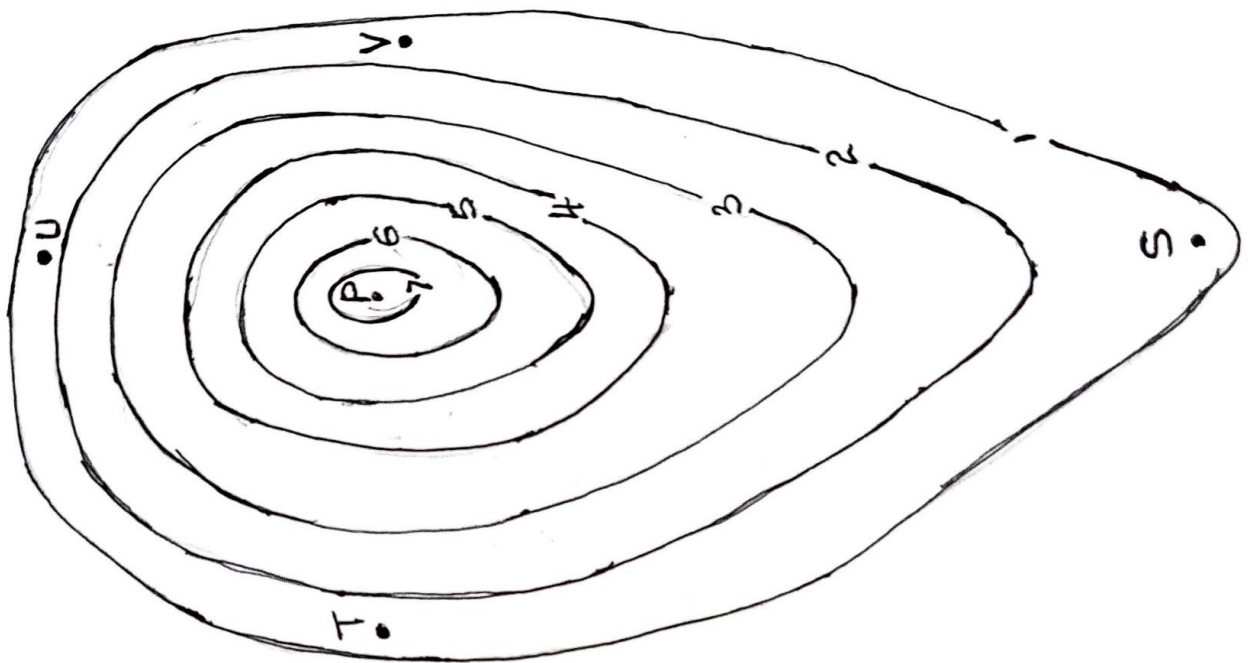
The scale of the map is 1:800,000. The horizontal distance measured on the contour map from point P to to some points shown on the map are as given in mm. Secondly, the values of the contours are given in the table below

Horizontal distance from P			Contour value	
Point	Distance (mm)		Contour	Elevation (m asl)
S	94		1	1000
T	42.5		2	1800
U	41.5		3	2600
V	33		4	3400
			5	4200
			6	5000
			7	5800

   i.   Calculate the general gradient along PS   (**3 Marks**)

   ii.   Calculate the general gradient along PV   (**3 Marks**)

  iii.   Determine the vertical interval of the map   (**2 Marks**)

  iv.   Determine the course of the only river that flows from the peak of this mountain and justify your answer   (**3 Marks**)

   v.   Which side of the mountain has the steepest slope and why? (**2 Marks**)

SECTION B   (40 Marks)

Attempt any two questions. All the questions carry the same marks

QUESTION THREE (20 Marks)

With reference to the diagram below,

a) Book the given readings and compute the reduced levels of the given survey stations

b) Carry out the necessary checks

Datum RL+50 m

Level position 1, Level position 2, Level position 3, Level position 4
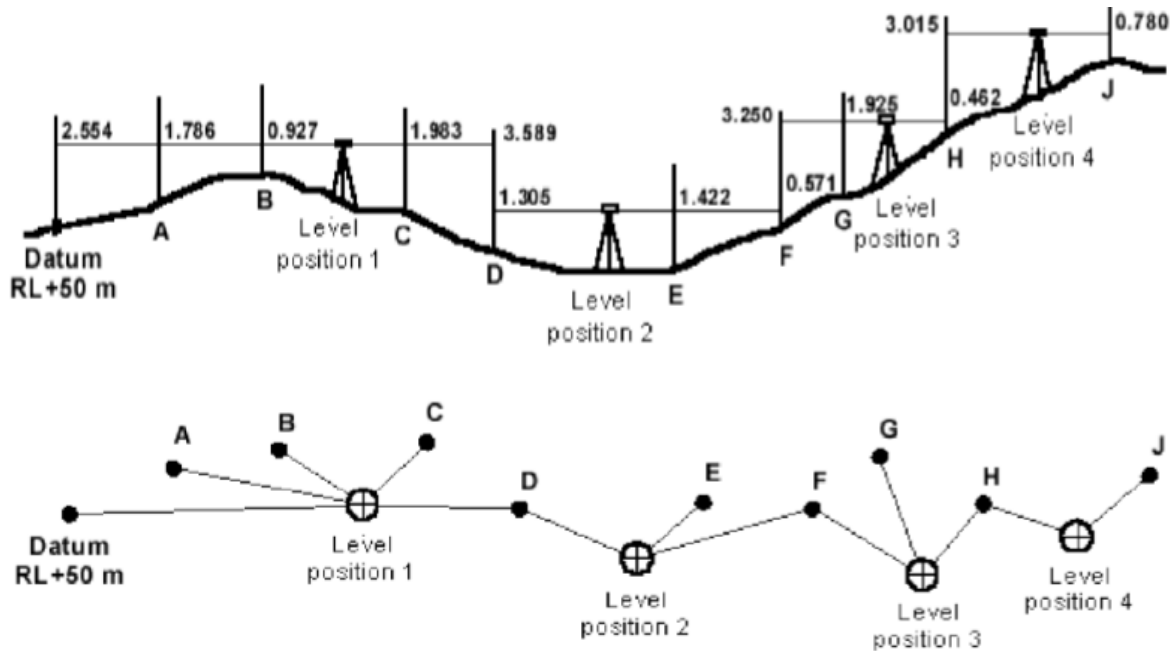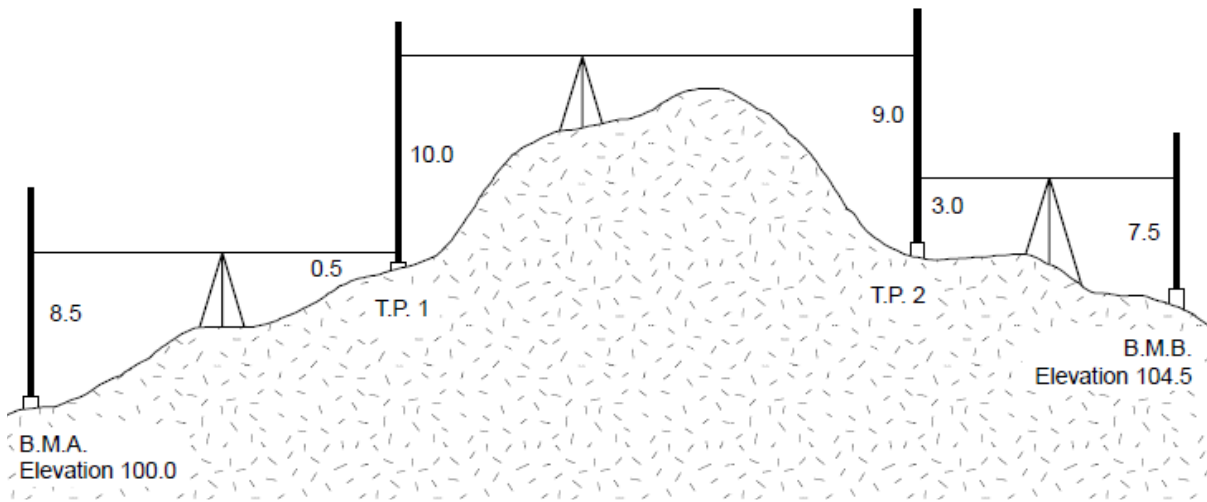
QUESTION FOUR (20 Marks)

Intersection by distance, intersection by angles, angle and distance, perpendicular offset and oblique offset are methods commonly used to fix points on the ground where one or two other points are already known; in the process of undertaking engineering survey. With the aid of neat clear sketches, briefly explain how the following techniques are used in fixing points

    a) Intersection by distances (**4 Marks)**

    b) Intersection by angles (**4 Marks)**

    c) Angle and distance (**4 Marks)**

    d) Perpendicular offsets (**4 Marks)**

   e) Oblique Offset (**4 Marks)**

QUESTION FIVE (20 Marks)

    a) Aided with sketches, briefly explain the principle of using a level instrument in measuring vertical heights   (**10 Marks)**

    b) Use the figure below to answer the questions that follow

       i.   Book the given survey data   (**4 Marks)**

      ii.   Compute the reduced levels   (**4 Marks)**

     iii.   Carry out the required checks   (**2 Marks)**

9.0

10.0

3.0

7.5

0.5

8.5

T.P. 1

T.P. 2

B.M.B.
Elevation 104.5

B.M.A.
Elevation 100.0

QUESTION SIX (20 Marks)

a) Describe any four methods of approximating linear horizontal distance measurement

(**8 Marks**)

b) In the process of chaining exercise, a survey line comes across a pond as shown. Describe a simple technique that bypasses the pond to continue with the chaining exercise. Include illustrative diagram. (**6 Marks**)

Pond
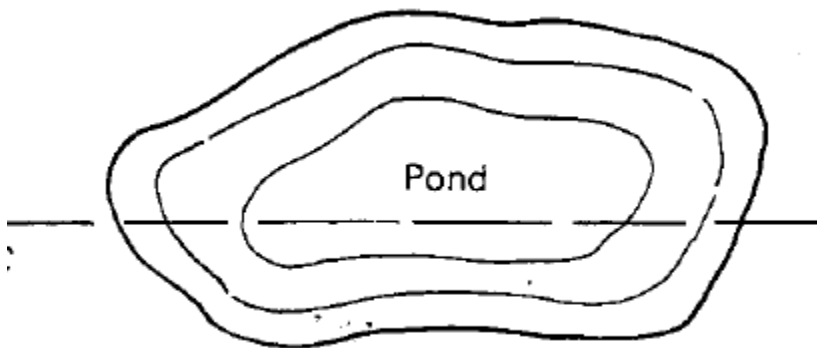
c) In the process of taping along a sloppy ground, the slope distance (S) was determined as 169.543m. The vertical slope between the two survey stations was determined by theodolite as $16.78°$. Determine the required distance (**2 Marks**)