# MURANG'A UNIVERSITY OF TECHNOLOGY

## SCHOOL OF ENGINEERING AND TECHNOLOGY

### DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

UNIVERSITY ORDINARY EXAMINATION

2017/2018 ACADEMIC YEAR

**SECOND** YEAR **FIRST** SEMESTER EXAMINATION
DIPLOMA IN CIVIL ENGINEERING
CLASS - 17MAY

SEB 1355 – SURVEYING V

DURATION: 2 HOURS

DATE: 16$^{TH}$ APRIL, 2018

TIME: 2.00 – 4.00 P.M.

**Instructions to Candidates:**

1. Answer **Question 1** and **Any Other Two** questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

**QUESTION ONE (30 MARKS)**

a) Define the following terms as used in Mass Haul Diagram (MHD)
    i.    Bulking
    ii.   Free haul distance
    iii.  Waste
    iv.  Borrow                                      (4 marks)

b) With the aid of a sketch, explain how to determine the verticality of a structure three (3) floors high.         (5 marks)

c) A distance between road junction measures 94.2mm on photograph the road junction distance on a map of 1:25000 scale of the same locality measures 47.2mm, use the information to determine:
    i.    Ground distance between the road junctions
    ii.   Photo scale
    iii.  The ground distance of a fence which measures 497mm on the photograph.             (8 marks)

d) Use the following information to tabulate the setting out data for a simple circular curve.

| | |
|---|---|
| Radius | 600m |
| Deviation angle | $20^\circ\ 30'$ |
| Chord interval | 20m |
| Chain age at intersection point | 3,000 |

                                                  (13 marks)

**QUESTION TWO (20 MARKS)**

a) Briefly explain how to overcome the following obstacles in setting out a curve
    i.    Inaccessible intersection point
    ii.   Inaccessible tangent point                 (8 marks)

b) Two straight PQ and QR meet on a inaccessible point Q. they have been joined by a circular curve of radius 500m in length. Two points E and F were selected on PQ and QR respectively and the following observations were made :
Angle  PEF = $160^0\ 00'$
         RFE = $145^0\ 00'$
         Distance EF = 130m
If the chainage of point E was 1200m and chord interval was 25m, complete the setting out data through chainage basis, giving the answer in tabular form.     (12 marks)

**QUESTION THREE (20 MARKS)**

a) Define the term  "Transition Curve"                       (2 marks)

b) Discuss briefly the setting out procedure of a  transition curve       (18 marks)

**QUESTION FOUR (20 MARKS)**

a) With a neat sketch, show the geometry of a simple horizontal curve

(5 marks)

b) Derive expressions for the following
   i. Tangent length
   ii. Exsecant
   iii. Mid- ordinate                                    (6 marks)

c) Explain the field procedure of setting out horizontal curve by ordinates method deriving the necessary expressions required if any.                    (9 marks)

**QUESTION FIVE (20 MARKS)**

a) Explain one method of ensuring each of the following:
   i. Horizontal control
   ii. Vertical control                                  (6 marks)

b) A 100m sewer is to laid at a fall of 1:50 between points A and B apart. The reduced levels of invert at A is 240.0 m above the datum , for the purpose of fixing sight rails at A and B, the ground reduced levels were 242.0m and 244.0m respectively . if the bonning rod 3.0m long was used, determine the height of sight rails set at A and B

(9 marks)

c) Sketch "Mash Haul Diagram" and outline four uses of MHD        (5 marks)