



MURANG'A UNIVERSITY COLLEGE
(A constituent college of Jomo Kenyatta University of Agriculture and Technology)
SCHOOL OF ENGINEERING

DEPARTMENT OF BUILDING AND CIVIL

UNIT TITLE: ENGINEERING SURVEYING V

CLASS: BC/C /014D MAY

UNIT CODE: SEB 1355

DATE: 21st April 2016

TIME: 2HRS

Instructions:-

- Question **ONE** is compulsory Attempt any other **TWO** questions.
- Marks for each question are allocated at the end of each.

QUESTION ONE (30 MARKS)

- i. Derive the expression for curve setting by offsets from long chord
- ii. State the procedure of overcoming the obstacle of setting the curve when the intersection point is inaccessible.
- iii. Derive the data needed when setting a 600 m curve with 16° deflection angle with 20 m chord interval.

QUESTION TWO (20marks)

- a) Explain briefly the derivation of the transition curve questions
- b) Three straights AB, BC, CD have whole circle bearings 30° , 90° , 45° respectively. AB is to be connected to CD a continuous reverse curve formed of two circular curves of equal radius together with four transition curves. BC which has a length of 800 m, is to be the common tangent to the two inner transition curves. Determine the radius of the circular curves if the maximum speed is to be restricted to 80 km / hr and a rate of change of radial acceleration of 0.3 m/s^3 obtains. Give
 - i. Offset
 - ii. The deflection angle, with respect to BC, to locate intersection of the third curve with its circular curve.

QUESTION THREE (20marks)

The image co-ordinates of three points A,B,C and of the principal points P and Q on two overlapping photographs were determined as follows, If the ground coordinates of A and B are 79000 m E, 92940 m N and 78910 m E , 92760 m N respectively, determine those of C

Left photo		points	Right photo	
X mm	Y mm		X mm	Y mm
0.0	0.0	p	-76.2	0.0
+ 76. 0	0.0	Q	0.0	0.0
+ 10.6	+60.5	A	-66.0	+59.0
+11.2	-6.3	B	-64.5	-6.7
+14. 5	+ 34.3	C	-61.5	+ 33. 7

QUESTION FOUR (20marks)

A length of sewer PQR is to be constructed in heading , the straight PQ and PR having whole circle bearings of $202^{\circ} 46'$ and $20^{\circ} 14'$ respectively, while manhole P has coordinates of 127.05 m E, 448.62 m N . If the coordinates of a nearby station A on a street traverse are 60.00 m E , 300.0 m N and the bearing of a traverse line AB is $210^{\circ} 33'$, obtain data for setting out the two straights of sewer.

QUESTION FIVE (20 marks)

- a) Outline the vertical alignment of a storey building by Theodolite
- b) Calculate the setting out data required to establish a batter rail, for use with a 1.3 m long traveler, which will define an embankment that is to slope upwards at 1 in 2.5 from a level of 72.509 m
- c) An area of 220 km² is to be photographed at a scale of 1 in 8000 from the air using a camera of focal length 150mm, the photographs being 230mm square. A longitudinal overlap of 60% and a lateral overlap of 25% must be provided. If the operating speed of the aircraft is 225 km/hr, find
 - i. The flying height of the air craft and interval between exposures
 - ii. The number of prints required if the flying strips are 16km long