W1-2-60-1-6

JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY

University Examinations 2016/2017

SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF LAND RESOURCE PLANNING AND MANAGEMENT

ECE 2218: ENGINEERING SURVEYING I

DATE: JUNE 2017 TIME: 2 HRS

INSTRUCTIONS
ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS) - COMPULSORY

a) Define the term surveying State some of the application of land surveying to land resource planning and management (6 marks)

b) State some of the sources of errors in levelling. (4 marks)

c) Write some short notes on the following as applied to levelling:-

i. Change Point (1 mark)

ii. Mean Sea Level (1 mark)

iii. Line of collimation (1 mark)

iv. Elevation (1 mark)

d) Working from first principles, derive the trapezoidal and simpsons rule for computing areas (6 marks)

e) A survey line AB is obstructed by a high building. To prolong the line beyond the building, a perpendicular BC 121.92 m long is set at B. From C two lines CD and CE are set out at angles of 30° and 40° with CB respectively. Determine the lengths CD and CE so that D and E may be on the prolongation of AB. If the chainage of B is 95.10 m find the chainage of D. Draw a sketch showing all the points (4 marks)

f) Using a diagram explain any six properties of mass haul diagrams (MHD) (6 marks)

QUESTION TWO (20 MARKS)

a) Define the following terminologies as used in mass Haul Diagrams(MHD) (6 marks)

i. Lead and lift.
ii. Limit of economic haul.
iii. Balancing line.
iv. Shrinkage.

b) The volumes between sections along a 1200 m length of proposed road are shown below, positive volumes denoting cut, and negative volumes denoting fill.

Chainage: 0	100	200	300	400	500
Volume($m^3 \times 10^3$)	+2.0	+3.2	+1.0	+1.1	-1.8
Chainage: 500	600	700	800	900	1000
Volume($m^3 \times 10^3$)	-4.4	-4.5	-2.8	+0.6	+3.5
Chainage: 1000	1100	1200			
Volume($m^3 \times 10^3$)	+3.7	-2.6			

i. Calculate cumulative volume (3 marks)
ii. Plot a Mass-Haul Diagram (MHD) for this length of road to a suitable scale and determine the overhaul if the free haul distance is 250 m. (7 marks)

c) Clearly differentiate between Plane and Geodetic surveying. (4 marks)

QUESTION THREE (20 MARKS)

a) Define the term Leveling. (2 marks)

b) Explain with a neat sketch, the two peg method of testing and adjustment of a dumpy level. (6 marks)

c) Explain in detail the procedure of levelling of a dumpy level. Draw a neat sketch to justify your answer. (6 marks)

d) The following observations were made during the testing of a dumpy level.

Instrument at	Staff readings on	
	A	B
A	2.400	1.300
B	2.300	1.400

Is the instrument in adjustment? If not determine the error. If R.L. of A is 200.00 m, determine the R.L. of B. (6 marks)

QUESTION FOUR (20 MARKS)

a) Distinguish between a Tilting level and an Automatic Level. (6 marks)

b) The following consecutive readings were taken with a dumpy level and 4 m levelling staff on a continuously sloping ground at 30 m intervals. 0.680, 1.455, 1.855, 2.330, 2.885, 3.380, 1.055, 1.860, 2.265, 3.540, 0.835, 0.945, 1.530 and 2.250. R.L of the starting point was 80.750 m.

i. Rule out a page of a level book and enter the above readings, use height of collimation method. (4 marks)

ii. Determine the RL of various staff stations. (10 marks)

QUESTION FIVE (20 MARKS)

a) Explain the following types of levelling and state where each is used (8marks)

i. Reciprocal levelling

ii. Fly levelling

iii. Differential levelling

iv. Simple levelling

b) Describe two methods that may be used to compute area of irregular bound figures (4 marks)

c) The following perpendicular offsets were measured from a chain line to an irregular boundary. Calculate the area between the chain line and the irregular boundary using Simpson's rule (4marks)

Chainage (m):	0	10	20	30	40	50
Offset (m):	2.4	1.8	3.6	2.8	3.2	2.0

d) State and explain the fundamental principles of surveying (4 marks)