



JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

BACHELOR OF SCIENCE LRPM

ECE 2218: Engineering Surveying I; ASSIGNMENT 2

DATELINE: 30/05/2017

Assignment 2

- 1) Volumes of cut (positive) and fill (negative) along a length of proposed road are as follows:

Chainage (m)	0	100	200	300	400	480	
Volume (m ³)		+290	+760	+1680	+620	+120	-20
Chainage (m)	500	600	700	800	900	1000	
Volume (m ³)		-110	-350	-600	-780	-690	-400
Chainage (m)	1100	1200					
Volume (m ³)		-120					

Draw a MHD and, excluding the surplus excavated material along this length, determine the overhaul if the freehaul distance is 300 m. (10marks)

- 2) The following notes refer to a 400 m section of a proposed railway and the earthwork distribution in this section is to be planned without regard to adjoining sections. The table shows the stations in 30 m units and the surface levels along the centreline the formation being at an elevation above datum of 14.5 m at station 20 and thence rising uniformly on a gradient of 1.2 per cent. The corresponding earthwork volumes are recorded in m³, the cut and fill volumes being prefixed respectively with the plus and minus signs.

Station	Surface level (m)	Volume (m ³)	Station	Surface level (m)	Volume m ³
20	17.6	+ 1400	23	15.7	- 100.00
21	19.1	+ 1160	24	14.9	- 820.00
22	17.8	+ 416	25	13.2	- 1540.00

Station	Surface level (m)	Volume (m ³)	Station	Surface level (m)	Volume m ³
26	12.5	-1600.00	29	18.1	+275.00
27	13.8	-850.00	30	20.3	+550.00
28	16.5	-180.00	31	20.7	+325.00
			32	26.2	

- Plot the longitudinal section using a horizontal scale of 1cm=24 m and a vertical scale of 1cm=10m.(5marks)
- Assuming a balancing factor of 0.8 applicable to fill volumes, plot the mass haul curve on a horizontal scale of 1cm=10 m and a vertical scale of 1 cm = 1000 m³ (6marks)
- Calculate the total haul in station meter and indicate the haul limits on the curve and longitudinal section.(5marks)
- State which of the following estimates you would recommend: (a) No free haul at Rs. 20.00 per m³ for excavating, hauling and filling. (b) Free haul limit of 100m at Rs. 15.00 per m³ plus Rs. 2.00 per station meter for "overhaul" or haul distance exceeding 100m.(5marks)

One station meter=1 cubic meter hauled through one station, i.e. 30 m.

- 3) The volume in m³ between successive section 100m apart on a 900m length of a proposed road are given below(excavation is positive and Fill is negative)

Section	0	1	2	3	4	5	6	7
Volume (m ³)	+1700	-100	-3200	-3400	-1400	+100	+2600	
Section	7	8	9					
Volume (m ³)	+4600	+1100						

- Plot a mass haul diagram for this length of road(5marks)
 - Determine the maximum haul distance when earth may be wasted only at the 900m end. (5marks)
 - Evaluate the overhaul in station metre (stn m) if the freehaul limit is 300m. (10marks)
- 4) A) Following data refer to a site of a reservoir.

Contour (m)	Area enclosed (hectare)
610	72
615	110
620	410
625	890
630	1158

The areas given are the ones which will be contained by the proposed dam and contour lines as given above. Calculate the volume of water in the reservoir. Use prismoidal rule (5marks)

- B) The following perpendicular offsets were taken from a chain line to a barbed wire fence

chainage (m)	0	20	40	60	80	95	110	140	170
offsets (m)	6.7	5.8	10.3	12.8	9.7	8.8	6.9	8.2	6.5

Calculate the area between the chain line, the barbed fence, and end offsets by (i) trapezoidal rule, (ii) Simpson's rule. (5marks)