

**ASSIGNMENT: 5 AREA & VOLUME**

- Q.1** What is use of planimeter ? what is the zero circle.? Under what condition do the zero circles get traced by the tracing point? How you can find the area of zero circles?
- Q.2** What are the general methods of calculating area? Explain double meridian distance (DMD) method in detail.
- Q.3** Enumerate different types of methods for measuring the volume and explain any one method in brief.
- Q.4** Derive an expression for prismoidal formula for volume. Compare it with the trapezoidal formula.
- Q.5** Derive equation for Trapezoidal and Simpson’s rule to find out area of an irregular boundary.
- Q.6** Discuss Prismoidal formula, Prismoidal correction and Curvature correction for computation of volumes from cross sections.
- Q.7** Discuss in brief the various methods of measurement of area by offsets from the baseline. State the relative merits and demerits of each methods
- Q.8** Determine the capacity of reservoir for the following observations of contour area map. A planimeter was used to measure the area of contours. The anchor point was kept outside the figure. Scale of map was 1cm = 10m and multiplying constant M = 10sq. cm for the planimeter. Use Prismoidal formula to calculate the volume.

Contour (m)	Reading on Planimeter		
	Final Reading	Initial Reading	Value on N
100	2.022	5.134	+1
102	3.168	9.025	+2
104	4.864	1.739	+2
106	5.972	8.238	+3
108	6.787	3.127	+3

- Q.9** Area enclosed between the dam and upstream contours at a reservoir are as follows

Contour level (m)	63	65	67	69	71
Enclosed area (sq m)	711	6512	52705	79500	374555

If the bottom level 63m and F.R.L and is 71m Determine the capacity of the reservoir by trapezoidal and Simpson’s formula.

- Q.10** An embankment of width 12 m and side slope 1.5:1 is required to be made on a ground which is in level in a direction transverse to the centre line. The centre height at 42m interval is as follows. 1.02, 1 23, 2 22, 2 35, 1.87, 1.33, and 0.97. Calculate the volume of earthwork according to trapezoidal and Simpson’s rule.

- Q.11** The following are the values of offsets taken from a chain line to an irregular boundary. Calculate the area included between chain line and irregular boundary by Simpson's rule.

Distance (m)	0	50	100	150	200	250	300	350	400
Offset (m)	10.6	15.4	20.2	18.7	16.4	20.8	22.4	19.3	17.6

- Q.12** A canal is running in cutting , bed width of canal is 10m and side slope 1 :1 , if depth of cutting of canal at 30 m intervals are 1.1, 1.3, 1.4, 1.35, 1.45 ,1.6, 1.9, 1.8 , 2.1 . Calculate volume of cutting by trapezoidal and prismoidal formula.
- Q.13** Compute the area of the cross-section if the formation width is 10 m, side slope is 1 to 1, average height along the centre-line is 5 m, and transverse slope of the ground is 10 to 1.
- Q.14** Area enclosed between the dam and upstream contours at a reservoir site are as follows:

Contour Level (m)	54	56	58	60	62
Enclosed area (Sq. m)	714	6512	52700	79000	374000

If the bottom level is 54 m and the F.R.L is 62 m, determine the capacity of the reservoir by trapezoidal and prismoidal formula. Also compute prismoidal correction.

- Q.15** A road embankment is 8m wide & 200m in length at the formation level, with a side slope of 1.5(H) :1(V). The embankment has a rising gradient of 1 in 100m. The ground levels at every 50m along the centre line are as follows

Distance (m)	0	50	100	150	200
Ground RL (m)	164.5	165.2	166.8	167	167.2

Take formation level of zero chainage is 166m calculate the volume of earth work by Trapezoidal rule & Prismoidal rule.