Total number of printed pages = 5

19/4th Sem/UCE 401

2022

SURVEYING - II

Full Marks – 100

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) What is the principle of tacheometric survey ? Derive the distance formula for a horizontal line of sight when the staff is held normal to the line of sight. 4

   (b) Calculate the ordinates at 10m distances for a circular curve having a long chord of 60m and a versed sine of 4m. 5

   (c) What are the different triangulation figures used in triangulation surveys ? State the criteria for selection of triangulation figures ? 5

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(d) The following perpendicular offsets were taken at 10m intervals from a survey line to an irregular boundary line : 6

2.25, 3.60, 4.20, 4.85, 6.30, 7.80, 4.20, 4.15, 3.20

Calculate the area enclosed between the survey line, the irregular boundary line and the first and last offsets by

(i) Trapezoidal rule and

(ii) Simpson fs rule.

2. (a) The following observations were taken with a tacheometer :

Distances (m)	Stadia interval (m)
20	0.195
100	0.996

Calculate the tacheometric constants. 5

(b) Determine the offsets to be set out at 10 m intervals to locate a curve of radius 50 m by radial offsets from tangents. 5

(c) Find the volume of earth work of a road embankment 10m wide at the formation level, with side slope of 2 to 1 and with an average height of 5 m constructed with an average gradient 1 in 20 from contour 210 m to 260m. 5

(d) In a triangulation survey how is the relative elevation of stations determined ? Write the formula if there is no obstruction due to intervening ground. 5

3. (a) The readings from a tacheometer station A to a vertically held staff at B were 2.200, 2.605 and 2.900. The inclination of the line of sight was +6°40′. Another observation on vertically held staff at B.M. gave the readings 1.600, 1.920 and 2.160, the inclination of the line of sight was −2°20′. Calculate the horizontal distance between A and B and the elevation of B if the R.L. of B.M. is 52.558 m. Take K=100 and C = 0.4. 5

(b) What is the principle of the two-theodolite method for setting out a simple circular curve ? Write down its procedures. 1+6=7

(c) If the mean coefficient of refraction for sights over land is 0.07 and the mean radius of earth is taken as 6370m. Write the formula to determine the distance of the visible horizon if there is no obstruction due to intervening ground. 4

(d) Why is a satellite station or false station used in a triangulation survey ? 4

4. (a) Derive the distance and elevation formulae of a staff station when the staff is held vertically for an inclined line of sight at an angle of depression. 6

(b) Two tangents intersect at a chainage of 50+40 and the deflection angle was 40°20′. Calculate the necessary data for setting out a curve of 10 chains radius to connect the two tangents by Rankine's method of tangential angles. The length of one chain is equal to 20m (100 links). 8

(c) What is photogrammetric surveying ? Define the two branches of photogrammetric surveying. 6

5. (a) Two triangulation stations P and Q are 30km apart. The elevations of P and Q are 160m and 180m respectively. Determine the minimum height of signal required at Q such that the line of sight may not pass near the ground less than 2m. Assume the intervening ground to have an uniform elevation of 120m. 5

(b) The scale of an aerial photograph is 1 cm = 100m. The photograph size is 25 cm × 25 cm. Calculate the number of photographs required to cover an area of 200 sq.km, if the longitudinal and side laps are 60% and 30% respectively. 5

(c) What are the different components of a GIS ? Explain them. 5

(d) Explain the Raster and Vector data model. What are their advantages and disadvantages ? 5

6. (a) For an aerial photogrammetry define the following : 2×5=10

(i) Exposure station

(ii) Flying height

(iii) Tilt

(iv) Scale of the vertical photograph

(v) Longitudinal and side laps.

(b) With a neat sketch explain the idealized remote sensing system. 10