53 (CE 401) SUR-II

2019

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)* Determine the gradient from point A to point B from the following observations made with a tacheometer fitted with an anallactic lens. The constant of the tacheometer was 100 and the staff was held vertically. 10

Instrument station	Staff point	Bearing	Vertical angle	Staff readings
P	*A*	132°	+10°30'	1·350, 1·900, 2·450
	B	220°	+5°0'	1·060, 1·880, 2·700

Contd.

(b) Two straight lines AB and BC are intersected by a line D_1D_2. The angles BD_1D_2 and BD_2D_1 are 40°30' and 36°20' respectively. The radius of the first arc is 600m and that of the second arc is 800 m. If the chainage of intersection point B is 8248·1 m, find the chainage of the tangent points and the point of compound curvature. 10

2. (a) The scale of an aerial photograph is 1cm=160m, the size of the photograph is 20cm×20cm. If the longitudinal lap is 65% and side lap is 30%, determine the number of photographs required to cover an area of 232 km^2. 10

(b) What is Remote sensing ? Explain the basic principles of remote sensing. Differentiate between active and passive remote sensing. 5

(c) A tacheometer reads 1·645 and 2·840 corresponding to the stadia wires, when sighted horizontally to a vertical staff 120m away. The focal length of the object glass to the trunnion axis is 15cm. Calculate the stadia interval. 5

3. (a) Determine the required data to compute a flight mission for an area 8km wide and 16 km long. The airplane has a speed of 192km/h. A camera with a focal length of 21 cm is to be used. The approximate scale is 1 : 10,000, the average elevation of the ground is 366m, and the photographs are to be 23cm × 23cm. The forward lap is 60% and the side lap is 25%. 10

(b) The following perpendicular offsets were taken from a chain line to a hedge :

Chainage :	0	15	30	45	60	70	80	100	120	140
Offsets :	7·60	8·5	10·7	12·8	10·6	9·5	8·3	7·9	6·4	4·4

Calculate the area between the survey line, the hedge and the end offsets by

(a) Trapezoidal rule

(b) Simpson's rule. 10

4. (a) Two triangulation stations A and B are 60km apart and have elevations 240m and 290m respectively. Find the minimum height of signal required at B so that the line of sight may not pass near the ground than 3m, the intervening ground may be assumed to have a uniform elevation of 200m. 6

(b) With the help of a neat diagram, explain an idealized remote sensing system. 8

(c) Define deflection angle at any point on the curve. Write down the procedure for setting out a single circular curve by two theodolite methods. 6

5. (a) Define : 2×4=8

(i) Simple circular curve

(ii) Compound curve

(iii) Reverse curve

(iv) Super-elevation.

(b) What is photogrammetry ? Differentiate between a map and an aerial photograph. 6

(c) Write down the procedure to determine the constants of a tacheometer by field method. 6

6. (a) Write down the procedure to set out a simple circular curve by method of offsets from chords produced. 10

(b) What do you understand by Geographical information system ? Write a note on components of GIS. 10