53 (CE 401) SUR–II

2018

SURVEYING–II

Paper : CE 401

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions.*

1. *(a)* Explain the procedure to determine the multiplying and additive constants of a tacheometer by field observation method. 5

   (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°24′ respectively. The radius of the first arc is 600*m* 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

   (c) Write a note on Raster and Vector data structures of GIS. 5

2. *(a)* What is satellite station in triangulation? Explain the methods of determining the intervisibility between triangulation station. 10

(b) Define deflection angle of a circular curve. Write down the procedure for setting out a simple circular curve by two theodolites method. 5

(c) The scale of an aerial photograph is $1cm = 160m$, and the size of the photograph is $20cm \times 20cm$. If the longitudinal lap is 65% and side lap is 30%, determine the number of photographs required to cover an area of $240km^2$. 5

3. *(a)* From a satellite station S, $6{\cdot}2m$ from the main triangulation station A, the following directions were observed :

A	0°	0′	0″
B	132°	18′	30″
C	232°	24′	6″
D	296°	6′	11″

the lengths of AB, AC and AD were computed to be $3265{\cdot}5m$, $4022{\cdot}2m$ and $3086{\cdot}4m$ respectively. Determine the directions of AB, AC and AD. 10

(b) Explain with the help of a neat diagram an idealized remote sensing system. 10

4. (a) Find out the desired data to compute a flight mission for an area 8*km* wide and 16*km* long. The airplane has a speed of 192*km/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 366*m* and the photographs are to be 23*cm*×23*cm*. The forward lap is 60% and the side lap is 25%. 10

(b) An excavation is made for a reservoir 20*m* long and 10*m* wide at the bottom, having the side of the excavation slope at 1 in 2. Calculate the volume of excavation if the depth is 4*m*. The ground surface is level before excavation. 5

(c) Define photogrammetry. Differentiate between a map and an aerial photograph. 5

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

Instrument Station	Staff Point	Bearing	Vertical angle	Staff readings
P	A	134°	+10°32′	1·360,1·915,2·470
	B	224°	−5°6′	1·065,1·965,2·865

(b) Explain the procedure to set out simple circular curve by method of offsets from chords produced. 10

6. *(a)* What is GPS ? Write a note on application of GPS. 5

(b) What is Tacheometric Surveying ? Describe the condition under which it is advantageous. 5

(c) A series of offsets were taken from a chain line to a curved boundary line at intervals of 15*m* in the following order — 0,2·56,3·91,3·84,4·52,3·21,4·05,5·71*m*

Compute the area between the chain line, the curved boundary and the end offsets by (a) average ordinate rule (b) trapezoidal rule and (c) Simpson's rule. 10

7. *(a)* Explain the following : 5×2=10

(i) Well-conditioned triangle

(ii) Systems of triangulation

(iii) Transition curve

(iv) P.T. and P.C. of a curve

(v) Compound curve.

(b) Derive the expressions and explain the procedure to set out simple circular curve by offsets from the tangents. Consider both radial and perpendicular offsets. 10