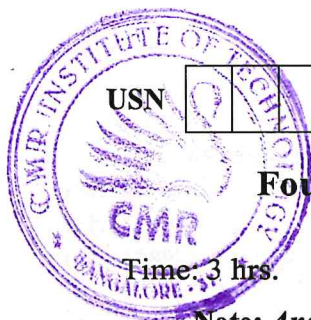


# CBCS SCHEME

15CV46



USN

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Fourth Semester B.E. Degree Examination, Jan./Feb.2021

## Advanced Surveying

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- What are the elements of a simple circular curve? (04 Marks)
  - Calculate the ordinates at 10 m distance for a circular curve having a long chord of 80 m and a midordinate of 4 m. (04 Marks)
  - Two tangents intersect at chainage 1200 m, the deflection angle being  $40^\circ$ . Compute the data for setting out a 400 m radius curve by Rankine's deflection angles method. Take 30 m chord length. Tabulate the results. (08 Marks)

OR

- With neat sketch, explain various elements of a compound curve. (04 Marks)
  - Define : (i) Transition curves (ii) Super elevation. (04 Marks)
  - A reverse curve is to be set out between two parallel tangents 10 m apart. The distance between the tangent points measured parallel to the tangents is 80 m. If the radius of the first branch is 150 m, calculate the radius of the second branch. Also calculate the lengths of the two branches. What would be the equal radius of the branches of the two reverse curve? If the chainage of first tangent point is 1988 cm, determine the chainages of the point of reverse curvature and the second tangent. (08 Marks)

### Module-2

- Define satellite station and reduction to centre. (04 Marks)
  - Mention the points to be considered in the selection of triangulation station. (04 Marks)
  - Directions are observed from a satellite station S, 62.18 m from station C. Following results were obtained,  $\angle A = 0^\circ 0' 0''$ ,  $\angle BSA = 71^\circ 54' 32''$  and  $\angle ASC = 296^\circ 12' 02''$ . The approximate lengths of AC and BC were 8240.60 m and 10863.60 m. Calculate the angle ACB. (08 Marks)

OR

- Define : (i) Probable error (ii) Mean square error. (04 Marks)
  - State the laws of weights. (04 Marks)
  - Angles were measured on a station and the observations were recorded as follows. Find the mass probable values of angles A and B.  
A =  $45^\circ 30' 10''$  weight 2  
B =  $40^\circ 20' 20''$  weight 3  
A + B =  $85^\circ 50' 10''$  weight 1 (08 Marks)

### Module-3

- Define the terms : (i) The zenith and Nadir (ii) The declination (iii) Hour circle (iv) Prime vertical (04 Marks)
  - What is spherical triangle? Mention its properties. (04 Marks)
  - Find the shortest distance between two places A & B given that the latitude of A and B are  $15^\circ 0' N$  and  $12^\circ 6' N$  and their longitudes are  $50^\circ 12' E$  and  $54^\circ 0' E$  respectively. Radius of earth = 6370 kms. (08 Marks)

OR

- 6 a. Define the terms : (i) Celestial sphere (ii) Azimuth (iii) Hour angle  
(iv) Altitude (04 Marks)  
b. Explain Astronomical triangle. (04 Marks)  
c. Explain spherical excess and derive the expression for spherical excess. (08 Marks)

**Module-4**

- 7 a. Define : (i) Principal point (ii) Tilt (iii) Flying height  
(iv) Scale of a vertical photograph. (04 Marks)  
b. A line AB measures 11.00 cm on a photograph taken with a camera having a focal length of 21.5 cm. The same line measures 3 cm on a map drawn to scale of  $\frac{1}{45000}$ . Calculate the flying height of the aircraft, if the average altitude is 350 m. (04 Marks)  
c. Two points A and B having elevations of 650 m and 250 m respectively above datum, appear on a vertical photograph obtained with a camera of focal length of 250 mm and flying altitude of 2700 m above datum. Their photographic coordinates are as follows:

Point	Photographic coordinates	
	x cm	y cm
a	+3.65	+2.54
b	-2.25	+5.59

Determine the length of the ground line AB. (08 Marks)

OR

- 8 a. Derive an expression for relief displacement on a vertical photograph. (08 Marks)  
b. The scale of an aerial photography is 1 cm = 100 m. The photograph size is 20 cm × 20 cm. Determine the number of photographs required to cover an area 10 km × 10 km, if the longitudinal lap is 60% and the side cap is 30%. (08 Marks)

**Module-5**

- 9 a. Mention the advantages of total station and also discuss the working principles of the same. (08 Marks)  
b. What do you understand by Remote Sensing? Write a detailed note on applications of remote sensing. (08 Marks)

OR

- 10 a. Explain the basic principles of GPS and its application in surveying. (08 Marks)  
b. What is GIS? Enumerate on GIS applications in civil engineering. (08 Marks)

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