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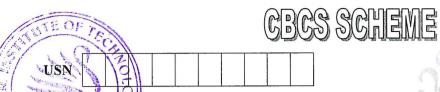**Fourth Semester B.E. Degree Examination, July/August 2022**
Advanced Surveying

Time: 3 hrs.   Max. Marks: 80

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

Module-1

1 a. With a neat sketch, derive expression for the following elements of a simple circular curve:
   (i) Tangent length   (ii) Long chord   (iii) Mid ordinate.   **(08 Marks)**
   b. Two tangents intersect at a chainage 1500m, the deflection angle 20°. Compute all the data necessary to setout a curve of radius 400m by offsets from chord produced method. Take length of normal chords as 20m. Tabulate the results.   **(08 Marks)**

OR

2 a. Why reverse curves are avoided on highways?   **(04 Marks)**
   b. Give functions and requirements of a transition curve.   **(06 Marks)**
   c. Calculate the length of transition curve from the following data:
   Maximum speed : 100 kmph
   Centrifugal ratio = 1/4
   Rate of change of radial acceleration = 30 cm/sec^3.
   Also calculate the shift of circular curve.   **(06 Marks)**

Module-2

3 a. What are the requirements of signal used in triangulation survey? With a neat sketch explain Heliotrope.   **(08 Marks)**
   b. In a triangulation survey the altitudes of two proposed stations A and B 100 km apart are respectively 430m and 710m. The intervening obstruction is situated at C, 60km from A and has an elevation of 440m. Ascertain if A and B are intervisible, and if necessary find by how much B should be raised so that the line of sight nowhere be less than 3m above the surface of the ground.   **(08 Marks)**

OR

4 a. Define weight of an observation and state the various laws of weights.   **(08 Marks)**
   b. Find the most probable values of the angles A, B and C of a triangle ABC from the following observations:

A = 65° 15′ 30″	Wt - 3
B = 51° 11′ 25″	Wt - 2
C = 63° 32′ 34″	Wt - 4

   (08 Marks)

Module-3

5 a. Define the following:
   (i) Zenith and Nadir   (ii) Celestial horizon   (iii) Hour angle
   (iv) Right Ascension   (v) Ecliptic   (vi) Solastices .   **(06 Marks)**
   b. With a neat sketch, discuss Altitude and Azimuth system.   **(04 Marks)**
   c. Find the shortest distance between two places K and L, given the latitude at K and L are 19° 00′ N and 13° 04′ N and their longitudes 72° 30′ E and 80° 12′ E respectively. Take radius of earth = 6370 km.   **(06 Marks)**

OR

6 a. Write short notes on :
   i)   Star at prime vertical
   ii) Star at horizon
   iii) Star at culmination   (09 Marks)
   b. Determine the azimuth and altitude of a star from the following data:
       Declination of star = 20° 30′ N
       Hour angle of star = 42° 6′
       Latitude of the observer = 50° N   (07 Marks)

Module-4

7 a. Define the following :
       Nadir point, Principal point, Isocentre, Principal plane   (04 Marks)
   b. A line AB 3000m long, lying at an elevation of 600m measures 9.65 cm on a vertical
       photograph for which focal length is 20cm. Determine the scale of the photograph in an area
       the average elevation of which is about 900m.   (04 Marks)
   c. Two points A and B having elevations of 200m and 150m respectively above datum appear
       on the vertical photograph having focal length of 152.4 mm and flying altitude 1500m above
       datum. Their photographic coordinates are as follows:

Point	Photographic Coordinates	
	x (mm)	y (mm)
A	+45.35	+38.41
B	-40.16	-45.65

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

OR

8 a. List the various steps involved in aerial survey and explain briefly.   (06 Marks)
   b. Describe how mosaic differs from a map.   (04 Marks)
   c. The vertical photograph of a chimney was taken from an elevation of 500m above MSL. The
       elevation of base of the chimney was 250m. If the relief displacement of the chimney was
       51.4mm and the radial distance of the image of the top of the chimney was 110mm.
       Determine the height of the chimney.   (06 Marks)

Module-5

9 a. What are the properties of electromagnetic waves?   (04 Marks)
   b. Write a note on Total Station.   (04 Marks)
   c. Explain effect of atmosphere on electromagnetic radiation.   (08 Marks)

OR

10 a. Briefly explain the various components of a GIS.   (08 Marks)
   b. Briefly explain the various applications of Remote Sensing in Civil Engineering. (08 Marks)

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