USN ☐☐☐☐☐☐☐☐☐☐ 15CV34

Third Semester B.E. Degree Examination, June/July 2017
Basic Surveying

Time: 3 hrs.   Max. Marks: 80

Note: *Answer FIVE full questions, choosing one full question from each module.*

Module-1

1   a.   Compare Plane Surveying and Geodetic Surveying (any two points).   **(04 Marks)**
    b.   Explain Indirect method of ranging, with a sketch.   **(06 Marks)**
    c.   Explain the basic principles of Surveying with sketches.   **(06 Marks)**

OR

2   a.   Discuss the classification of surveying.   **(08 Marks)**
    b.   A big pond obstructs the chain line AB. A line AL was measured on the left of the line AB for circumventing the obstacle. The length of AL was 901m. Similarly, the line AM was measured on the right of the line AB whose length was 1100m. Points M, B, L are in the same straight line. Lengths of the links BL and BM are 502m and 548m, respectively. Find the distance AB.   **(08 Marks)**

Module-2

3   a.   Compare the following : i) Fore bearing and Back bearing   ii) Whole circle bearing and Quandrantal bearing   iii) Meridian and Bearing.   **(06 Marks)**
    b.   List the fundamental lines of a theodolite. Summarize the desired relationship between them.   **(06 Marks)**
    c.   The magnetic bearing of a line was found to be N 60^0 30' W in 2002, when the declination was 5^0 10' E. Find its present magnetic bearing, if declination is 3^0 W.   **(04 Marks)**

OR

4   a.   Explain the following terms with reference to a theodolite :
      i) Transiting   ii) Swinging   iii) Trunnion axis.   **(03 Marks)**
    b.   Explain the measurement of a horizontal angle by repetition method. Draw a typical tabular column. List the errors eliminated by this method.   **(08 Marks)**
    c.   The following bearings were observed in a closed compass traverse :

Line	FB	BB
AB	S 45^0 30' E	N 45^0 30' W
BC	S 60^0 00' E	N 60^0 40' W
CD	S 5^0 30' E	N 3^0 20' W
DA	N 54^0 30' W	S 56^0 00' E

Determine the stations affected by local attraction, apply the corrections and find the corrected bearings.   **(05 Marks)**

Module-3

5   a.   Compare the following : i) Latitude and Departure   ii) Dependent coordinates and independent coordinates.   **(04 Marks)**
    b.   Describe the closing error in a compass traverse. Explain how the closing error is adjusted by transit rule.   **(05 Marks)**
    c.   A tachometer, fitted with an analectic lens and having the multiplying constant 100, was set up at station C to determine the gradient between two points A and B and the following observations were taken, keeping the staff vertical.

Staff at	Vertical angle	Stadia readings
A	$+4^0$ 20' 0"	1.300, 1.610, 1.920
B	$+0^0$ 10' 40"	1.100, 1.410, 1.720

If the horizontal angle ACB is 35^0 20', determine the gradient between A and B. **(07 Marks)**

OR

6 a. Summarize the different systems of tachometric measurements. **(03 Marks)**
  b. Find the expressions for distance and elevation when the staff is held vertical and line of sight is inclined. **(08 Marks)**
  c. The bearings of PQ and QR are 18^0 36' and 60^0 24' respectively. The coordinates of the ends P and R are :

Point	North co-ordinates	East co-ordinates
P	300.0	400.0
R	1432.8	1257.2

Find the lengths of PQ and QR. **(05 Marks)**

Module-4

7 a. Compare the following terms used in leveling :
    i) Back sight and Fore sight   ii) Bench mark and Reduced level. **(04 Marks)**
  b. Explain the effects of curvature and refraction in levelling. **(04 Marks)**
  c. The following observations were made on a hilltop to ascertain its elevation. The height of the target F was 5m.

Instrument station	Staff reading on BM	Vertical angle	Remarks
O_1	2.550	18^0 6'	RL of BM
O_2	1.670	28^0 42'	= 345.580

The instrument stations were 100m apart and were in line with F. **(08 Marks)**

OR

8 a. Derive the expressions for the horizontal distance, vertical distance and the elevation of an elevated object, when the base is inaccessible and instrument stations are not in the same vertical plane with the object. **(08 Marks)**
  b. The following consecutive readings were taken along AB with a 4m levelling staff on a continuously sloping ground at intervals of 20 meters.
    0.345 on A , 1.450 , 2.630 , 3.875 , 0.655 , 1.745 , 2.965 , 3.945 , 1.125 , 2.475 , 3.865 on B. The elevation of A was 60.350. Enter the above readings in a level – book form and work out the RL's by rise and fall method. Also find the gradient of line AB. **(08 Marks)**

Module-5

9 a. List the various methods to calculate the area with their formula. **(06 Marks)**
  b. Explain the following terms : i) Contour interval ii) Horizontal equivalent. **(04 Marks)**
  c. The following offsets were taken from a chain line to an irregular boundary line at an interval of 10m. Compute the area by trapezoidal and Simpson's rule.
    Offsets : 0 , 2.5 , 3.5 , 5.0 , 4.6 , 3.2 and 0 m. **(06 Marks)**

OR

10 a. Explain the characteristics of contours, with sketches (any five). **(05 Marks)**
  b. Explain the interpolation of contours. List the methods of contouring. **(05 Marks)**
  c. A road embankment is 30m wide at the top with side slopes of 2:1. The ground levels at 100m intervals along a line AB are as under :
    A 170.30 , 169.10 , 168.50 , 168.10 , 166.50 B. The formation level at 'A' is 178.70m with uniform falling ground of 1 in 50 from 'A' to 'B'. Determine the volume of earthwork by Prismoidal formula. Assume the ground to be in cross – section. **(06 Marks)**

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