Department of Civil Engineering, NIT Hamirpur (H.P.)
End Semester Examination-Surveying CED 214

Time Allowed: 3 Hours

Max Marks 50

Question 1-4 are of 2.5 marks and 5-12 are of 5 Marks

1. Explain how plane surveying differs from geodetic surveying.

2. Explain the difference between a level line and a horizontal line.

3. At what distance does Earth curvature have a value of 10 mm?

4. The readings obtained from a two-peg test carried out on an automatic level with a staff placed on two pegs A and B 50 m apart are:
   With the level midway between A and B: Staff reading at A = 1.283 m Staff reading at B = 0.860 m
   With the level positioned 5 m from peg B on line AB extended: Staff reading at A = 1.612 m Staff reading at B = 1.219 m. Calculate the collimation error of the level per 50 m sighting distance and the horizontal reading that should be observed on the staff at A with the level in position 5m from B.

5. A steel tape of nominal length 30 m was used to measure the distance between two points A and B on a structure. The following measurements were recorded with the tape suspended between A and B:

Line	Length	Measured Slope angle	Mean temperature	Tension applied
AB	29.872 m	3°40'	5 °C	120 N

   The standardised length of the tape against a reference tape is 30.014 m at 20 °C and 50 N tension. The tape weighs 0.17 N m^{-1} and has a cross-sectional area of 2 mm^2. Calculate the horizontal length of AB. (E=200,000 N mm^{-2}; α=0.0000112 per °C for steel)

6. The traverse diagram of Figure is an abstract for a polygon traverse A1234A which starts at existing control point A (642.515 mE, 483.980 mN) and is orientated to existing control point B (548.005 mE, 594.279 mN). Calculate the adjusted coordinates of stations 1–4 and the fractional linear misclosure for the traverse.
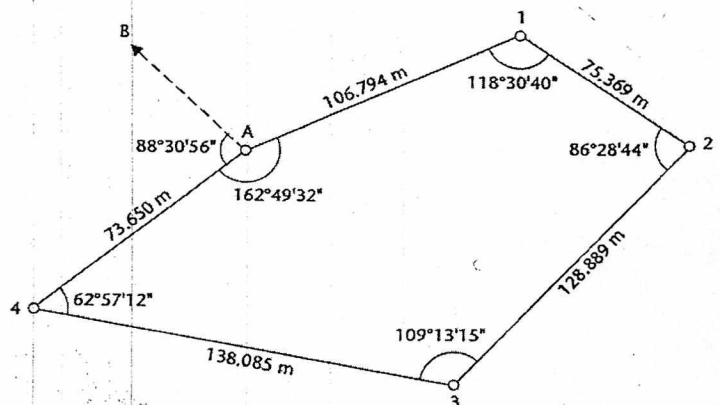
7. It is required to connect two intersecting straights whose deflection angle is 13°16'00" by a circular curve of radius 600 m. The through chainage of the intersection point is 2745.72 m and pegs are required on the centre line of the curve at exact 25 m multiples of through chainage. Tabulate the data necessary to set out the curve by the tangential angles method using a theodolite and a tape.

8. Derive the basic equation of a parabolic vertical curve and also state the various assumptions.

9. The following offsets, 8 m apart, were measured at right angles from a traverse line to an irregular boundary.
   0 m   2.3 m   5 m   7.9 m   8.6 m   6.9 m   7.3 m   6.2 m   3.1 m   0 m
   Calculate the area between the traverse line and the irregular boundary using the trapezoidal rule and Simpson's Rule.

10. Compute azimuths of all lines for a closed traverse ABCDEFA that has the following balanced angles to the right, FAB = 118°26'59", ABC = 123°20'28", BCD = 104°10'32", CDE = 133°52'50", DEF = 108°21'-58", EFA = 131°47'13". Bearing AB = N88°18'42"W.

11. Derive an expression for the horizontal distance and Elevation difference between two points using a tacheometer when the staff is held vertically and the line of sight is inclined downwards.

12. Define Contours and discuss the characteristics of contours giving suitable sketches. Describe the method of contouring used in the practical lab course.