5E5064

B.Tech. (Sem. V) (Main/Back) Examination- 2014
Civil Engineering
5CE4 Surveying - II

Time : 3 Hours

Total Marks : 80
Min. Passing Marks : 24

Instructions to Candidates :

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

UNIT - I

1. (a) What do you mean by 'axis signal' correction. Derive an expression to compute the axis signal correction. Support your answer with an appropriate sketch. (10)

   (b) Find out the corrected angle of elevation from the given data :
   Distance between P & Q = 5070m
   Angle of elevation from P to Q = 2°47'23"
   Height instrument at P = 1.54m
   Height of signal at Q = 3.65 m
   Coefficient of refraction m = 0.07 and radius of earth = 6370km. (6)

   OR

1. (a) Find the difference of levels of the points P, Q and R.L. of P from following data :
   Horizontal distance between P and Q = 7118 m;   Angle of depression from P to Q = 1°32'12"
   Height of signal at P = 3.87 m.;   Height of instrument at Q = 1.27 m.
   Coefficient of refraction = 0.07;   R sin 1" = 30.88m
   R.L. of Q = 417.86 m (10)

   (b) Explain how will you find level of top of over head tank by trigonometric leveling, if instruments are set in different vertical planes. (6)

UNIT - II

2. (a) What do you understand by super elevation? Why it is necessary to provide super elevation in curves? Explain how you will compute super elevation for roads. (8)

   (b) A compound curve has radius of short curve as 400m, long curve 600m, deflection angle for short curve is 40° and long curve is 55°. If the chainage of point of intersection is 2050m, find the chainages of point of curve (T_1), point of compound curvature (D) and point of tangency (T_2). (8)

   OR

2. (a) Explain empirical methods of computing length of transition curve. (6)

   (b) Two straights AB and CD both when produced intersect at V. Angle CBV = 30° and angle BCV is 120°. It is proposed to introduce reverse curve consisting of two arcs AT and TD, where T is point of reverse curvature (PRL), lying on BC. Length BC is 791.71m and radius of arc AT is 800m, chainage of B is 1000m. Calculate :
   (i) Radius of arc TD   (ii) Length of arc AT
   (iii) Length of arc TD   (iv) Chainage of point D (10)

UNIT - III

3. (a) Explain what do you understand by strength of figure. Explain how will you calculate strength of figure? (8)

   (b) Compute value of C and $\frac{D-C}{D}$ for the given figures. Heavy lines are boxes of known length. Direction are not observed shown dotted, station not occupied shown follow dot.

(a)   (b)

(8)
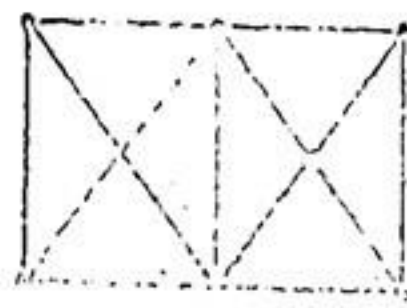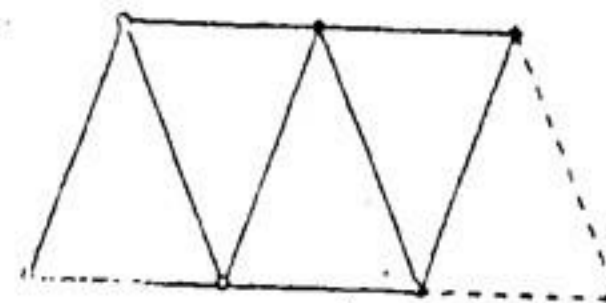
3. (a) Describe various criteria for selection of triangulation stations. (6)

   (b) The elevations of two triangulation stations A & B, 120km apart, are respectively 210m and 1050m above mean sea lent. The elevations of two peaks C and D on the profile between them are respectively 320m & 557m the distance being AC=50km & AD = 80km. Check whether the two stations are inter-visible or not. Compute height of signal at B, if required. (10)

UNIT-IV

4. (a) Explain with examples the following :

   (i) Independent quantity   (ii) Indirect observation

   (iii) Most probable error   (iv) Residual error (8)

   (b) Following angles were measured closing the horizon :

   $A = 10° 30' 48"$ weight – 4

   $B = 92° 30' 14"$ weight – 1

   $C = 56° 11' 58"$ weight – 2

   $D = 100° 57' 06"$ weight – 3

   Find corrected values of angles. (8)

4. (a) Explain Laws of weight with suitable examples. (8)

   (b) Following angle were measured closing the horizon at a station :

   $P = 45° 23' 37"$ weight – 1

   $Q = 75° 37' 15"$ weight – 2

   $R = 125° 21' 21"$ weight – 3

   $S = 113° 37' 59"$ weight – 3

   Find the corrected values of angles using method of correlates. (8)

UNIT-V

5. (a) Enumerate the different astronomical co-ordinate systems. Explain one of them in detail. (8)

   (b) Explain what do you understand by declination? Make a neat sketch and show the variation of declination of sun with salient values and specific dates. (8)

5. (a) Explain the Astronomical Triangle. (4)

   (b) Following Ex-meridian observations at a station K towards sun were taken :

   Mean observed A latitude $\alpha = 31° 45' 20"$

   Mean Horizontal angle $= 269° 16' 34"$

   Mean time of observation $= 15h\ 20m\ 33s$

   Latitude of place $= 24° 15'\ N$

   Increasing 56" per hour

   Compute the Azimuth of line. (12)