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B. Tech

PECI 5303

Fifth Semester (Back/Special) Examination – 2013
SURVEYING - II

BRANCH : CIVIL

QUESTION CODE : D 325

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any five from the rest.

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

   (a) State the basic principle of tacheometry.

   (b) What do you mean by analyatic lens ?

   (c) What is the relationship between degree and radius of a curve ? Sketch a reverse curve.

   (d) What is transition curve ? When and why is it used ?

   (e) What is a satellite station ?

   (f) What do you mean by phase of a signal ?

   (g) What do you mean by weight of an observation ?

   (h) What do you mean by tilt and tip in photogrammetry ?

   (i) Enumerate the errors in EDM.

   (j) How surveying by using total station is advantageous over traditional surveying ?

2. To determine the elevation of a point P, a tacheometer was set up at a station A and observations were made on a staff held vertical at P. As a check, the instrument was set up at another point B and observations were taken to a staff held at P. The RL of the BM was 235.455. The instrument constants were 100 and 0.3. Determine the RL of P from the following data recorded (Table 1).

Table-1

Instrument at	Staff at	Vertical angle	Hair readings			Readings at BM
A	P	3°45'	2.235	2.795	3.355	1.75
B	P	2°30'	0.945	1.490	2.035	2.25

P.T.O.

3. (a) A simple circular curve is 330 m radius. Calculate the offsets from tangent to locate points on the curve at 15 m intervals for a distance of 60 m from the tangent points. Give the radial as well as perpendicular offsets. What are their approximate values ? 7

(b) A railway curve of 1500 m radius is to be set out to connect two tangents. The design speed is 120 kmph. Find a suitable length of transition, and the necessary shift of the circular curve. 3

4. The following observations were made at a satellite station S: the direction of the true station P was 0° 00' 00"; the direction of M was 70° 36' 40"; the direction of N was 145° 24' 20"; and the direction of O was 212° 42' 10". Given that the distance PS was 25.24 m and PM, PN and PO were respectively 7567 m, 8435 m and 6694m, reduce the observed angles to the true station. 10

5. Find the most probable values of the angles P, Q and R of a triangle PQR from the following measurements: P = 70° 31' 18.6" (weight = 3), Q = 61° 12' 11.8" (weight = 2) and R = 48° 16' 36.6"(weight = 4), P + Q = 131° 43' 34.6" (weight = 2). 10

6. (a) Explain how the coordinates of a point are worked out from terrestrial photographs. 5

(b) A 1-km-long line on the ground with an average elevation of 685 m measures 11.35 m in a photograph. The focal length of the lens is 210 mm. Find the scale of the photograph for an area having an average elevation of 900 m. 5

7. (a) What are the basic features of a total station ? Explain how field works are carried out using total stations. 5

(b) Explain the 'batter board method' of setting out a large public building. 5

8. Write brief notes on any **five** of the following : 2×5

(a) Errors in tacheometry
(b) Vertical curve with all its features
(c) Well conditioned triangle
(d) Most probable value
(e) Overlaps in photogrammetry
(f) Basic principles of EDM
(g) Reverse running profile
(h) Heliotrope.