Total No. of Questions—12] [Total No. of Printed Pages—8

[3862]-108

S.E. (Civil) (Second Semester) EXAMINATION, 2010

SURVEYING

(2008 COURSE)

Time : Three Hours **Maximum Marks : 100**

N.B. :— (*i*) Answer *three* questions from Section I and *three* questions from Section II.

(*ii*) Answers to the two Sections should be written in separate answer-books.

(*iii*) Neat diagrams must be drawn wherever necessary.

(*iv*) Figures to the right indicate full marks.

(*v*) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(*vi*) Assume suitable data, if necessary.

SECTION I

1. (*a*) What is meant by orientation in plane table survey ? Explain method of backsighting for orientation. [5]

(*b*) A closed traverse was run along a square PQRS in counter-clockwise direction. The bearing of the line PQ was observed as 118° 30′. Find the Forebearings and Backbearings of the remaining lines and record them in a tabular form. [7]

P.T.O.

(*c*) Differentiate between Dip and Declination. The magnetic bearing of the sun at noon is 356° 30′. Find out the declination. [6]

Or

2. (*a*) While carrying out compass traverse, the following Forebearings and Backbearings of various lines were observed. Correct the bearings affected by local attraction and enter your result in tabular form : [7]

Line	Observed FB	Observed BB
PQ	110° 00′	292° 00′
QR	40° 00′	220° 00′
RS	320° 30′	140° 00′
ST	270° 00′	91° 00′

(*b*) Explain in brief intersection method of plane table survey. When is it used ? [5]

(*c*) Write in tabular form, how you will convert the bearings from Reduced Bearing system to WCB system. [6]

3. (*a*) What is meant by interpolation of contours ? State various methods of it and explain any *one* in detail. [6]

(*b*) Reciprocal levels were taken with dumpy level as under : [6]

Instrument at	Reading on		Remarks
	P	Q	
P	1.500	2.250	Distance between
Q	0.600	1.320	P and Q = 880 m

Assuming collimation error to be –0.005 in 100 m. Calculate the true difference between P and Q and the correction for curvature, refraction and collimation.

(*c*) Write a short note on profile levelling. [4]

Or

4. (*a*) Differentiate between collimation plane method and Rise and Fall method. [4]

(*b*) State and define various fundamental axes of dumpy level. Also write the relationships between them. [6]

(*c*) Derive an expression for the combined correction for curvature and refraction effect in levelling. [6]

5. (*a*) How would you determine omitted measurement when length of one side and bearing of other side is omitted ? [6]

(*b*) Define the following terms : [4]

(1) Vertical Asix

(2) Trunion Axis

(3) Optical Axis

(4) Line of Collimation.

(*c*) The following are the latitudes and departure for a closed traverse ABCD. Compute the missing length and whole circle bearing of side DA of the traverse : [6]

Line	Latitude	Departure
AB	–116.10	–44.40
BC	+6.80	+58.20
CD	+80.50	+17.20
DA	?	?

Or

6. (*a*) What do you mean by prolongation of a straight line ? How is it done using 20″ Theodolite ? [6]

(*b*) Define deflection angle. Explain in brief the procedure of measurement of the deflection angle using 20″ vernier transit theodolite. [6]

(*c*) Define the following terms with neat sketch : [4]

(1) Closing error of traverse

(2) Independent co-ordinates

(3) Open traverse

(4) Closed traverse.

SECTION II

7. (*a*) State the functions of the following parts of a Theodolite : [6]

(1) Clip screw

(2) Optical plumet

(3) Eyepiece

(4) Shifting head

(5) Bubble tube

(6) Lower tangent screw.

(*b*) A staff was held vertically at a distance of 125 m and 50 m from the centre of a Tacheometer. The staff intercepts with the telescope horizontal were 1.248 and 0.498 respectively. Calculate the constants of a tacheometer. [6]

(*c*) Explain the necessary test and adjustment for making the vertical circle to read zero when the line of collimation is horizontal. [6]

Or

8. (*a*) Describe in detail the field procedure of determining the constants of a Tacheometer. [6]

(*b*) Write a short note on Tacheometric Contour Survey. [4]

(*c*) A tacheometer was set up at an intermediate point between two stations A and B and the following observations were made on a vertically held staff : [8]

Staff Station	Vertical Angle	Staff Readings
A	+4° 30′	1.605, 2.400, 3.195
B	–2° 45′	0.805, 1.345, 1.885

The instrument is fitted with an anallatic lens having a constant of 100. Compute the length AB and R.L. of point B, if that of A was 395.400 m. The instrument and staff stations are in one straight line.

9. (*a*) Draw the neat sketches of the following : [4]

(1) Simple circular curve

(2) Compound curve

(3) Reverse curve

(4) Valley curve.

(*b*) Work out the relationships between the elements of a simple circular curve. [4]

(*c*) Two straights of road intersects at a chainage of 2550.50 m. The angle of intersection being 110°. Taking chord length of 30 m, calculate the following : [8]

(1) Radius of curve

(2) Length of curve

(3) Tangent length

(4) Length of long chord

(5) Chainages at the starting point and end point.

Or

10. (*a*) Write a short note on necessity of vertical curves in highways. [4]

(*b*) Describe in detail the method of setting out a simple circular curve by offset from chord produced. [6]

(*c*) A transition curve is to be designed for the following data : [6]

(1) Radius of circular curve = 300 m

(2) Gauge = 1.5 m

(3) Maximum superelevation = 15 cm

(4) No lateral pressure on rails

(5) Rate of gain of radial acceleration = 0.3 m/sec^3.

Find the length of the curve and design speed.

11. (*a*) State the classification of EDM instruments. [5]

(*b*) Explain in brief the process of setting out a building on ground. [5]

(*c*) What is total station ? State any *five* special functions available in total station. [6]

Or

12. (*a*) Define gradient. What is the importance of gradient while laying sewer pipe ? How is it decided ? [6]

(*b*) Write a short note on basic principle of EDM Instruments. [5]

(*c*) Write a short note on different types of construction survey. [5]