Total No. of Questions—12] [Total No. of Printed Pages—8+4

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S.E. (Civil) (II Sem.) EXAMINATION, 2010

SURVEYING

(2008 COURSE)

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

N.B. :— (*i*) Answer Q. No. **1** or Q. No. **2**, Q. No. **3** or Q. No. **4**, Q. No. **5** or Q. No. **6** from Section I and Q. No. **7** or Q. No. **8**, Q. No. **9** or Q. No. **10**, Q. No. **11** or Q. No. **12** 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*) Your answers will be valued as a whole.

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

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

SECTION I

1. (A) Distinguish between the following terms : [6]

(*i*) True meridian and Magnetic meridian.

P.T.O.

(*ii*) Local attraction and Declination.

(*iii*) Whole circle bearing and Reduced bearing.

(B) Find which station is free from local attraction and work out correct bearings : [7]

Line	F.B.	B.B.
AB	191°45′	13°
BC	39°30′	222°30′
CD	22°15′	200°30′
DE	242°45′	60°45′
EA	330°15′	147°45′

(C) Explain with neat sketches, any *one* method of plane tabling for locating details. [5]

Or

2. (A) Describe the various methods of plane tabling. Under what condition each is preferred ? [6]

(B) Examine the following notes on a compass survey for local attraction. Determine correct bearings. Also determine the included angles at A, B, C, D and E. [7]

Station	F.B.	B.B.
A	S10°W	N85°E
B	S77°E	N11°E
C	N5°E	N75°W
D	N54°W	S2°W
E	S88°W	S50°E

(C) State the advantages and disadvantages of plane table survey over other types of survey. [5]

3. (A) Explain how reciprocal levelling eliminates the effect of earth's curvature, atmospheric refraction and non-adjustment of the line of collimation. [6]

(B) Differentiate between direct and indirect methods of contouring. [4]

(C) The following readings refer to reciprocal level taken with one level :

Instrument near	**A**	**B**
Staff reading on A	1.824	0.929
Staff reading on B	2.748	1.606

The distance AB is 2220 m and reduced level of A is 630. 750 m

Determine the following :

(*a*) True R.L. of B.

(*b*) Combined correction for curvature and refraction.

(*c*) Angular error in the collimation adjustment of the instrument. [6]

Or

4. (A) Draw neat sketches of the pattern of contours that show :

(*i*) An overhanging cliff

(*ii*) Depression

(*iii*) Area having flat slope

(*iv*) Ridge line. [4]

(B) What are the sources of errors in levelling ? What precautions are necessary to avoid them ? [6]

(C) The following reciprocal levels were taken with one level on two points P and Q, 2645 m apart. Calculate the true difference in elevation between P and Q and the error due to refraction when the collimation error is — 0.003 m per 100 m. [6]

Level near	**Staff reading on**	
	P	**Q**
P	2.165	3.810
Q	0.915	2.350

5. (A) What are the methods of traversing by a theodolite ? Explain any *one* in detail. [4]

(B) ABCDA is a closed traverse in which the bearing of DA and length of BC have not been recorded. The rest of the field records are as follows : [8]

Line	Length (M)	Bearing
AB	555	181°19′
BC	?	90°30′
CD	310	356°49′
DA	750	?

Find the missing readings.

(C) Describe how you would measure vertical angles by theodolite. [4]

Or

6. (A) Define the following terms :

(*i*) Swinging

(*ii*) Transiting

(*iii*) Face Right

(*iv*) Telescope inverted. [4]

(B) What is Gale's traverse table ? Discuss the procedure for recording the various entries in the table. [6]

(C) The following are the latitudes and departures of the sides of a closed traverse ABCDA. Calculate the area of the traverse by independent coordinates. [6]

Line	Latitude		Departure	
	N	S	E	W
AB	—	280.20	343.0	—
BC	250.70		188.40	—
CD	330.30		—	320.90
DA		300.80		220.50

SECTION II

7. (A) Enlist the fundamental axes of a transit theodolite and state the conditions between them when the theodolite is in perfect adjustment. [5]

(B) How will you find out the constants of tacheometer in the field by using Field Method ? [5]

(C) A tacheometer with multiplying constant 100 and additive constant 0.3 was set up at a station O and the following results were obtained by keeping the staff vertical. Calculate the horizontal distance between O and P and the reduced level of P. [8]

Inst. Stn.	Staff Stn.	Hair Readings	Vertical Angle	Remarks
O	BM	1.875, 2.150, 2.425	+6°30′	RL of B.M. = 259.60 M
O	P	1.650, 1.800, 1.950	–11°45′	

Or

8. (A) Explain the necessity, test and adjustment for making the horizontal plate bubble tube perpendicular to the vertical axis in transit theodolite. [6]

(B) Write a short note on Tacheometric contouring project. [4]

(C) A staff was held vertically at a distance of 200 m and 600 m from the centre of a theodolite fitted with stadia hairs, and the staff intercepts with the telescope horizontal were 0.990 m and 3.000 m respectively. The instrument was then set over a station A of R.L. 1050.50 m and the height of the instrument was 1.42 m. The hair readings on a staff held vertically at station B were 1.000, 1.830 and 2.670 m while the vertical angle was –10°. Find the distance AB and RL of B. [8]

9. (A) Work out the relationships between the elements of a circular curve. [5]

(B) Two tangents intersect at a chainage 2052 m deflection angle 60°30′. Calculate the necessary data for setting out a curve of 300 m radius to connect the two tangent if it is intended to set out the curve by offsets from chord produced. Take peg interval 20 m, length of the chain used being 20 m. [6]

(C) Define transition curve. State why and where it is essential to introduce a transition curve. Enlist the requirements of an ideal transition curve. [5]

Or

10. (A) Classify the curves into different types. Draw a sketch of simple circular curve showing its various elements. [4]

(B) Tabulate the data required for setting out a circular curve by the deflection angle method, considering the following information :

(*i*) Angle of intersection = 135°

(*ii*) Chainage of point of intersection = 1620 m

(*iii*) Degree of curve = 5°

(*iv*) Peg interval = 30 m. [8]

(C) What is super elevation ? State its importance and also derive the expression for super elevation. [4]

11. (A) Explain briefly the process of setting out tunnel centre line on surface. [5]

(B) What is total station ? Explain any *six* principal features of total stations. [6]

(C) Explain stepwise, the process to check vertically of a building with a theodolite. [5]

Or

12. (A) Describe in brief the procedure to stake out a pipeline to given gradient. [5]

(B) Explain stepwise the procedure to set out the roadway. [6]

(C) Enlist and explain the uses of ETS. [5]