Faculty of Engineering & Technology
Fourth Semester B.E. (Civil Engineering) (C.B.S.) Examination
SURVEYING–I

Time—Three Hours] [Maximum Marks—80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Due credit will be given to neatness and adequate dimensions.

(3) Assume suitable data wherever necessary.

(4) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Describe with neat sketch an optical square and explain its principle. How it is used in the field ? 7

(b) The following bearings were observed in running a compass traverse. Calculate the interior angles and correct them for observational error. Taking bearing of CD as correct, find the corrected bearing of all the remaining sides : 7

Line	Fore Bearing	Back Bearing
AB	75° 5'	254° 20'
BC	115° 20'	296° 35'
CD	165° 35'	345° 35'
DE	224° 50'	44° 5'
EA	304° 50'	125° 5'

OR

2. (a) Distinguish between Whole circle bearing and Quadrantal bearing. 4

   (b) Define magnetic declination and true bearing of a line. 3

   (c) A line was measured with a steel tape which was exactly 30m at a temperature of 20°C and a pull of 100N. The measured length was 1620m. The temperature during measurements was 30°C and the pull applied was 150N. Find the true length of line if the cross sectional area of the tape was 0.025 cm^2. The coefficient of thermal expansion of the material of the tape is 3.50×10^{-6} per°C and modulus of elasticity of the tape material is 2.1×10^7 N/cm^2. 7

3. (a) Explain with neat sketches the characteristics of contours. 6

   (b) The following series of readings of back sights and fore sights was taken in a Fly levelling.

   1.235, 1.396, 2.345, 1.986, 2.148, 0.735, 0.325, 2.568, 1.465, 2.435, 1.356, 0.768, 1.985, 2.655.

   The first reading was taken on a point of R.L. 100.000m. Draw a page of levelling field book and enter readings on it. Find R.L.s of all the points by rise and fall method. 7

OR

4. (a) What are the temporary adjustments of dumpy level ? How it is done ? 6

(b) The following notes refer to the reciprocal levels taken with one level :

Instrument Station	Staff reading on		Remarks
	A	B	
A	1.029	1.634	Distance between A and B = 800 m , RL of A = 421.543 m
B	0.943	1.542	

Find (i) the true R.L. of B, (ii) combined correction for curvature and refraction , and (iii) the error in collimation adjustment of the instrument. 7

5. (a) Explain the procedure of indirect leveling. 6

(b) A dumpy level was set up exactly mid-way between two pegs A and B 100 m apart, the readings on the staff when held on the pegs A and B were 1.875 and 1.790 respectively. The instrument was then moved and setup at a point C on the line BA produced and 10 m from A. The respective staff readings on A and B were 1.630 and 1.560. Calculate the staff readings on A and B to give a horizontal line of sight. 7

OR

6. (a) Enlist the fundamental lines of level and describe relationship between them. 6

(b) In order to ascertain the elevation of the top (Q) of the signal on a hill, observations were made from

two instrument stations P and R at a horizontal distance 100 meters apart, the stations P and R being in line with Q. The angles of elevation of Q at P and R were 28° 42' and 18° 6' respectively. The staff readings upon the bench mark of elevation 287.28 were respectively 2.870 and 3.750 when the instrument was at P and at R, the telescope being horizontal. Determine the elevation of the foot of the signal if the height of the signal above its base is 3 meters. 7

7. (a) Describe the repetition method of measurement of horizontal angle by theodolite. 7

(b) Calculate latitudes, departures and closing error for the following traverse. Adjust also the traverse using Bowditch's rule.

Line	Length (m)	W.C.B.
AB	89.31	45° 10'
BC	219.76	72° 05'
CD	151.18	161° 52'
DE	159.10	228° 43'
EA	232.26	300° 42'

7

OR

8. (a) Distinguish between consecutive and independent co-ordinates of traverse station. 6

(b) A deep valley between the points M and N makes it impossible to measure the distance by a chain or tape. The following angular observations were,

therefore, taken from points A and B 800 m apart.

$\angle$ MAN = 45° $\angle$ NAB = 35°

$\angle$ ABM = 50° $\angle$ MBN = 65°

Compute the distance MN. 8

9. (a) What are the advantages and disadvantages of plane table survey ? 6

(b) A road in cutting has a formation width of 9m, side slopes of 1.5:1 and centre line depths at chainages tabulated below. Calculate the earthwork by prismoidal formula.

Chainage (m)	0	30	60	90	120	150	180
Depth (m)	0.3	0.45	0.36	0.60	1.20	1.11	0.15

7

OR

10. (a) Explain three point problem in plane table surveying. 7

(b) Explain Trapezoidal and Simpson's rule for area calculation. 6

11. (a) What is meant by soundings ? Explain any one method of locating soundings. 7

(b) Write a short note on optical theodolite. 6

OR

12. (a) Explain the procedure of transferring the levels underground. 6

(b) State the equipment and personnel used for locating and making soundings. 7