

320353(20)

B. E. (Third Semester) Examination,

April-May 2020

(New Scheme)

(Civil Engg. Branch)

SURVEYING-I

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) of each question is compulsory carries 02 marks. Attempt any two parts from each questions from (b), (c) or (d), carries 07 marks.

Unit-I

1. (a) Describe the combined effect of curvature and refraction in levelling and derive the formulae for the same?
(b) Reciprocal levelling was conducted across a wide

[2]

river to determine the difference in level of points A and B, A situated on one bank of the river and B situated on the other. The following results on the staff held vertically at A and B from level stations 1 and 2 respectively, were obtained. The level station 1 was near to A and station 2 was near to B.

Instrument at	Staff reading on	
	A	B
1	1.385	1.625
2	1.195	1.410

- If the reduced level of B is 60 m above the datum, what is the reduced level of A?

Assuming that the atmosphere condition remain unchanged during the two sets of the observations, calculate (i) the combined curvature and refraction correction if the distance AB is 525 m, and (ii) the collimation error.

- (c) A dumpy level was setup midway between A and B, 120 m apart, the readings on A and B being 1.865 and 1.780 m each. The Dumpy level was then set up at C on BA produced 20 m from A. The staff readings at A and B were 1.620 m and 1.550 m. Calculate the staff readings on A and B to give

320353(20)

[3]

a horizontal line of sight?

- (d) Four stations C, A, B, and D were set out in a straight line such that $CA = AB = BD = 40$ m. A level was set up at C and readings of 2.135 and 1.823 were observed on vertically held staff at A and B, respectively, when bubble was at the centre of its run. The level was then set up at D and reading of 2.026 and 1.768 were again observed at A and B, respectively. Determine the collimation error of the level and correct difference in level of A and B.

Unit-II

- (a) Explain a "Contour Gradient"?
- (b) Explain the functions of the planimeter and the Ceylon Ghat Tracer following with neat figures.
- (c) Explain the various indirect methods of locating contours? Also explain graphical methods of plotting of contours?
- (d) Explain the functions of the Box Sextant and the Indian Pattern Clinometer with neat figure?

Unit-III

- (a) Transit rule of balancing a traverse is applied when :

320353(20)

PTO

[4]

- (i) The linear and angular measurements are of same precision.
 - (ii) The linear measurement are more precise than the angular measurements.
 - (iii) The angular measurements are more precise than the linear measurements.
 - (iv) The linear measurements are proportional to l and the angular measurements are proportional to $(1/l)$ where l is the length of the line.
- (b) While traversing, a closed traverse ABCD was made. Due to obstructions it was not possible to measure the bearings of lines BC and CD. Calculate the missing bearings.

Line	Length (m)	W.C.B
AB	580	60°
BC	1200	?
CD	880	?
DA	1050	310°

- (c) The lengths and bearings of closed traverse ABCDEA and the latitudes and departures of the

320353(20)

[5]

known sides are given below. The lengths of two sides BC and CD could not be measured. Compute the omitted measurements.

Line	Length(m)	Reduced bearing
AB	740.0	S 60°00' E
BC	?	N 62°18' E
CD	?	N 37°42' W
DE	950.00	S 55°24' W
EA	575.00	S 02°42' W

- (d) The following traverse has been run to locate a point F midway between A and E. If the coordinates of A are (500, 500), compute (i) the independent coordinates of C, E and F, and (ii) the length and bearing of CF.

Side	Length (m)	Bearing
AB	400	330°00'
BC	350	0°00'
CD	350	31°11'
DE	400	319°31'

Unit-IV

320353(20)

PTO

[6]

4. (a) (i) The North line of the Plane Table is marked on the :

(a) Right hand bottom corner

(b) Left hand top corner

(c) Right hand top corner

(ii) The plane table map cannot be plotted in a different scale, because there is no :

(a) Level book

(b) Log book

(c) Field book

(b) When is the "Resection" method applied in plane table traversing? Explain the methods of resection using back sighting and through compass?

(c) Explain the two point problem in plane table surveying?

(d) Explain the Bessels graphical method of Plane Tabling?

Unit-V

5. (a) Explain the application of a transition curve in civil engineering?

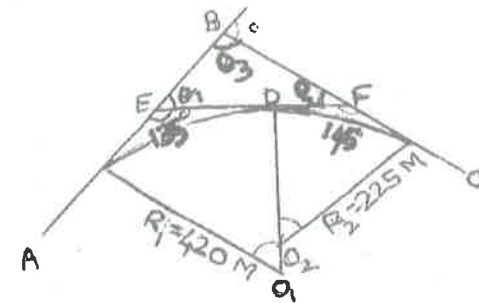
(b) Two straight lines AB and BC intersect at a point B

[7]

as shown in the figure below of chainage 1,200 m. To avoid an obstacle, another line EF is taken to connect AB and BC, so that $\angle AEF = 135^\circ$ and $\angle EFC = 145^\circ$. The radius of the first arc is 420 m and that of the second, 225 m. Calculate the chainages of :

(i) the tangent points, and

(ii) the point of compound curvature,



(c) Two parallel railway lines are to be connected by a reverse curve, each section having the same radius. If the line 10 m apart and the maximum distance between tangent points measured parallel to the straight is 40 m, find maximum allowable radius. If, however, both the radius different, calculate the radius of the second branch in of the 1st branch is 50 m. Also calculate lengths of branches.

- (d) Two straight lines AB and BC intersect at a chainage 1110.23 m, the angle of intersection $135^{\circ}.50'$. The angle of the curve is 300 m. Calculate all data required setting the curve by method of offsets from the cord produced. [Offset Interval = 20 m].

