320453 (20)

BE (4ᵗʰ Semester)

Examination, Nov-Dec 2021

Branch : Civil

SURVEYING - II (NEW)

Time Allowed : Three Hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Answer all units. Part (a) of all units is compulsory

(2 marks). Attempt any two questions from b, c or

d of all units. (2 × 7 = 14 marks).

Unit-I

Q. 1. (a) (1) Distance of visible horizon for a point

having an elevation of 637.5 m is :   2

(i)   6.735 km

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(ii)   67.35 km

(iii) 10 km

(iv) 100 km.

(2)   Phase correction is done on :

(i)   Pole signals

(ii) Beacons

(iii) Cylindrical signals

(b) What is meant by a satellite station and reduction to centre ? Derive expression for reducing the angles measured at the satellite stations to centre (one case).

7

(c) The altitudes of two proposed stations A and B, 80 km apart are respectively 225 m and 550 m. The intervening obstructions situated at C, 40 km from A has an elevation of 285 m. Ascertain if A and B are intervisible, and if necessary, find by how much B should be raised so that the line of sight must nowhere be less than 3 m above the surface of the ground. 7

(d) A steel tape is 30 m long at a temperature of 20°C when lying horizontally on the ground. Its sectional area is 0.082 sq.cm, its mass 2

kg and coefficient of expansion 65×10^{-7} per 1°C. The tape is stretched over three equal spans. Calculate actual length between the end graduations under the following conditions : temperature 40°C, pull 180 N. Take $E = 2.07 \times 107$ N/cm².   7

Unit-II

Q. 2. (a) Errors in horizontal angle measurements due to eccentricity of signal is completely eliminated by :   2

     (i)   Repetition method

     (ii)   Reiteration method

(5)

(iii) Direction method

(iv) None of the above

(b) The following angles were measured at a station O so as to close the horizon :   7

∠AOB = 83°42'28".75 weight 3

∠BOC = 102°15'43".26 weight 2

∠COD = 94°38'27".22 weight 4

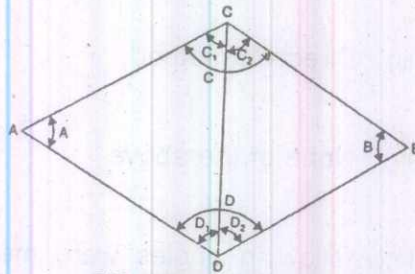∠DOA = 79°23'23".77 weight 2. Adjust the angles.

(c) The following are the measured values of equal weight for two connected triangles ACD and BCD (Figure).

(6)

TWO CONNECTED TRIANGLES

A	68°12'24"
B	52°28'46"
C	128°16'30"
D	110°02'25"
C_1	62°18'40"
C_2	65°57'51"
D_1	49°28'59"
D_2	16°33'28"

Adjust the values of the angles.   7

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(d) The following round of angles was observed

from central station to the surrounding

stations of a triangulation survey :   7

A = 93°43'22" weight 3

B = 74°32'39" weight 2

C = 101°13'44" weight 2

D = 90°29'50" weight 3

In addition, one angle $\overline{(A+B)}$ was measured

separately as combined angle with a mean

value of 168°16'06" (wt. 2).

Determine the most probable values of the

angles A, B, C and D.

Unit-III

Q. 3.   (a) Discuss the theory of anallatic lens.   2

(b) A tacheometer was set up at station 'A' and the following readings were obtained on a vertically held staff.

Station	Staff station	Vertical Angle	Hair readings	Remarks
A	B.M.	−2°18′	3.225, 3.550, 3.875	R.L. of B.M.
	B	+8°36′	1.650, 2.515, 3.380	=425.515 m

Calculate the horizontal distance from A to B and the R.L. of B if the constants of the instruments are 100 and 0.4.   7

(c) To find the RL of station B, two observations

are taken by a theodolite from station A - one

to a BM and the other to the station B. The

records are as follows :   7

Find the RL of B, and the distance between

the BM and station B.

Inst. Station	Staff station	Target	Vertical angle	Staff reading	Remark
A	BM	Lower	$-10^0 0'$	0.655	RL of BM = 510.500 m
A	B	Upper	$-7^0 0'$	2.655	
		Lower	$-5^0 0'$	1.250	
		Upper	$+4^0 0'$	3.200	

(d) Two points A and B are on opposite sides of

a summit. The tacheometer was set up at P

on top of the summit, and the following

readings were taken :   7

Inst. Station	Height of Inst.	Staff station	Vertical angle	Hair readings	Remark
P	1.500	A	$-10°0'$	1.150, 2.050, 2.950	RL of P = 450.500 m
P	1.500	B	$-12°0'$	0.855, 1.605, 2.355	

The tacheometer is fitted with an anallatic

lens, the multiplying constant being 100. The

staff was held normal to the line of sight.

Find :

(i)   The distance between A and B, and

(ii)   The gradients of lines PA and PB.

Unit-IV

Q. 4. (a) Write the expression for length of line

between two stations of different elevations

as from an aerial photograph ?　　　**2**

(b) Prove that ratio of Tilt Displacement of a

point not on the principal line to that of a point

on a principal line = Secant of angle at

isocentre from principal line to the point.　**7**

(c) Derive an expression for scale of a tilted

photograph.　　　　　　　　　　　　**7**

(d) Explain the calculation of amount of relief

displacement ?　　　　　　　　　　　**7**

Unit-V

Q. 5.   (a) Give some examples of the applications of

'hydrographic surveying' ?   2

(b) What is meant by sounding ? Explain the

method of observation of sounding from a

sounding boat, case - Ranging and one angle

from the boat ?   7

(c) Explain the various equipments used for

taking soundings ?   7

(d) An observer taking soundings from a boat

wished to locate his position P. He measures

an angle to A and B, AP at right angles to AB.

If the measured angle APB is 29° and

distance AB is 550 m, calculate the boat

position from A ? 7

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