

Total No. of printed pages = 4

CE 131304 (NR)

Roll No. of candidate

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25/21

2021

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B UNIT 3, TIPS  
25th Hall, Hoopara,  
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B.Tech. 3<sup>rd</sup> Semester End-Term Examination

CE

ENGINEERING SURVEYING - I

(New Regulation & New Syllabus)

Full Marks - 70

Time - Three hours

The figures in the margin indicate full marks  
for the questions.

Answer question No. 1 and any *four* from the rest.

1. Choose the correct answer :

(10 × 1 = 10)

(i) When the length of chain used in measuring distance is longer than the standard length, the error in measured distance will be

- (a) Positive error
- (b) Negative error
- (c) Compensating error
- (d) Closing error

(ii) For a well conditioned triangle, no angle should be less than

- (a) 20°
- (b) 30°
- (c) 45°
- (d) 60°

(iii) Compensating error that occur in chaining are proportional to

- (a) L
- (b)  $\sqrt{L}$
- (c) 1/L
- (d)  $1/\sqrt{L}$

[Turn over

- (iv) If the fore bearing of a line is \_\_\_\_\_, its back bearing will be  $36^{\circ}15'$
- (a)  $36^{\circ}15'$
  - (b)  $126^{\circ}15'$
  - (c)  $143^{\circ}45'$
  - (d)  $216^{\circ}15'$
- (v) The process of turning the telescope about the vertical axis in horizontal plane is known as
- (a) Transiting
  - (b) Reversing
  - (c) Plunging
  - (d) Swinging
- (vi) In a whole circle bearing system  $N 25^{\circ}15' W$  corresponds to
- (a)  $115^{\circ}15'$
  - (b)  $154^{\circ}45'$
  - (c)  $205^{\circ}15'$
  - (d)  $334^{\circ}45'$
- (vii) The theodolite is an instrument used for measuring very accurately
- (a) Horizontal angles only
  - (b) Vertical angles only
  - (c) Horizontal and vertical angles
  - (d) Linear measurements
- (viii) The method of surveying in which field work and plotting work are done simultaneously, is called
- (a) Compass surveying
  - (b) Leveling survey
  - (c) Plane table survey
  - (d) Chain surveying
- (ix) When 1 cm on a map represents 10 m on a ground the representative fraction of the scale is
- (a)  $1/10$
  - (b)  $1/100$
  - (c)  $1/1000$
  - (d)  $1/10000$

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- (x) The horizontal distance between any two consecutive contours is called
- vertical equivalent
  - horizontal equivalent
  - contour interval
  - contour gradient

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2. (a) Distinguish between compensating and cumulative error. (6)  
 (b) Discuss the correction to be made for absolute length, temperature and pull (tension) in measurements by tape. (3+3+3=9)
3. (a) What do you mean by true meridian and magnetic meridian? (2)  
 (b) The following bearings were observed while traversing with a compass.

Side	Fore bearing	Back bearing
AB	45°45'	226°10'
BC	96°55'	227°5'
CD	29°45'	209°10'
DE	324°48'	144°48'

Mention which stations were affected by local attraction and determine the corrected bearings. (10)

- (c) Discuss the operations involved in plane table surveying (3)
4. (a) What are face right and face left observations? Why is it necessary to take both face observations? (2+2=4)  
 (b) Distinguish between closed traverse and open traverse (4)  
 (c) In a running fly levels from a bench mark of RL 384.705 m, the following readings are obtained-

Back sight	3.215	1.030	1.295	1.855
Fore sight	1.225	3.290	2.085	

From the last position of the instrument, six pegs at 25 m interval are to be set out on a uniform falling gradient of 1 in 100. The first peg is to have a RL of 384.500. Work out the staff readings required for setting the tops of the pegs on the given gradient. (7)

5. (a) Discuss the advantages and disadvantages of plane table surveying over other methods. (3+3=6)
- (b) The following perpendicular offsets were taken at 10 m intervals from a survey line to an irregular boundary line:  
3.25, 5.60, 4.20, 6.65, 8.75, 6.20, 3.25, 4.20, 5.65
- Compute the area enclosed between the survey line, the irregular boundary line, and the first and last offsets, by the application of
- average ordinate rule,
  - trapezoidal rule and
  - Simpson's rule. (3+3+3=9)
6. (a) What is a contour? Write any three characteristics of contour with sketches. (2+3=5)
- (b) It was required to ascertain elevations of P and Q. A line of level was taken from A P to Q and then continued to a benchmark of elevation 83.500 m. The observations are recorded below. Obtain the RL's of P and Q. Apply necessary check. (8+2=10)

BS	IS	FS	RL	Remarks
1.622				P
1.874		0.354		
2.032		1.780		
	2.362			Q
0.984		1.122		
1.906		2.824		
		2.036	83.500	BM

7. (a) What is a well conditioned triangle? (2)
- (b) Define the following terms :
- Benchmarks
  - Parallax
  - Reduced level
  - Line of collimation
  - Contour interval. (5)
- (c) A survey line BAC crosses a river, A and C being on the near and distant banks respectively. Standing at D, a point 50 m measured perpendicularly to AB from A, the bearings of B and C are  $230^\circ$  and  $320^\circ$  respectively. AB is 25 m. Find the width of the river. (8)

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