

KATHMANDU UNIVERSITY  
End Semester Examination  
June/July, 2023

Marks Scored:

Level : B.E.

Year : II

Exam Roll No. :

Time: 30 mins.

Registration No.:

Course : GEOM 202

Semester : I

F. M. : 10

Date :

09 JUL 2023

SECTION "A"

[20 Q. × 0.5 = 10 marks]

Encircle the most appropriate answer

1. In reduction of level using height of instrument method, height of instrument refers to
  - a. Height of line of sight over the instrument station
  - b. Height of the center of telescope from the plane of foot screw
  - c. The reduced level of line of sight
  - d. The reading on the staff from the instrument
2. Change point in levelling are:
  - a. The staff positions where both backsight and foresight readings are taken
  - b. The instrument stations that are changed from one position to another
  - c. The staff stations that are changed from point to point to obtain the reduced levels of the points
  - d. The staff stations of known elevation
3. An imaginary line joining the point of intersection of the cross hair of the diaphragm and optical center of objective is known as:
  - a. Line of collimation
  - b. Axis of telescope
  - c. Axis of level tube
  - d. Fundamental line
4. Length and bearing of line of line AB is 128m and  $S45^{\circ}30'E$  respectively, calculate the coordinate of B if coordinate of A is (34.5, 83.7)
  - a. (55.21, 7.59)
  - b. (56.79, -6.01)
  - c. (125.79, -6.01)
  - d. (55.21, 173.41)
5. The distance angles in triangulation are
  - a. The angle calculated using distance measured
  - b. The angles used in calculating distance
  - c. Angles measured during triangulation
  - d. The lines measured during triangulation
6. The departure of a line of traverse is
  - a. The deviation in alignment of line
  - b. The projection of line in north-south direction
  - c. The projection of line in reference direction
  - d. The projection of line in east-west direction
7. Which of the following is **FALSE** for trilateration?
  - a. Scale error is highly controlled
  - b. Cosine law is used
  - c. Higher internal checks than triangulation
  - d. Azimuth error is accumulated
8. The angle of dip on pole is
  - a.  $0^{\circ}$
  - b.  $90^{\circ}$
  - c.  $180^{\circ}$
  - d.  $360^{\circ}$

9. Satellite station is also known as
  - a. True Station
  - b. Centric Station
  - c. Eccentric Station
  - d. Check Station
10. The sensitivity of a bubble tube can be increased by
  - a. Increasing the diameter of tube
  - b. Increasing the radius of curvature of the tube
  - c. Increasing the length of tube
  - d. Increasing the length of divisions
11. The slope distance between A (600, 712, 807) and B (650, 720, 880) is
  - a. 88.84
  - b. 50.64
  - c. 72.15
  - d. 78.33
12. If the angular measurements of a traverse are more accurate than the linear measurements, balancing of traverse is generally done by
  - a. Bowditch's rule
  - b. Transit Rule
  - c. Arbitrary Rule
  - d. Axis method
13. Benchmark is established by
  - a. Spirit Levelling
  - b. Hypsometry
  - c. Barometric Levelling
  - d. Trigonometric Levelling
14. Which of the following is **FALSE** about resection?
  - a. Single setup of instrument can fix position of occupied station
  - b. Position of any desired place can be established without visiting control points
  - c. No need of figural adjustment, only adjustment for horizontal misclosure is needed
  - d. Strength of fix is stronger in or near great circle
15. Two points A and B are in distance of D km. If reading is taken with level instrument placed in point A and staff in point B, what would be the curvature correction that needs to be applied to staff reading?
  - a.  $0.00112D^2$
  - b.  $0.06735D^2$
  - c.  $0.0785D^2$
  - d.  $0.112 D^2$
16. Which of the followings is the main characteristics of spherical triangle?
  - a. Sum of three angles is  $180^\circ$
  - b. Sum of three angles is always greater than  $180^\circ$
  - c. Sum of three angles is always less than  $180^\circ$
  - d. Triangle is formed in horizontal surface
17. The best figure in triangulation is
  - a. Single chain of triangles
  - b. Double chain of triangles
  - c. Braced Quadrilateral
  - d. Centered Polygon
18. Which of the following is **TRUE** when theodolite in proper adjustment?
  - a. The axis of the plate level must lie in a plane perpendicular vertical axis
  - b. The horizontal axis must be perpendicular to the vertical axis
  - c. The line of collimation must be at right angles to the horizontal axis
  - d. The axis of altitude level must be perpendicular to the line of collimation
19. Temporary adjustment of theodolite doesn't include
  - a. Setting up and centering
  - b. Levelling
  - c. Adjusting instrument's optical and mechanical components
  - d. Elimination of parallax
20. The process of turning telescope about its horizontal axis through 180 degree in the vertical plane thus bringing its upside down and making it point, exactly opposite direction is
  - a. Transiting
  - b. Swinging
  - c. Centring
  - d. Levelling

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Level : B.E.  
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Time : 2 hrs. 30 mins.

Course : GEOM 202  
Semester : I  
F. M. : 40

SECTION "B"  
[6 Q. × 4 = 24 marks]

Attempt *ANY SIX* questions. Assume suitable data where necessary

1. Write basic principle of EDM. Explain how distance is calculated in phase difference method. [1.5+2.5]
2. Compare and Contrast between triangulation and trilateration.
3. Calculate the coordinate of P by intersection if the bearing of line AP and BP are  $68^{\circ} 14' 16''$  and  $30^{\circ} 15' 18''$  respectively if the coordinates of A is (1000, 1000) and B is (500, 1200).
4. Write advantages and disadvantages of resection. Write precautions for selection of resection station. [2+2]
5. Write about well-conditioned triangle. Derive an expression to show the best shape of triangle for triangulation is an isosceles triangle with base angle  $56^{\circ} 14'$ . [1+3]
6. Reciprocal levelling was conducted across a wide river to determine the difference in level of points A and B situated in either bank of river. The following reading was measured on the staff held at A and B from instrument at 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	Staff reading on B
1	1.362	1.002
2	1.313	1.538

- a. If the reduced level of A is 658.12m, what is the reduced level of B? [2]
- b. Calculate combined curvature and refraction correction if distance of AB is 286.12m assuming that the atmospheric conditions remain unchanged during the two sets of observations. [2]
7. State principle of traverse survey. Write about methods of balancing the traverse. [1+3]
8. Following is the sample field book of rise and fall method of levelling computation. Fill in the missing values marked with cross mark '×' and perform necessary arithmetic check. [4]

Station	B.S	I.S	F.S	Rise	Fall	R.L
1	×					150.00
2		2.457			0.827	×
3		2.400				×
4	2.697		×		×	148.070
5	×		2.051			148.716
6		2.500				149.784
7		2.896				149.388
8		×			0.124	×
9			2.672			149.612

SECTION "C"  
[2Q. × 8 = 16 marks]

Attempt *ANY TWO* questions.

9. Following distances were observed during trilateration in braced quadrilateral. Assuming AB as fixed, determine the correct distance after adjustment of trilateration network.  
 AB=1525.456m, AD=2401.715m  
 BC=2176.945m, AC=3073.845m  
 CD=1697.435m, BD=2483.115m
- 10.
- Define control survey. Write about control survey methods. [1+2]
  - Recommend suitable method for establishment of control point for 30km long road survey project. Give reason why you prefer among other methods. [2]
  - Write control survey working procedure for the same project. [3]
11. Find the best path for calculation of length of line BD from known side AC in the figure. All stations were occupied and all the angles were measured.

