

KATHMANDU UNIVERSITY
End Semester Examination
January/February 2024

Level : B.E.
Year : II

15 FEB 2024

Course : CIEG 207
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date :

SECTION "A"

[20Q. \times 0.5 = 10 marks]

Choose and encircle the most appropriate option from each set of choices.

1. In a closed traverse, the sum of the north latitudes exceeds the sum of the south latitudes and the sum of west departures exceeds the sum of the east departures, then the closing line will lie in
a. NW quadrant b. SE quadrant c. SW quadrant d. NE quadrant
2. In theodolite traversing the precision of linear measurement is 1:10000, then the allowable angular error shall be nearest to
a. $0^{\circ}20'26''$ b. $0^{\circ}3'26''$ c. $0^{\circ}0'40''$ d. $0^{\circ}0'20''$
3. Axis method for balancing consecutive co-ordinates in the closed traverse is used when
a. both lengths and angles are measured with less precision
b. angles are measured more accurately compared to lengths
c. both lengths and angles are measured with same accuracy
d. lengths are measured more accurately compared to angles
4. The staff intercept is kept constant in
a. tangential system b. fixed hair method with staff normal
c. movable hair method d. fixed hair method with staff vertical
5. The most common method of tacheometry is
a. fixed hair method with staff normal b. movable hair method
c. fixed hair method with staff vertical d. tangential method
6. An instrument was set up at B and the angle of elevation of the top of an electric pole CD was $24^{\circ}36'$. The horizontal distance between B and C, the foot of the pole was 600 m. Determine the RL of the top of the pole, if the staff reading held on a BM (RL=1000m) was 2.532m.
a. 1277.233m b. 1272.169m c. 1000.532m d. 722.767m
7. A theodolite was set up at B and the angle of elevation to a target 3m above the top of a tower was $12^{\circ}15'$. The horizontal distance between the instrument and the target was known to be 220m. The RL of the top of the tower if the RL of the trunnion axis of the theodolite was 2650.602m is
a. 2695.369m b. 2698.369 c. 2701.369m d. 2707.375m
8. The direction of steepest slope on a contour is
a. along the contour b. at right angle to the contour
c. at an angle of 60° to the contour d. at an angle of 45° to the contour

9. Contours of different elevations unite to form one contour in the case of
 - a. vertical cliff
 - b. ridge
 - c. overhanging cliff
 - d. plateau
10. Which of the following methods of contouring is most suitable for a hilly terrain?
 - a. Square method
 - b. Direct method
 - c. Cross-section method
 - d. Tacheometric method
11. If the radius of a simple curve is 300 m, the maximum length of normal chord for calculating offsets, is limited to
 - a. 30 m
 - b. 15 m
 - c. 12.5 m
 - d. 10 m
12. Cubic parabola is a type of _____ curve.
 - a. transition
 - b. compound
 - c. vertical
 - d. simple
13. A right handed circular curve with radius 400 m is inserted between two alignments with angle of intersection of 144° . The length of long chord will be
 - a. 760.845m
 - b. 470.228m
 - c. 259.935m
 - d. 247.213m
14. The station from which no observations are made but angles to those stations are used for continuity of a triangulation series is known as _____ station.
 - a. Pivot
 - b. Satellite
 - c. Laplace
 - d. Subsidiary
15. Beacon is a type of _____ signal used during triangulation surveying.
 - a. Luminous
 - b. Sun
 - c. Night
 - d. Opaque
16. Which of the following EDM uses visible light for distance measurement?
 - a. Distomats
 - b. Tellurometer
 - c. Tacheometer
 - d. Geodimeter
17. _____ is a point where a plumb line dropped from front nodal point strikes the photograph.
 - a. Focal point
 - b. Principal point
 - c. Nadir point
 - d. Ground nadir point
18. If apparent horizon is shown in the photograph then photograph is said to be
 - a. high oblique
 - b. low oblique
 - c. tilted
 - d. vertical
19. The minimum number of GPS satellites necessary in order to fix the vertical position of receiver is
 - a. 3
 - b. 6
 - c. 4
 - d. 8
20. Global Positioning System consists of _____ segments.
 - a. 4
 - b. 3
 - c. 8
 - d. 6

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F.M. : 40

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SECTION "B"

Attempt ALL questions. Elaborate the answer with the use of appropriate examples and figures.

1. In conducting a traverse PQRSTP, the lengths of two lines QR and ST could not be measured. From the available data, find the lengths of these two lines. [6]

Line	PQ	QR	RS	ST	TP
Length, m	186.8	-	193.6	-	151.0
Bearing	N39°30'W	N64°45'E	S22°45'E	S3°48'W	N58°18'W

2. The following observations were taken from two traverse stations by means of a tacheometer fitted with an anallactic lens. The additive and multiplying constant of instrument being 0.10 and 100.5 respectively. [6]

Inst. Station	HI	Staff Station	Zenithal Angle	Staff Readings			Remarks
A	1.330	BM	91°54'	2.420	1.720	1.020	Staff held normal
A	1.330	B	87°24'	2.430	1.825	1.220	Staff held vertical
C	1.450	B	86°54'	2.435	1.610	0.785	Staff held vertical

If RL of BM is 1605 m, find the RL's of stations A, B and C.

3. The top (A) of a tower was sighted from two stations B and C at very different levels, the stations B and C being in line with the top of the tower. The angle of elevation from B to the top of tower was 36°12' and that from C to the top of the tower was 16°48'. The angle of elevation from C to a vane 1 m above the foot of the staff held at B was 8°24'. The heights of instrument at B and C were 1.85 m and 1.65 m respectively. The horizontal distance between B and C was 100 m and the RL of C = 248.260 m. Find the RL of the top of the tower and the horizontal distance from B to the tower. [5]
4. Tabulate the necessary data for setting out simple circular curve with the following data:
Angle of deflection = 36°, Radius of curve = 300 m
Chainage of point of intersection = 1940 m
The curve is to be set out by offsets from chords produced with pegs at every 20 m of through chainage. [5]
5. A gradient of -1% meets a gradient of -4% at the intersection point C, the chainage and RL of which are 800 m and 631.50 m respectively. A 200 m long vertical curve is to be inserted between the straights. Tabulate the chainages and R.L's of the station pegs at 25 m interval for setting out the vertical curve. [6]
6. Briefly explain any two factors that should be considered in determining the contour interval for any topographical map. How will you locate a given contour gradient in a contour plan? Explain the process in detail with the help of appropriate example. [2+4]
7. Write short notes on ANY TWO: [3+3]
- Triangulation layouts
 - Principle of photogrammetric surveying and its limitations
 - Segments of GPS system

