KATHMANDU UNIVERSITY
End Semester Examination [C]
April/May, 2023

Marks Scored:

Level : B.E.
Year : II

Course : GEOM 202
Semester : I

Exam Roll No.:

Time: 30 mins.

F. M. : 10

Registration No.:

Date : 03-May-023

SECTION "A"
[20 Q. × 0.5 = 10 marks]

Encircle the most appropriate alternative from each set of choices.

1. The magnetic bearing of line PQ is 124°35'. Find its true bearing, if the magnetic declination is 10°10'W.
   a. 141°14' b. 125°14' c. 114°25' d. 114°41'

2. While measuring zenithal angles by T_2 and T_{16} theodolites, if the closing error is not exactly 400 grade, the difference is known as
   a. The collimation error
   b. The zenithal error
   c. The index error
   d. The vertical error

3. In order to find the difference in elevation between two points P and Q, a level was set upon the line PQ, 30 m from P and 1280 m from Q. The reading obtained on staff kept at P and Q were respectively 0.545 m and 3.920 m. Find the true difference in elevation between P and Q?
   a. 3.226 m b. 3.343 m c. 3.265 m d. 3.345 m

4. A looking mirror is generally provided on object vane to
   a. Sight on whole circle bearing system
   b. Sight the objects too low
   c. Sight the objects too high or too low
   d. Observe the reading while sighting

5. The angle of dip at a point on equator is
   a. 0^0 b. 180^0 c. 360^0 d. 90^0

6. Strength of fix is maximum when the point to be located P lies at the ..... of the great triangle ABC
   a. Incenter b. Orthocenter c. Centroid d. Mid-point

7. The line joining points of equal dip are called
   a. Aclinic lines b. Isogonic lines c. Agonic lines d. Isoclinic lines

8. The difference between face left and face right of an object is double the value of ..... .
   a. Index Error b. Collimation Error c. Zero Error d. Centric Error

9. Which of the following errors is not eliminated by the method of repetition for horizontal angle measurement?
   a. Error due to eccentricity of verniers
   b. Error due to displacement of station signals
   c. Error due to wrong adjustment of line of collimation and trunnion axis
   d. Error due to inaccurate graduations

10. 205-112/2 represents.....
    a. First order PBM
    b. Second order PBM
    c. Second order TBM
    d. First order TBM

11. When a level is in adjustment, the line of sight of the instrument is
    a. perpendicular to vertical axis of the instrument and parallel to the bubble tube axis.
    b. perpendicular to vertical axis of the instrument and bubble level axis.
    c. perpendicular to bubble tube axis of the instrument and parallel to the vertical axis.
    d. perpendicular to bubble tube axis

12. Coordinates of A are 100 (Northing) and 200(Easting), that of B are 100(souhing) and 200(Easting). length AB is
    a. 200 b. 282.84 c. 244.94 d. 400

13. In a closed traverse, if ΣL= negative and ΣD= positive, then the whole circle bearing of the error of closure will be between
    a. 0° to 90° b. 90°to 180° c. 180° to 270° d. 270° to 360°

14. What is CORS network?
    a. Common Observation Reference Station
    b. Coordinate Recording System Network
    c. Continuously Operation Reference Station Network
    d. Continuously Operating Radar Satellite Network

15. Apart from arithmetic, the levelling work is best checked by
    a. height of instrument method
    b. rise and fall method
    c. closed loop check
    d. open loop check

16. Satellite station is also known as
    a. Centric station
    b. True station
    c. Eccentric Station
    d. Instrument Station

17. In trilateration angles, ... are measured
    a. all three angles of a triangle.
    b. all the angles and one side of the triangle.
    c. two angles and one included angle of the triangle.
    d. all three sides of the triangle.

18. Find the value of D if the wave length of the wave is 40m, n=2 m and the angles are given as $\theta 1 = 0°$, $\theta 2 = 180°$.
    a. 50 m b. 40 m c. 20 m d. 10 m

19. The prismatic compass and surveyor's compass:
    a. Give QB of a line and WCB of a line respectively
    b. Both give QB of a line
    c. Both give WCB of a line
    d. Give WCB of a line and QB of a line respectively

20. Sensitivity of a bubble tube doesn't depend on:
    a. Radius of Curvature
    b. The length of the vapor bubble
    c. The smoothness of inner surface of bubble tube
    d. The smoothness of outer surface of bubble tube

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Semester : I
F. M. : 40

SECTION "B"
[6Q. × 4 = 24 marks]

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

1. Define sensitivity of a level tube. Show that the sensitivity of level tube depends on the radius of curvature (R) and is usually expressed as angle (θ) per unit division (d) of the bubble scale. Mention how the sensitivity of a bubble tube can be increased. [1+2+1]

2. Deduce the relationship between line of sight and line of collimation, line of sight and axis of telescope, line of collimation and horizontal axis. Briefly explain the temporary adjustments of a theodolite. [1.5+2.5]

3. Define Magnetic Declination. Establish the relationship between magnetic bearing, true bearing and magnetic declination. In 1993, a certain line has a magnetic bearing S67°30'E and the magnetic declination was 8°E. In 1997, the magnetic declination was 4°W. Find the magnetic bearing in 1997. [1+1+2]

4. Briefly describe the basic principle of electronic distance measurement. Explain how EDM computes the distance from the phase difference. [2+2]

5. Mention the different condition of adjustment of braced quadrilateral and illustrate with diagram. Derive an expression for corrections value (v") to satisfy the side condition. [2+2]

6. It is said that the best shape of geometrical figure in triangulation is an isosceles triangle with base angles of 56°14'. Derive how you find out the numerical value and also state why such figure is necessary in configuring the triangulation network. [3+1]

7. Write short notes on: [2+2]
   a. Reiteration method of horizontal angle measurement
   b. Graphical adjustment of traverse

SECTION "B"
[2Q. × 8 = 16 marks]

Attempt *ANY TWO* questions.

8. a. Explain how the procedure of reciprocal levelling eliminates the effect of refraction and curvature as well as collimation error. [4]

   b. The following readings were taken with a level and 4 m staff. Draw up a level book page and reduce the levels by the height of instrument method.
   0.578 B.M. (= 58.250 m), 0.933, 1.768, 2.450, (2.005 and 0.567) C.P., 1.888, 1.181, (3.679 and 0.612) C.P., 0.705, 1.810. [4]

9. a. Define strength of figure. Explain with figure the different types of triangulation stations used in triangulation. [4]

b. Suppose you are conducting a survey in order to establish horizontal as well as vertical control points for the preparation of topographic map of Kathmandu University. Briefly explain the field procedure in order to establish horizontal and vertical control points. [4]

10. a. What would be the set value if the number of sets for the given traverse is taken three times? What is the significance of measuring more than one set of reading for horizontal angle measurement in traverse survey? Describe the method of repetition for the measurement of horizontal angle. [1+1+2]

b. Define spherical excess. In a triangulation network a triangle was observed as follows:
A = 052°12'48.15", B = 076°09'10.27"; C = 051°38'05.12" and by measuring the area on map the area of the triangle was found to be 1350.21 sq km, then how do you adjust this figure? Assume radius of earth = 6367 km. [1+3]