KATHMANDU UNIVERSITY
End-Semester Examination
March/April, 2017

Marks Scored:

Level : B.E.
Year : II

Course : GEOM 201
Semester: I

Exam Roll No. :

Time : 30 mins.

F.M. : 20

Registration No.:

Date :

SECTION "A"

[20 Q × 0.5=10 marks]

Choose the best alternatives among the given choices:

1. Which of the following principles of surveying is not followed if the angles are measured by Wild T2 theodolite and distances by chain?
   a. Working from the whole to part
   b. Economy of the accuracy
   c. Inconsistency in work
   d. Independent check

2. The station which is selected close to the main station to avoid intervening obstruction is *not* known as
   a. False Station
   b. Satellite Station
   c. Eccentric Station
   d. Pivot Station

3. If the distance of 210.00 m was measured with a steel tape of nominal length 30.00 m. On standardization, the tape was found to be 30.00 mm long. The correction length should be
   a. - 63 mm b. +21 mm c. +63 mm d. -21 mm

4. The intercept of the staff is
   a. Maximum if the staff is held truly normal to the line of sight
   b. Minimum if the staff is held truly normal to the line of sight
   c. Decreases if the staff is tilted away from the normal
   d. Increases if the staff is tilted towards the normal

5. The map at larger scale contain
   a. Much detail of small area then that of smaller scale map
   b. Less detail of larger area than that of smaller scale map
   c. Much detail of larger area than that of smaller scale map
   d. Less details of smaller area than that of smaller scale map

6. Pick the correct statement from the following
   a. The eyepiece plays no part in defining the line of sight.
   b. The diaphragm plays no part in defining the line of sight.
   c. The optical center of the objective plays no part in defining the line of sight
   d. None of the above

7. Which of the following is not used in measuring perpendicular offsets?
   a. Line Ranger
   b. Optical Square
   c. Cross Staff
   d. Steel Tape

8. The curvature of the earth is taken into account when extent of the area is more than
   a. 150 sq. km
   b. 100 sq. km
   c. 200 sq. km
   d. 250 sq. km

9. The degree of precision required in survey work depends on
   a. Area to be surveyed
   b. Purpose of survey
   c. Nature of field
   d. Sources of errors

10. The error which occur while conducting a survey from whole to part and part to whole is
   a. Localized in both the cases
   b. In whole to part error is localized and in part to whole error is expanded
   c. In part to whole error is localized and in whole to part error is expanded
   d. Error is expanded in both the case.

11. Bowditch rule is applied to
   a. an open traverse for graphical adjustment
   b. a closed traverse for adjustment of closing error
   c. determine the effect of local attraction
   d. for the adjustment of internal angles in a closed loop

12. According to Triangulation Directives issued by survey department (Blue Book), maximum horizontal misclosure allowed in first order triangulation is
   a. 1cc
   b. 2cc
   c. 5cc
   d. 10c

13. Reciprocal levelling is carried out to eliminate
   a. Error due to collimation
   b. Error due to earth curvature
   c. Error due to refraction
   d. Error due to staff reading

14. Normal tension is that pull which
   a. is used at the time of standardizing the tape
   b. neutralizes the effect due to pull and sag
   c. makes the correction due to sag equal to zero
   d. makes the correction due to pull equal to zero

15. The R.L, of the point A which is on the floor is 100 m and back sight reading on A is 2.455 m. If the foresight reading on the point B which is on the ceiling is 2.745 m, the R.L. of point B will be
   a. 94.80m
   b. 100.29m
   c. 99.71m
   d. 105.20m

16. The area of rectangular parcel is required together with standard deviation. The length a= 100m with error of ±0.10m and the width b= 40 m with an error of ±0.08 m. The area of the parcel is
   a. 4000 ±8.94
   b. 4000± 8.94 $m^2$
   c. 4000 ±9.84
   d. 4000 ± 9.84 $m^2$

17. In an optical square the mirror are fixed at an angle of
    a. $45^0$
    b. $\pi/4^c$
    c. $50^g$
    d. All of the above

18. In a braced quadrilateral the position of unknown corner points can be determined by
    a. A single route only
    b. 2 alternative routes only
    c. 3 alternative routes only
    d. 4 alternative routes only

19. If the bearing of the line AB is $60^030'$ and the bearing of the line BC is $122^0$. What is the angle subtended by CBA?
    a. $61^030'$
    b. $218^030'$
    c. $182^030'$
    d. $118^030'$

20. If the level instrument is placed midway between two stations, than which of the following error is not eliminated?
    a. Collimation error of the level
    b. Error due to atmospheric refraction
    c. Graduation error in a staff
    d. Error due to earth curvature

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

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F.M. : 40

SECTION "B"
[6 Q.×4=24 marks]

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

1. What do you mean by error? Explain various types of error. [1+3]

2. Differentiate between Geoid and Ellipsoid. Define Orthometric and Geoidal height. Establish the relationship between Orthometric and Geoidal height with appropriate diagram. [1+1+2]

3. What is the principle of chain survey? Define plus measurement and explain its importance. [1+3]

4. What do you mean by temporary and permanent adjustments of theodolite? How do you test horizontal and vertical angles measured by theodolite? [2+2]

5. What is the purpose of optical square? Briefly explain the principle of optical square with diagram [1+3]

6. Briefly explain the different types of errors in linear measurement. [4]

7. Suppose you are conducting levelling survey from Panchkhal to Chautara. Explain how do you transfer RL across Sunkoshi river. [4]

8. What do you mean by linear error of closure in traverse? How do you adjust the traverse loop when angles are read by theodolite and distance of the traverse leg by chain? Explain with mathematical expressions. [1+3]

SECTION "C"
[4 Q.×6=24 marks]

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

9. What do you mean by propagation of error? Two sides and the angle (included) of a triangle were measured as:

$a = 757.64 \pm 0.045$ m
$b = 946.70 \pm 0.055$ m
$C = 54°18' \pm 25''$

Compute the area of the triangle and its standard error. [2+4]

10. A base line was measured by a tape suspended in catenary under a pull of 145 N, and mean temperature of 14°C. The lengths of various segments of the tape and the difference in level at the two ends of a segment are given below:

| SN | Length (m) | Difference in Level (m) |
|---|---|---|
| 1 | 29.988 | +0.346 |
| 2 | 29.895 | -0.214 |
| 3 | 29.838 | +0.309 |
| 4 | 29.910 | -0.106 |

If the tape was standardized on the flat under a pull of 95 N at 18°C, determine the correct length of the line. [6]

Cross-sectional area of the tape = 3.35 $mm^2$
Mass of the tape = 0.025 kg/m
Coefficient of linear expansion = $0.9 \times 10^{-6}$ per °C
Young's modulus = $14.8 \times 10^4$ $MN/m^2$
Mean height of the line above M.S.L. = 51.76 m
Radius of earth = 6370 km

11. What do you mean by bearing? The angles at the stations of a closed traverse *ABCDEFA* were observed as given below:

| Traverse Station | Interior angles |
|---|---|
| A | 120°35′00″ |
| B | 89°23′40″ |
| C | 131°01′00″ |
| D | 128°02′20″ |
| E | 94°54′40″ |
| F | 155°59′20″ |

Adjust the angular error in the observations, if any, and calculate the bearings of the traverse lines if whole circle bearing of the line *AB* is 42°. [1+5]

12. The following perpendiculars offsets in meter were measured from a straight line to the irregular boundary at regular interval of 10m.

| H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | H10 | H11 | H12 | H13 | H14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8.25 | 13.85 | 12.25 | 10.85 | 12.25 | 13.60 | 15.25 | 16.85 | 14.95 | 17.35 | 20.05 | 15.90 | 12.25 | 12.00 |

Compute the area lying between the straight line and irregular boundary by Simson's rule. [6]

13. What is Geomatics? How do you differentiate Geomatics from surveying? Discuss the integration of Geomatics with various fields. [1+2+3]