KATHMANDU UNIVERSITY
End Semester Examination [C]
June, 2018

Marks Scored:

Level : B.E.
Year : II
Course : GEOM 202
Semester: I

Exam Roll No.:
Time: 30 mins.
F.M. : 10

Registration No.:
Date JUN 15 2018

SECTION "A"
[20 Q.× 0.5 = 10 marks]

Choose the most appropriate alternatives among the given choices:

1. A tube is said to be more sensitive if the bubble
   a. Moves by less divisions for a given change in angle
   b. Does not move
   c. Moves by more divisions for a given change in angle
   d. Has high viscosity of liquid

2. When not a single physical feature is available during Monumentation,
   a. It is better to cancel that benchmark.
   b. "V" shaped witness mark could be used for measurement.
   c. Upside down "Λ" shaped witness mark could be used for measurement.
   d. Measurement for Monumentation could not be done.

3. If bearing of AB = N40°E and bearing of BC = S70°E, then the value of angle A is:
   a. 150^0 b. 110^0 c. 30^0 d. 70^0

4. Reciprocal levelling is employed to determine the accurate difference in level of two points which:
   a. Are quite apart and where it is not possible to set up the instrument midway between the points.
   b. Are at almost same elevation
   c. Have very large difference in level and two instrument settings are required to determine the difference in level.
   d. Are quite close and where it is not possible to set up the instrument midway between the points

5. What will be the map sheet size for an area of 25km * 25 km in the scale of 1:50,000?
   a. 20 cm * 20 cm
   b. 50 cm * 50 cm
   c. 25 cm * 25 cm
   d. 40 cm * 40 cm

6. A zenith angle was observed twice direct giving values of 70°00'10'' and 70°00'12'', and twice reverse yielding readings of 289°59'44'' and 289°59'42''. What is the mean zenith angle?
a. 70°00'22'' b. 70°00'11'' c. 70°00'14'' d. 70°00'28''

7. The strength of figure for a triangle ABC whose angles A, B and C were observed as 70^0, 50^0 and 60^0 assuming line AC as a base of known length is:
a. 3.75 b. 7.35 c. 5.37 d. 3.57

8. The line joining the intersection of the cross hairs with the center of the objective provides a definite line of sight known as:
a. Line of sight
b. Line of collimation
c. Axis of telescope
d. Axis of bubble tube

9. The effect of phase is more common in _____ signals.
a. Circular b. Rectangular c. Cylindrical d. Triangular

10. What is the datum for height being mentioned in map published from Survey Department of Nepal?
a. Mean level of datum assumed by China and India
b. Mean level of Indian Ocean
c. Datum being accepted by India
d. Datum being accepted by China

11. In a distance of 5000m long, a 5 ppm error equals
a. 0.25m b. 25m c. 2.5m d. 0.025 m

12. A declination of 3°East means
a. Magnetic north is 3° east of true north
b. Magnetic north is 3° west of true north
c. True north is 3° east of magnetic north
d. True north is 3° west of magnetic north

13. To fix a ground point in the map
a. Clinometer is essential
b. Triangulation is essential
c. Angle and distance is essential
d. Both 'b' and 'c' except 'a'

14. In a closed traverse, if Σ Latitude = negative and Σ Departure = 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°

15. The magnitude of error due to imperfect leveling of the plate bubble for horizontal angle measurement is:
    a. Large when sights are approximately level
    b. Large for long sights
    c. Less for steeply inclined sights
    d. Large for steeply inclined sights

16. The principle used for measuring distances electronically is that the difference in phase between the transmitted and received waves represents
    a. Only a fraction of wavelength
    b. Half wavelength
    c. ¼ of wavelength
    d. 1/3 of wavelength

17. The error eliminate by changing face of theodolite is:
    i. Error due to line of collimation not being perpendicular to the horizontal axis.
    ii. Error due to horizontal axis not being perpendicular to the vertical axis.
    iii. Error due to line of collimation not being parallel to altitude level
    a. 'i'. 'ii' and 'iii' are eliminated
    b. Only 'i' is eliminated
    c. 'i' and 'ii' are eliminated
    d. None of these are eliminated

18. Which one of the following time is good for measuring horizontal angles of the basic first, first, second and third order?
    a. Mid-day
    b. Between 12- 2 PM
    c. Early Morning & Late afternoon
    d. Any time

19. If the precision of the angular measurement is 20", the corresponding consistent precision in linear measurement is:
    a. 1 in 1000
    b. 1 in 10000
    c. 1 in 5000
    d. 1 in 3000

20. In triangle ABC, the side opposite the angle C is known. It is required to compute the side opposite the angle B. The distance angles will be:
    a. A and B
    b. B and C
    c. C and A
    d. A only

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

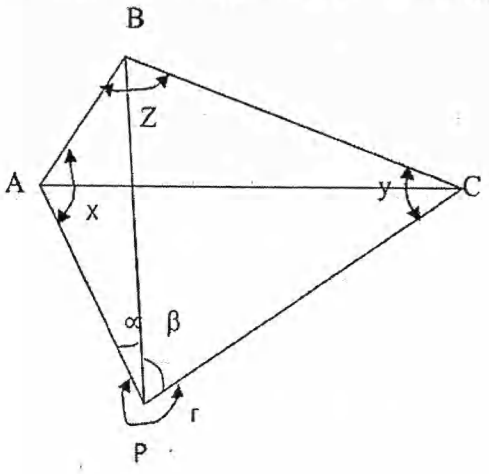
Course : GEOM 202
Semester: I
F.M. : 40

SECTION "B"
[6 Q. × 4 = 24 marks]

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

1. If the combined error due to earth's curvature and atmospheric refraction are known; error due to in adjustment of line of collimation can be found out. Develop an expression to meet aforementioned conditions. *Candidates are required to develop expression for the case of reciprocal levelling.*
   What happens if the change point settles between taking a foresight and the following backsight? [3+1]

2. What are the precautions to be taken in order to get strong fix? Derive an expression in order to solve for the position of unknown point P as shown in figure. ***Use ϕ - 45° method for solution where the symbols carry the usual meanings.*** [2+2]

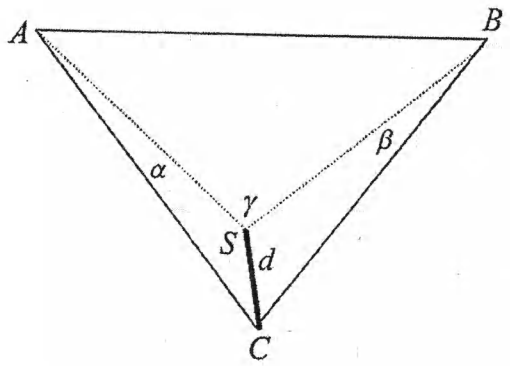


3. Describe the method of repetition and reiteration for measurement of horizontal angles using theodolite. Mention the significance of each methods. ***Supplement your answer with well labelled diagram and mathematics if any.*** [2+2]

4. A surveyor measures 3D coordinate of top of tower located at Kathmandu University central library with GPS. What sort of height is measured? What needs to be done in order to convert the measured height to orthometric height? Explain briefly the different methods of checking the correction of angular observations in an open theodolite traverse. [1+1+2]

5. In the Braced quadrilateral shown in figure below; the measured distances are as follows: **AB = 1525.456m, BC = 2176.945m, CD = 1697.435m, AD = 2401.715m, AC = 3073.845m, BD = 2483.115m.**
Compute the angles of Braced quadrilateral and adjust them assuming AB as fixed. [4]

6. Define different types of triangulation station with figure? Derive the condition on how to reduce the horizontal angle in case of satellite station whose placement on the ground is as shown in figure. [2+2]



7. Explain the principles of electronic distance measurement. How does EDM carry out reduction of slope distance to horizontal distance? ***Supplement your answer with well labelled diagram and mathematical expression if any.*** [2+2]

SECTION "C"
[2 Q. × 8 = 16 marks]

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

8. The Department of Civil and Geomatics Engineering at Kathmandu University is planning to establish network of about 5 – 10 control points inside the boundary of Kathmandu University. The main purpose of it is to use it as a reference point for various construction works inside KU premises as well as to aid survey labs. How would you establish control points as per Department plan? ***You must explain each and every step for achieving above works. You could use the 3rd order control points as known point located at Land Management Training Center.*** [8]

9. A) Compare the two different methods of reduction of levels i.e. the height of instrument and rise and fall method. Briefly explain how compensator in automatic level makes the line of sight level with appropriate diagram. [2+2]
B) Define loop closure. The following readings were recorded in a levelling operation from points 1 to 10. Reduce the levels by the height of instrument method and apply appropriate checks. The point 10 is a bench mark having elevation of 66.374m. Evaluate the loop closure and adjust the calculated values of the levels by applying necessary corrections. [1+1+1+1]

Station	Chainage	B.S.	I.S.	F.S.	Remarks
1	0	0.597			B.M. = 68.233
2	20	2.587		3.132	C.P.
3	40		1.565		
4	60		1.911		
5	80		0.376		
6	100	2.244		1.522	C.P.
7	120		3.771		
8	140	1.334		1.985	C.P.
9	160		0.601		
10	180			2.002	

10. A) What are the disadvantages of using an assumed meridian for the starting course in a traverse? How would you distribute closing error in theodolite traverse graphically? [2+2]

B) Compute and tabulate for the following closed-polygon traverse: (a) preliminary bearings, (b) unadjusted departures and latitudes, (c) linear misclosure, and (d) relative precision. (Note: Line BC bears NE) [1+1+1+1]

Course	Bearing	Length (m)	Interior angle (Right)
AB	S50°54'23''E	329.722	A = 120°07'10''
BC		210.345	B = 059°39'10''
CD		279.330	C = 248°00'57''
DE		283.426	D = 086°51'04''
EF		433.007	E = 102°09'16''
FA		307.625	F = 103°12'41''