KATHMANDU UNIVERSITY
End Semester Examination
February, 2025

Marks Scored:

Level : B.Arch.
Year : II

Course : CIEG 242
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date : 14 FEB 2025

SECTION "A"

[10 Q. × 0.5 = 10 marks]

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

1. The intercept of a staff
   [ ] is maximum if the staff is held truly normal to the line of sight.
   [ ] is minimum if the staff is held truly normal to the line of sight.
   [ ] decreases if the staff is tilted away from normal
   [ ] increases if the staff is tilted towards normal.

2. A closed contour line with one or more lower ones inside it represent a
   [ ] Lake [ ] valley [ ] Hill [ ] cliff

3. The latitude of traverse leg is obtained by multiplying its length by
   [ ] Tangent of its reduced bearing [ ] Sine of its reduced bearing
   [ ] Cosine of its reduced bearing [ ] Cosecant of its reduced bearing

4. In a closed traverse of n no. of sides, the algebraic sum of the deflection angle
   [ ] $0°$ [ ] $(2n-4) \times 90^0$ [ ] $(2n+4) \times 90^0$ [ ] 360^0

5. In tacheometrical observations, vertical staff holding is generally preferred to normal staff, due to
   [ ] ease of reduction of observations
   [ ] facility of holding
   [ ] minimum effect of careless holding on the result
   [ ] easy to hold staff

6. Topographic map is used to represent the
   [ ] artificial detail [ ] natural detail [ ] construction detail [ ] geological detail

7. Setting out is done
   [ ] prior to the preparation of plans [ ] along with the preparation of plans
   [ ] after the preparation of plans [ ] if observations are present

8. The most reliable method of plotting a theodolite traverse, is
   [ ] by consecutive co-ordinates of each station
   [ ] by independent co-ordinates of each station
   [ ] by plotting included angles and scaling off each traverse leg
   [ ] by the tangent method of plotting

9. Two hill tops A and B 20 km apart are intervened by a third top C. if the top most contour of the three hill tops are of the same value, state weather the line-of sight AB

[ ] passes clear of top C
[ ] passes below the hill top C
[ ] grazes the hill top C
[ ] grazes the hill top C

10. Centering error of a theodolite produces an error

[ ] in all angles equally
[ ] which does not vary with the direction or pointing
[ ] which varies with the direction of pointing and inversely with the length of sight
[ ] does not produce an error

SECTION "B"
[10 Q × 0.5 = 5 marks]

Fill in the blanks with appropriate word/words.

11. The operation of making the algebraic sum of latitudes and departures of a closed traverse, each equal to zero, is known _____.

12. The direction of steepest slope on a contour, is _____.

13. The main plate of a transit is divided into 1080 equal divisions. 60 divisions of the vernier coincide exactly with 59 divisions of the main plate. The transit can read angles accurate upto _____.

14. If a tacheometer is fitted with an anallatic lens additive constant is _____, multiplying constant is _____.

15. The orthographical projection of a traverse leg upon the reference meridian, is known a_____.

16. The linear error in a 50 m long traverse is 0.01m. The angular error (in seconds) considering equal precision will be_____.

17. The tacheometer focal length of object glass is 20 cm, the distance between the object glass and trunnion axis is 10cm and the spacing between the outer lines of diaphragm axis is 4mm. if the staff intercepts are 1.000 (top) and 2.500 (middle) when the line of collimation is perfectly horizontal, then the horizontal distance between the staff station and instrument station will be_____.

18. If the coordinates of A are 100 N and 200 E, and those of C are 100S and 200E, then the length AC is_____.

19. In a tacheometer, the number of horizontal cross wires in the stadia diaphragm is_____.

20. If the bearing of a line AB is N 60^0 30^0 E and that of BC is 122^0 of a closed traverse ABCDE, then the measure of the interior angle B is_____.

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SECTION "C"

Attempt *ALL* questions. Assume suitable data whenever necessary. The figures in the margin indicates full marks.

1. Explain all the factors considered while deciding contour of particular plan. [4]

2. Explain the direct and indirect method of contouring and also mention the advantages of indirect method of contouring over the direct method of contouring. [3+1]

3. Why we need to calculate the omitted measurements in theodolite traversing. Explain how you will calculate the omitted measurements when the affected legs are not adjacent. [4]

4. The following data refers to a traverse ABCDEA. Complete the Gale's table with final adjusted length and bearing of each line. Coordinates of D is (300.00mN, 500.00mE). [7]

Station	Horizontal Angle	Distance (m)	Bearing
A	$128^0 47'38"$	47.23	$41^0 00'39"$(AB)
B	$102^0 06'18"$	42.51	
C	$108^0 52'33"$	67.25	
D	$91^0 00'13"$	49.36	
E	$109^0 12'08"$	44.02	

5. Explain how theodolite traversing hold principle of surveying. And state the principle of theodolite traversing. [2+1]

6. Two sets of tacheometric readings were taken from an instrument station A, the RL of which was 15.05 ft to a staff station B.
   a. Instrument P- multiplying constant 100, additive constant 14.4 in., staff held vertical.
   b. Instrument Q- multiplying constant 95, additive constant 15.5 in., staff held normal to the line of sight.

   What should be the stadia readings with instrument Q? [5]

Instrument	At	To	Ht. of instrument (ft.)	Vertical angle	Stadia Readings (ft.)
P	A	B	4.520	300	2.35,3.31,4.27
Q	A	B	4.470	300	????

7. Explain the principle of Tacheometric survey and describe the working principle of subtense bar also Derive an expression for the horizontal distance D and RL of a vertical staff from a tacheometer if the line of sight is inclined. [1+1+4]

8. Write short note on followings:
   a. Features, importance and uses of Total Station. [3]
   b. Explain the process of setting out of building. [4]