

KATHMANDU UNIVERSITY
End Semester Examination
June/July, 2023

Marks Scored:

Level : B.Sc.

Year : III

Exam Roll No. :

Time: 30 mins.

Course : ESEE 310

Semester : II

F. M. : 10

Registration No.:

Date 1: 1 JUL 2023

SECTION "A"

[20 Q. × 0.5 = 10 marks]

Encircle the most appropriate option.

- KII stands for
a. Key Independent Interview
b. Key Information Interview
c. Key Independent Informant
d. Key Informant Interview
- The number of significant digits in 1559.00 is.....
a. six
b. four
c. two
d. five
- If 5 cm length on a map corresponds 1 km feature on ground, the map scale is
a. 1:50000
b. 1:2000
c. 1:20000
d. 1:5000
- The Traverse survey that starts at known point but ends at unknown point is called traverse.
a. axis
b. open
c. closed
d. link
- The correction for sag is
a. always additive
b. always subtractive
c. always zero
d. may be additive or subtractive
- In thesampling, each participant in a study has an equal chance of being chosen.
a. stratified
b. cluster
c. systematic
d. random
- Closed contours, with higher value outwards, represent a....
a. hill
b. plain surface
c. cave
d. depression
- In a map showing contours, the name of the darker contour lines is
a. Key Contour
b. Lines of deviation
c. Index contour
d. Lines of elevation
- The sum of interior angles of a closed traverse is
a. $(2n-4)90^0$
b. $(2n-4)180^0$
c. $(3n-4)90^0$
d. $(3n-4)180^0$
- If the true bearing of the line AB is $269^030'$, then the azimuth of the line AB is
a. $0^030'$
b. $269^030'$
c. $89^030'$
d. $90^030'$

11. The mean sea level is a
- a. benchmark b. datum c. level d. station
12. The difference between the most probable value of a quantity and its observed value is ...
- a. True Value b. Residual error c. Weighted Value d. Conditional value
13. A 30 m Chain was found to be 10 cm too short after chaining 1500m. The corrected length of total distance chained is
- a. 1506 m b. 1497.5 m c. 1495 m d. 1502.50 m
14. If h is the difference in height between the end points of a chain of length L, the slope correction is approximately equal to
- a. $-\frac{h^2}{2L}$ b. $\frac{h}{2L}$ c. $\frac{h^2}{2L}$ d. $-\frac{2h^2}{L}$
15. The existing environmental condition survey performed to develop a reference point for monitoring the environmental change issurvey.
- a. Compliance b. Insurance c. Baseline d. Impact
16. The instrument 'Abney Level' is also called
- a. Theodolite b. Barometer c. Planimeter d. Clinometer
17. The Survey stations may be marked on the ground using a.....
- a. Pole b. Rod c. Pointer d. Peg
18. Ranging is the process of ...
- a. fixing ranging rods on the extremities of the area.
 b. aligning the chain in a straight line between two extremities.
 c. taking offsets from a chain line.
 d. chaining over a range of mountains.
19. Theodolite is an instrument used to measure.....
- a. Vertical distance and angle b. Vertical and Horizontal angle
 c. Horizontal distance and angle d. Horizontal angle and contour interval
20. The magnetic bearing of line AB is $132^{\circ}45'$. If the magnetic declination is $10^{\circ}20'W$, the true bearing of the line is ...
- a. $122^{\circ}25'$ b. $143^{\circ}5'$ c. $121^{\circ}25'$ d. $122^{\circ}30'$

KATHMANDU UNIVERSITY
End Semester Examination
June/July, 2023

11 JUL 2023

Level : B.Sc.
Year : III
Time : 2 hrs. 30 mins.

Course : ESEE 310
Semester : II
F. M. : 40

SECTION "B"
[8Q × 5 = 40 marks]

Attempt *ALL* questions. Abbreviations have usual meaning.

1. A steel tape of nominal length 30 m was suspended between supports to measure a length of a line AB. The measured length of the line AB is 29.859 m. If the pull applied to a tape of length 30.003 m was 100 N, Calculate the corrected horizontal length (after pull and sag correction) if the standard pull is 45 N, weight of the tape and its cross sectional area is 0.15 N/m and 2.5 mm². (Take modulus of elasticity of the tape material as 2×10^5 N/mm².)
2. Detect the local attraction at stations and correct the bearing of lines of a traverse **ABCDEA**. Also calculate included angles.

Table 1

Line	Fore Bearing	Back Bearing
AB	126°45'	308°00'
BC	49°15'	227°30'
CD	340°30'	161°45'
DE	258°30'	783°0'
EA	212°30'	314°5'

3. a. Draw and label the neat sketches of the patterns of the contours and profiles of. [3]
 - i. An overhanging cliff
 - ii. Depression
 - iii. Area having uniform steep slope
- b. Area between the dam and upstream contours at a reservoir site are as follows. [2]

Table 2

Contour Level (m)	Enclosed area (sq. m)
54	714
56	6512
58	52700
60	79000
62	374000

Determine the capacity of the reservoir by trapezoidal formula.

4. a. List out the name of major instruments used in chain surveying. [2]
- b. Discuss about three sources of error in compass surveying. [3]

5. Balance the closing error of a traverse by using Bowditch rule.

Table 3

Line	Length (m)	Bearing
AB	85.21	35°10'
BC	209.75	70°65'
CD	150.18	160°53'
DE	156.10	226°45'
EA	230.36	300°45'

6. Write short notes on *ANY TWO* of the following. [2Q × 2.5 = 5]
- Abney Level
 - Total station
 - Stepping method in ranging
7. Discuss about three segments of GPS. Briefly describe the operation mechanism of DGPS. [3+2]

OR

What are the three components of Baseline Environmental Survey? Briefly describe the types two types of sample collection methods. [3+2]

8. Widening of a road section in Gorkha district is being proposed by National Reconstruction Authority to provide improved transportation services to earthquake affected area. The existing width of road is **4 m**. The Authority plans to make the road **6.25m** wide.
- In an environmental survey conducted on a road section of Gorkha district, the following information (**Table 4**) was observed.
- Draw the plan of typical topography of the road section based on the given information. Assume both sides of the road have the similar land use. [1]
 - Fill the missing information on **Table 5** given below. [3]
 - According to forest rules, for an Individual cut down of trees 25 seedlings should be planted and should grow for 5 years to minimize the adverse impact on environment. Also, additional forest area loss should be compensated with additional plantation i.e., for 1 ha loss of forest area, 1600 trees needs to be planted. The unit cost of plantation is NRs.151.12. Based on this information fill the missing information on **Table 6**. [1]

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Table 4 Land Use pattern road alignment

Chainage		Type of land
From	To	
0+000	0+200	Build up Area
0+200	0+840	Agricultural Land
0+840	2+740	Community Forest (114 trees to be cut down)
2+740	2+880	Agricultural Land
2+880	4+380	Governmental Forest (55 trees to be cut down)
4+380	4+750	Build up Area
4+750	5+240	Barren land
5+240	6+440	Build up Area
6+440	7+040	Barren land
7+040	8+040	Community Forest (87 trees to be cut down)
8+040	9+160	Barren land
9+160	10+280	Build up Area
10+280	11+960	Community Forest (68 trees to be cut down)
11+960	12+146	Build up Area

Table 5 Land requirement detail along Road alignment

Type of Land, Ownership	Length (m)	Existing width (m)	Additional width (m)	Existing Area (ha)	Additional Area (ha)	Total Area (ha)
Agricultural Land	?	4	2.25	?	?	?
Barren Land	?	4	2.25	?	?	?
Forest	?	4	2.25	?	?	?
Build up Area	?	4	2.25	?	?	?
Total	12,146			?	?	?

Table 6 Plantation plan

Name of the CF/ Govt. forest	No. of Trees to be cut down	Compensatory Plantation (1:25)	Total Cost (NRs)
Community Forest	?	?	?
Government forest	?	?	?
Subtotal (A)	?	?	?
	Additional Area loss (ha)	Compensatory Plantation @ 1600 plants per 1 ha	
For Additional Forest area loss (B)	?	?	?
Total	-	Total plants for compensations?	?

References:

- i. Latitude = $l \cos \theta$
- ii. Departure = $l \sin \theta$
- iii. Closing error = $\sqrt{(\sum L)^2 + (\sum D)^2}$
- iv. $C_1 = \sum L \times \frac{l}{\sum l}$
- v. $C_2 = \frac{1}{24} \left(\frac{W}{P} \right)^2 L$
- vi. $C_3 = \frac{P - P_0}{AE} L$
- vii. 1 ha = 100 m \times 100 m
- viii. 1 inch = 2.54 cm
- ix. 1 m = 3.28 ft