

KATHMANDU UNIVERSITY  
End Semester Examination  
February, 2025

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

27 FEB 2025

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

Abbreviations have usual meaning. Make a logical assumption if needed.

SECTION "B"

[8 Q. × 5 = 40 marks]

*Attempt ALL questions.*

1. What are the principles of surveying? What are the three sources of error that may occur during compass surveying? [2+3=5]
2. The Bagmati Corridor Highway (assumed) is a key infrastructure project in Nepal, connecting Kathmandu, Makwanpur along different regions of Nepal and facilitating trade and transportation. However, due to frequent flooding, the alignment and road markers need updating. [2+2+1=5]
  - a. Explain the steps you would take to re-align and update the chainage markers along the highway.
  - b. Prepare a sample table describing the types of land use (e.g., residential, agricultural, commercial) found along the highway's route. Assume the land use is similar on both sides of the road.
  - c. Draw a plan of the typical topography and land features based on the land use described in your table.
3. Balance the closing error of a traverse by using Bowditch rule. [5]

Table 1

Line	Length (m)	Bearing
AB	160	46 <sup>0</sup>
BC	190	130 <sup>0</sup>
CD	200	220 <sup>0</sup>
DE	180	180 <sup>0</sup>

4. A closed compass traverse was conducted round a forest and following whole circle bearings were observed. Determine which of the station suffers from local attraction and compute the values of the corrected bearings. [5]

Table 2

Line	Fore Bearing	Back Bearing
AB	74 <sup>0</sup> 20'	256 <sup>0</sup> 00'
BC	107 <sup>0</sup> 20'	286 <sup>0</sup> 20'
CD	224 <sup>0</sup> 50'	44 <sup>0</sup> 50'
DA	306 <sup>0</sup> 40'	126 <sup>0</sup> 00'

5. a. Draw and label the neat sketches of the patterns of the contours and profiles of the following [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.

Table 3

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. [2]

6. What are the three components of Baseline Environmental Survey? Briefly describe two types of sample collection methods

**OR**

What do you mean by checklist? Prepare a sample questionnaire to conduct an interview with locals regarding construction of a landfill Site. [5]

7. A construction project requires creating an accurate topographical profile of a hilly area to design a water pipeline system. As a surveyor, you are tasked with preparing the profile of the area using levelling. [2+2+1=5]
- a. Explain the steps you would follow to prepare the profile of the area using levelling techniques.
  - b. List the equipment needed for the levelling process and their functions.
  - c. Provide a sample table of levelling field notes for a small section of the area.
8. Differentiate between *ANY TWO* of the following. [2.5+2.5=5]
- a. Ranging and Chaining
  - b. Surveyors Compass and Prismatic Compass
  - c. Plane and Geodetic Surveying