BANGLADESH UNIVERSITY OF PROFESSIONALS
Military Institute of Science and Technology
B.Sc. in Environmental, Water Resources, and Coastal Engineering,
Term Final (Fall) Examination 2023: Dec 2023 - Feb 2024

Student Group: 0 < Earned Credit Hours ≤ 36

Subject: EWCE 103, Surveying

Time: 3.00 hours **Full Marks: 180**

INSTRUCTIONS:

a. Use **SEPARATE** answer scripts for each section.
b. **Question-1** in **Section-A** and **Question-5** in **Section-B** are compulsory
c. Answer any other **TWO** from rest of the **THREE** questions from each section.
d. Figures in the margin indicate full **marks**.
e. Assume reasonable data if necessary.
f. **Symbols** and **abbreviations** used have their usual meanings.

SECTION-A

Question 1 (Compulsory)

a. Define surveying. How do you differentiate between the plan and the map of a land area? Write down the areas where the surveyings are being used. **05**

b. Explain the scale of a map and a plan. Briefly describe the different methods of representation of scales on a map. How the scales are given on a map or a plan? **05**

c. Define chaining in chain surveying. What is 'Field Book' used in chain survey? Write down the characteristics of 'field book' used in the chain surveying. **05**

d. Explain the terms of photogrammetry and the photogrammetric surveying. What do you mean by the pixels and the resolutions of photographs? Write down the applications of photogrammetry in surveyings. **05**

e. Define GIS. What is query in GIS? Write down the benefits of the implementation of GIS. **05**

f. Define project surveying. Write down the different types of surveys that need to be conducted for an engineering project. And why? **05**

Question 2

a. Write down the purposes of the surveyings. Briefly describe the classifications of survey based on the nature of the fields of surveys. **10**

b. Define the plane table survey. Describe in brief the centering and the orientation of plane table before the starting of plane table surveying. Explain the resection methods of plane table surveying. **10**

c. i. Describe the different types of vertical aerial photographs used during aerial photogrammetric surveying. **04**

ii. A DSLR camera installed in an UAV having focal length of 15cm, is to take vertical aerial photographs of a terrain, having an average elevation of 400m. What will be the height above mean sea level at which the UAV must fly in order to get a scale of 1:1000 of the photographs? **06**

Question 3

a. Define the 'calibration' of the survey equipment. As a surveyor, why and when do you need to calibrate your equipment? Write down the precautionary measures you will undertake of your equipment while conducting survey in the coastal areas. **10**

b. Describe the equinox, the solstice and explain how these involve in the changes of seasons on the earth's surface. **10**

c. i. As a surveyor, how you are going to choose the scale to plot the field data of the surveying, for the construction of a map or a plan? **04**

ii. An old urban map is found to be shrunk so that a line originally measures 10cm long now measures 9.85cm only. The map was found to be constructed to a scale of 1:10,000. An area of a plot on the map measures now 10.02 sq.cm as found by a planimeter. Find out the true area of the plot on the ground. **06**

Question 4

a. i. Explain the purposes of providing 'base line, 'check lines' and 'tie lines' in chain survey. Why the chain survey is being called as 'triangulation survey'? **05**

ii. Chain line at a point 'A' on the home bank has to stop because of a river and cannot be reached at point 'B' located on the otherside of the river. The point 'C' is located along the chain line on the home bank and measured from 'A' as 3.2m. 'AD' is perpendicular at point 'A' and measures as 9.0m. At point 'D', the magnetic bearings of point 'B' and point 'C' are measured and found to be 345° and 195° respectively. Find out the width of the river AB. **05**

b. Define GPS. Explain the methods of GPS measurements utilized by the surveyors. Briefly describe the Bangabandhu Satellite – 1 including its ground segments and service areas. **10**

c. i. Explain RS system with example. Describe in brief the characteristics of the RS system. **05**

ii. The scale of an aerial photograph is 1cm = 100m. The photograph size is 25cm×25cm. Determine the number of photographs required to cover an area of 120 sq.kms if the longitudinal overlap is 50% and side lap is 40%. **05**

SECTION-B

Question 5 (Compulsory)

a. Explain how to adjust the errors in a close traverse. **08**

b. What do you mean by sounding? Why sounding is required? **05**

c. Describe the errors due to curvature of earth and refraction of atmosphere. **06**

d. Why different types of curves (circular, transition and vertical curves) are provided on road and railway? **06**

e. The area enclosed by the contour in a reservoir are as follows: **05**

Contour (m)	175	180	185	190	195
Area (sq.m)	460	750	2500	3500	3950

Find the volume of water (reservoir capacity) between 175m and 195m.

Question 6

a. When the point of intersection (P.I) of a simple circular curve is inaccessible, how can you set out the curve? **08**

b. Two tangents intersect at chainage 49+60, the deflection angle being 50°30'. Calculate the necessary data for setting out a curve of 15 chains radius if it is intended to set out the curve by Rankine's method of tangential angle. Take peg interval equal to 100 links and length of each chain is 20m. The theodolite has a least count of 20". Tabulate the actual theodolite readings of the deflection angles to be set out. **22**

Question 7

a. Explain how you are going to conduct the levelling survey across a river/pond/lake which is too wide to be sighted across? **06**

b. The following readings were taken with a 4m leveling shaft. The instrument was shifted after 3rd and 6th readings. The readings are 2.665, 3.225, 2.905, 1.850, 0.980, 2.620, 1.585, 0.960, 0.425 m. Calculate the Reduced level (R.L) of all the points if first reading was taken on a B.M of 240m. **14**

c. A parabolic vertical curve is to be set out connecting two uniform grades of +0.8% and -0.9%. The change and R.L of P.I are 1664m and 238.755m respectively. The rate of change of grade is 0.05% per chain of 20m. Calculate **10**

(i) The length of the curve
(ii) Chainages of first and second tangents
(iii) RL of the beginning and end of the curve

Question 8

a. List the uses of a contour map. **05**

b. Write short notes on: **09**
(i) ADCP (ii) OBS (iii) Eco sounder

c. A tacheometer is set up at an intermediate point on a traverse course PQ and the following observations are made on a vertically held staff: **16**

Staff Station	Vertical Angle	Staff Intercept	Axial hair reading
P	+ 8°36'	2.350	2.105
Q	+ 6°6'	2.055	1.895

The instrument is fitted with an anallactic lens and the constant is 100. Compute the length of PQ and RL of Q, that of P being 321.50 meters.