Ref. No.: Ex/CE/5/T/201/2024

BACHELOR OF ENGINEERING (CIVIL ENGINEERING) SECOND YEAR FIRST SEMESTER EXAMINATION 2024

SURVEYING III

Time: 3 Hours **Full Marks: 100**

[50 Marks for each part]

Part I

Use Separate Answer scripts for each Part

Answer brief & to the point. Assume standard value for any parameter, if required

Answer Questions (1), (2) and other Three from rest

Group: A – Answer any Two questions

1. An area 30Km long and 20Km wide is to be covered in an aerial survey scheme having R.F. as 1:20,000 with a 150mm focal length camera and 250mm 250mm photographic plate. The shutter interval is 8secs and the forward and lateral overlaps are 55% and 25% respectively. Without considering the effect of Crab and Drift, Determine Flying Height, Number of flight lines, Total No of Photographs to be taken and Ground Velocity. 10
2. The image of base (B) and top (T) of two sets of relief displaced objects on a photograph taken by a 150mm focal length camera at a scale of 1:10,000 are B1(10, 32) & T1(15, 47) and B2(0,7) & T2(2,3) respectively. Determine the height of the object. 10
3. A Total Station Survey to find the coordinates of target point B was conducted from instrument station point A. The coordinates of 'A' are Easting 1047.5418m, Northing 956.3224m and elevation 99.696m. The height of the centre of the instrument and centre of target are 1.45m and 1.6m respectively. The observed vertical and horizontal angles measured with respect to the line of horizon and north are (-)2°38′50″ and 82°57′40″ respectively. Determine the coordinates of the point 'B' 10

Group: B – Answer any Three questions

4. What is photogrammetry? Name the types of Photogrammetry. With brief explanation of each state the major differences among them 2+1+7
5. With a schematic diagram explain the following and their application in photogrammetry –
   a. Fiducial marks
   b. Ground and Photo Principal Point 2+4+4
6. What is Stereoscopic pair? Explain the following in connection with stereoscopic study
   a. Orientation of stereoscopic pair
   b. Stereoscopic overlap 2+4+4
7. Explain the following points in a photograph and write the corresponding equations, explaining all the terms involved, which are used to find suitable parameters based on these points
   a. No Shadow Point
   b. Photo Vertical Point 2×(2+3)
8. What is the full form of EDM? State the basic working principle of a total station and why is it considered as a EDM device? With a typical sketch, explain how the coordinates of a target station can be obtained using total station? 1+3+6

[Turn over

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Subject: SURVEYING – III Time: 3 hours Full Marks: 100 (50 in each part)

Part II

(ANSWER EACH PART IN SEPARATE ANSWER SCRIPT)

Answer any five questions.

1. At what speed does Electromagnetic radiation propagates Earth's atmosphere? How does Earth's atmosphere impact electromagnetic radiation? Why is radiation diverted as it passes through? Illustrate such diversion diagrammatically. (2+3+2+3)
2. Why does scattering of radiation happen in atmosphere? On what factors does scattering depends? What are the different types of scattering? Compare in between types of scattering. (2+3+2+3)
3. With aid of diagrammatic illustration define the following: (5×2)
   a) Ground-track
   b) Apogee
   c) Perigee
   d) Nadir point
   e) Zenith point
4. Compare between spatial, spectral, radiometric and temporal resolutions. An image with spatial resolution 30 m and an image with spatial resolution 1 m – Which is better for analysis and why? Differentiate between a 8 bit and a 4 bit image. (4+3+3)
5. What do you mean by atmospheric windows? Name the major atmospheric windows. State the wavelength ranges of major atmospheric windows. What is the visible portion of electromagnetic spectrum? (2+3+3+2)
6. How to distinguish between trees and water bodies with reference to their spectral response? Compare between across track and along track scanning. What are the two major GIS models? What do you mean by remote sensors? (3+3+2+2)
7. Why is image enhancement an important technical tool for digital image processing? Compare between image reduction and image magnification. What do you mean by projected and geographic coordinate systems? What are the two sections of infrared portion of electromagnetic spectrum? (2+2+4+2)
8. What do you mean by a satellite? What is a satellite orbit? Name any four types of orbits. What do you mean by Normalized Difference Vegetation Index or NDVI? What are the two major image classification types? (2+2+2+2+2)