

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV (NEW) EXAMINATION – SUMMER 2024****Subject Code:2140601****Date:01-07-2024****Subject Name:Advanced Surveying****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

- Q.1**
- (a) Define triangulation and objects of geodetic triangulation. **03**
- (b) Explain any four laws of weight with example used in theory of error. **04**
- (c) An area 50km long in the north-south direction and 25 km long in the east-west direction is to be photographed with a lens having 20cm focal length for the purpose of constructing a mosaic. The photograph size is 50cm x 50cm. The average scale is to be 1:10000 effective at an elevation of 400m above datum. Overlap is to be at least 55% and the side lap is to be at least 25%. An intervalometer will be used to control the interval between exposures. The ground speed of the aircraft will be maintained at 250kmph. The flight lines are to be laid out in a north-south direction on an existing map having scale of 1:40000. The outer flight lines are to coincide with the east and west boundaries of the area. Determine the flight height, exposure interval, number of photographs per flight line, and total number of photographs and other necessary data for the flight plan. **07**
- Q.2**
- (a) Define (i) Altitude (ii) Azimuth (iii) Declination. **03**
- (b) Explain any four corrections to the base line measurements. **04**
- (c) Derive the expression for the horizontal and vertical distance by tangential system, where one angle is of elevation and other of depression. **07**

OR

- (c) Following observations were taken from two transverse stations by means of tacheometer fitted with an anallactic lens. The constant of the instrument is 100. **07**

Inst. Station	Staff Station	Height of Inst.	Bearing	Vertical Angle	Staff reading
P	Q	1.53	245°30'	+15°00'	0.860, 1.325, 1.790
R	S	1.32	89°45'	-13°40'	1.245, 2.300, 3.355

Coordinate of station P 200.3N 190.8W

Coordinate of station R 109.8N, 100.4W

Compute the length and gradient of the line RS, if R is 3m higher than P.

- Q.3**
- (a) Enumerate the factors to be considered in the selection of the triangulation stations. **03**
- (b) Define total station and explain various parts of it **04**
- (c) Define remote sensing and explain basic components of ideal remote sensing system. **07**

OR

- Q.3** (a) Define GIS and describe objectives of GIS **03**
(b) Explain basic principle of EDM **04**
(c) Determine the azimuth and altitude of a star from the following data: **07**
(i) Declination of star = $30^{\circ}45'N$
(ii) Hour angle of star = $30^{\circ}06'$
(iii) Latitude of observer = $80^{\circ}N$

- Q.4** (a) Explain types of errors in the field of surveying. **03**
(b) What is strength of figure in the triangulation work. **04**
(c) Write down the application of remote sensing in the field of civil engineering. **07**

OR

- Q.4** (a) Enlist and explain the stages of remote sensing system? **03**
(b) Explain principle of remote sensing. **04**
(c) Explain the principle of EDM. **07**

- Q.5** (a) A steel tape 30m long standardized at $55^{\circ}F$ with a pull of 5kg was used for the measurement of base line. Find the correction per tape length, if the temperature at the time of measurement was $80^{\circ}F$ and the pull exerted was 10kg. Weight of 1 Cubic cm of steel = 7.86g, weight of tape = 1kg, and $E=2.109 \times 10^6 \text{ kg/cm}^2$. Coefficient of expansion of tape per $1^{\circ}F=6.2 \times 10^{-6}$. Cross sectional area of tape = 0.05089 Sq CM. **03**
(b) How will you determine the position of star when it is at the elongation? **04**
(c) Explain the integration of remote sensing with GIS. **07**

OR

- Q.5** (a) What are the purposes of conducting the triangulation survey? **03**
(b) What are the laws of accidental errors? **04**
(c) Define exposure station, focal length, principal point, nadir point, tilt, swing and iso centre. **07**
