Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)
B.E. / B. Tech / B. Arch (Full Time) - ARREAR EXAMINATIONS, NOV/DEC. 2024
B.E GEOINFORMATICS ENGINEERING
GI5304 PHOTOGRAMMETRY
(Regulation 2019)

Time: 3hrs Max. Marks: 100

CO 1	Understand and appreciate the importance of photography as a means of mapping, functionaland physical elements of photography.
CO 2	Understand and reflect on the history and need of photogrammetric mapping and the relevant of the accuracy standards and means to achieve them for precise large-scale mapswith scientific methods.
CO 3	Evaluate the standards of map based on the state of art tools and techniques and assess the production standards for photogrammetric map making.
CO 4	Acquire knowledge on the current development, issues methods and solutions in map making and evaluate methods of production.
CO 5	Analyze critically and evaluate methods by applying the knowledge so gained and to be a part of innovation and integration of mapping technology.

BL – Bloom's Taxonomy Levels
(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analysing, L5 - Evaluating, L6 - Creating)

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

Q. No	Questions	Marks	CO	BL
1	Explain the concept of Photogrammetry.	2	1	L2
2	The air base of a stereo pair of vertical photos is 1400 m and the flying height above average ground is 2440 m. The camera has a focal length of 152.4 mm and a 23 cm format. What is the percentage end lap?	2	1	L1
3	How do you compute the relief displacement on a vertical photograph?	2	2	L2
4	What is stereovision and explain its purpose it is used.	2	2	L1
5	What are stereo plotters and describe their use.	2	3	L1
6	Explain the importance of viewing systems in stereo plotters.	2	3	L2
7.	Infer and describe pass points and tie points.	2	4	L2
8	Compare reliability Vs. Validity.	2	4	L2
9	Differentiate normal scanners and aerial photography scanners.	2	5	L2
10	Describe a brief overview of Unmanned Aerial Systems (UAS).	2	5	L1

PART- B (5 x 13 = 65 Marks)

(Restrict to a maximum of 2 subdivisions)

Q. No	Questions	Marks	CO	BL
11 (a) (i)	Examine the area of a triangular parcel of land captured in a vertical aerial photograph under the following conditions i.e. The sides of the triangle on the photograph measure 54.12 mm, 87.57 mm, and 70.61 mm; The photograph was taken with a camera having a focal length of 152.4 mm; The flying height of the aircraft is 3100 m above datum; The average ground elevation of the terrain is 925 m.	6	1	L4
(ii)	Classify the types of photogrammetry based on applications and describe them.	7		
	OR			
11 (b) (i)	Analyse the total number of photographs required to cover a project area with dimensions of 16 km long (east-west) and 10.5 km wide (north-south). The photograph has a scale of 1:12,000 with 60% end lap and 30% side lap, taken in a camera with a focal length of 152.4 mm with a 230 mm square format. The outer flight line coincides with the northern project boundary. You can Include two extra photographs at the ends of each strip to ensure complete coverage.	7	1	L4
(ii)	Examine the different refinements applied to the measured coordinate.	6		
12 (a)(i)	Images of the endpoints of ground line AB, whose horizontal length is 650.47 m, appear on a pair of overlapping vertical photographs. Photo coordinates measured with respect to the flight axis on the left photo were xa = 33.3 mm, ya = 13.5 mm, xb = 41.8 mm, and yb = –95.8 mm. The photo coordinates measured on the right photo were xa′ = –52.3 mm and xb′ = –44.9 mm. Determine the air base for this stereopair.	7	2	L5
(ii)	Compare the different coordinate systems employed in photogrammetry.	6		
	OR			
12 (b)	A pair of overlapping vertical photographs were taken from a flying height of 1233m above sea level with a 152.4mm-focal-length camera. The air base was 390m. With the photos properly oriented, flight-line coordinates for points *a* and *b* were measured as *xa* = 53.4mm, *ya* = 50.8mm, *xa'*= -38.3 mm, *ya′* = 50.9 mm, *xb* = 88.9mm, *yb* = -46.7 mm, *xb′* = -7.1 mm, *yb′* = -46.7 mm. Analyze the given data and Determine the elevations of points *A* and *B* and the horizontal length of line *AB*. If a flight-line axis *x* and *x′* coordinates for the images of a vertical control point *C* were measured as *xc* = 14.3 mm and *xc′* = -78.3 mm. If the elevation of point *C* is 591 m above sea level, calculate the elevations of points *A* and *B* of that example, using parallax difference. Compare the values obtained from both methods and Infer the convenience of use of parallax differences for determining elevations.	13	2	L5
13 (a)	Simplify the concept of stereo plotters, and their orientation and classify them in detail.	13	3	L4

	OR			
13 (b)	A vertical photograph taken from a flying height of 3500 m above mean sea level contains image *a* of object point *A* at coordinates (with respect to the fiducial system) *xa* = 73.287 mm and *ya* = -101.307 mm. If the elevation of object point *A* is 120 m above mean sea level and the camera has a focal length of 153.099 mm. Examine the given data and compute the x' and y' coordinates of the point, corrected for atmospheric refraction.	**13**	**3**	**L4**
14 (a) (i)	Compare DEM, DTM, and DSM, and explain their applications in detail.	**6**	**4**	**L4**
(ii)	Examine Rectified Photo, Orthophoto, Orthomosaic, and True Orthophoto, and explain the processes involved in their generation.	**7**		
	OR			
14 (b)(i)	Analyse the use of photogrammetric stereo imagery for collecting 3D features and explain them.	**6**	**4**	**L4**
(ii)	Infer the concept of Aerotriangulation Measurement, its purpose, and the ground control point requirements per stereo model.	**7**		
15 (a) (i)	Identify the quality parameters to be calibrated for a commercial photogrammetric scanner.	**6**	**5**	**L3**
(ii)	Relate the various methods by which stereo display is enabled in digital systems.	**7**		
	OR			
15 (b)	Identify and elucidate four methods employed for image-matching procedures in both interior and exterior orientation processes.	**13**	**5**	**L3**

PART- C (1 x 15 = 15 Marks)

(Q.No.16 is compulsory)

Q. No	Questions	Marks	CO	BL
16.	Assess the requirements and design a comprehensive flight plan for systematic aerial coverage of a trapezoidal area with undulated terrain, utilizing aerial photography at a scale of 1:5000. Given end lap and side lap parameters of 80% and 30% respectively, and employing a camera with a 230mm square format, determine the total number of photographs needed and strategically plan flight lines to ensure complete coverage of the project area. Consider incorporating two additional photographs at each end of every strip to guarantee thorough coverage. Utilize the provided ground coordinates of the project boundary. The project boundary ground coordinates (X(m), Y(m)) are A (34000, 60000), B (50000, 60000), C (37000, 68000), and D (46000, 68000).	**15**	**1& 2**	**L5**