KATHMANDU UNIVERSITY
End Semester Examination
January/February 2024

Level : B.E.
Year : III
Time : 2 hrs. 30mins.

31 JAN 2024

Course : GEOM 316
Semester : I
F. M. : 40

SECTION "B"
[6 Q. × 4 = 24 marks]

Attempt *ANY SIX* questions. Assume suitable data if necessary.

1. Define photogrammetry. How do you determine the scale of any tilted photograph? [1+3]

2. What are the main points to be considered before aerial flight planning for photogrammetric data acquisition? [2+2]

3. What is relief displacement? Prove that the relief displace on image is directly proportional to the height of the object and inversely proportional to the flying height of the aircraft. [1+3]

4. The distance from the principal point to an object in a photograph is 6.52 cm and the elevation of the object above the datum is 250 m. What is the relief displacement of the point if the datum scale is 1:10000 and the focal length of the camera is 20 cm? [4]

5. What are the parts of Aerial camera? Explain in brief with diagram. What are the general requirement for aerial camera? [3+1]

6. How do you obtain an ortho rectified photos? Differentiate between conventional and differential rectification? [2+2]

7. Write Short Notes on *ANY TWO*. [2+2=4]
   a. Chromatic Aberration
   b. Astigmatism
   c. Coma
   d. Snell's Law

SECTION "C"
[2Q. × 8 = 16 marks]

Attempt *ANY TWO* questions.

8. Explain in brief about the types of UAV. Suppose you are selected as a photogrammetry expert in one of the biggest hydropower of Nepal. Your task is to carry out survey works for the entire area. The following data are given; [2+6]
   a. Nominal scale 1cm :25000ft
   b. Size of photographs 23*23 cm
   c. Overlap along line of flight (endlap)70%
   d. Overlap along adjacent lines of flight (sidelap) 40%
   e. Length of area along lines of flight 30 km.
   f. Width of area across lines of flight 25 km.

   Based on these information, calculate;
   i) Convert the given scale into RF.
   ii) No. of strip
   iii) No. of photographs required per strip
   iv) Total no of photographs required to cover the area
   v) Time interval between exposures
   vi) Draw the grid lines to show the row and column for the entire area

9. What is co-linearity condition? What is its importance in photogrammetry? Derive the co-linearity equation where each symbol carries meaning. [1+2+5]

10. Define Stereoscopic Vision. Explain the orientation in photogrammetry. Explain different types of orientation used in aerial photogrammetry. [1+2+5]

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Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date :

SECTION "A"

[20Q. × 0.5 = 10 marks]

Choose and encircle in the appropriate option.

1. A point where a plumb line dropped from the front nodal point strike the photograph is called _____
   a. Nadir Point b. Isocenter c. Principal Point d. Perspective Point

2. Which of the following statement is **NOT TRUE**?
   a. Picture plane is also called positive plane
   b. The Image plane is also called negative plane
   c. Picture plane is imaginary plane in front of the camera lens
   d. The images of the objects are formed in picture plane

3. An aerial photograph, in which the angle of tilt is 30 degree can be referred as
   a. True vertical photograph b. Near Vertical photograph
   c. Low Oblique photograph d. High Oblique photograph

4. If DTM A and DTM B have cell size 10m and 20m respectively, then which statement is **TRUE**?
   a. DTM A is less accurate than DTM B
   b. DTM A has larger file size than DTM B
   c. Both DTM represents the terrain with same accuracy
   d. Both DTM file size are equal

5. Which type of projection happens in the aerial photograph?
   a. Perspective Projection b. Orthogonal Projection
   c. Parallel Projection d. Conformal Projection

6. Which statement is **NOT TRUE**?
   a. Flying height is inversely proportional to contour interval
   b. Flying height is directly proportional to c-factor
   c. Flying height is directly proportional to contour interval
   d. The product of contour interval and c-factor gives flying height

7. Which type of camera is used to capture aerial photograph for topographical map preparation?
   a. Narrow Angle b. Super wide Angle c. Wide Angle d. Normal Angle

8. Which of the following provides the highest level of DTM accuracy?
   a. Digitizing existing maps
   b. Laser Scanner
   c. Radar
   d. Photogrammetry

9. Which of the following is not used to model the elevation of the terrain?
   a. Spot Height
   b. Viewshade
   c. Hillshade
   d. Layer Tint

10. A vertical photograph is taken at an altitude of 800m above sea level. The terrain is flat and has an elevation of 250m. if the camera focal length is 50mm, what is the scale?
   a. 16000
   b. 11000
   c. 1:11000
   d. 1:1600

11. Which of the following is **TRUE** for parallex?
   a. p=(H-h)/Bf
   b. p=Bf/(H-h)
   c. p=[(H-h)/B]*f
   d. p=[bh/(H-h)]*f

12. Super-wide angle lens has field of view:
   a. <10 degrees
   b. 90-100 degrees
   c. 30 degrees
   d. 110- 130 degrees

13. In which of the photograph, large amount of detail is seen?
   a. Vertical
   b. High Oblique
   c. Near Vertical
   d. Low Oblique

14. Which of the following is **TRUE** for aerial photograph?
   a. Larger the scale, smaller the object size on photograph
   b. Larger the scale, difficult to recognize the details
   c. Larger the scale, smaller the processing time
   d. Larger the scale, smaller the ground coverage

15. After filtering the DSM, we obtain.....
   a. Orthophoto
   b. Digital Elevation Model (DEM)
   c. Digital Terrain Model (DTM)
   d. Stereo Model

16. The image, corresponding object and principle point line is same line, which principle does it satisfy?
   a. Principle of Coplanarity
   b. Principle of Passive Sensor
   c. Principle of Collinearity
   d. Principle of Triangulation

17. In Map Versus Aerial photograph, due to symbolic representation the clarity of details is :
   a. More on map than on a photo
   b. Less on map than on a photo
   c. Less on a photo than on a map
   d. More on a photo than on map

18. The tilt in an aerial photograph is radial from:
   a. Isocenter
   b. Plumb Point
   c. Principal Point
   d. Nadir Point

19. In aerial vertical photography, the longitudinal overlap is normally kept as:
   a. 50 Degree
   b. 70 Degrees
   c. 75 Degrees
   d. 60 Degrees

20. Vertical photograph coincides with the_____
   a. Direction of line of sight
   b. Direction of lens
   c. Direction of aperture
   d. Direction of gravity