KATHMANDU UNIVERSITY
End Semester Examination
July/August, 2024

Marks Scored:

Level : B.E.
Year : III
Course : GEOM 316
Semester : I
Exam Roll No. :
Time: 30 mins.
F. M. : 10
Registration No.:
Date 28 JUL 2024

SECTION "A"
[20 Q. × 0.5 = 10 marks]

Choose and encircle in the most appropriate option from each set of choices

1. What is the sensing distance in Close Range Photogrammetry?
   a. <10m b. <100m c. <10000m d. >10000m

2. Which of the following projections is used for mapping?
   a. Isometric b. Orthogonal c. Oblique d. Perspective

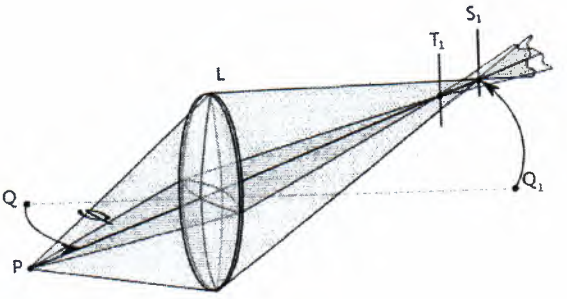
3. If the focal length of the camera is 15.24mm, the flying height is 3700m AGL and the lowest point in the mapping area is 700m, the scale of the photograph will be _____.
   a. 10000 b. 20000 c. 25000 d. 30000

4. Ground (air) distance between principal points of overlapping photographs is known as _____ in Photogrammetry.
   a. Airbase b. Air distance c. Ground base d. Photo base

5. A light ray travels from the air with a refractive index of 1.00 into water with a refractive index of 1.33. If the angle of incidence in the air is 30∘, what is the angle of refraction in water?
   a. 22.6° b. 33.7° c. 41.8° d. 48.1°

6.  represents _____ lens.
   a. Biconvex b. Negative meniscus
   c. Planoconvex d. Positive meniscus

7. The below image represents _____ lens defect.



   a. Astigmatism
   b. Barrel distortion
   c. Chromatic aberration
   d. Coma

8. Absolute orientation determines _____ parameters.
   a. 5 b. 6 c. 7 d. 12

9. Differences in parallax in aerial photogrammetry can be used to determine _____.
a. Easting b. Elevation c. Elevation change d. Northing

10. _____ regulates the pixel size of the image.
a. Flying Height b. Speed of the aircraft
c. Sensor Size d. Overlap percent

11. _____ fiducial marks are measured on a photograph to correct for film deformation using Affine transformation.
a. Two b. Three c. Fours d. Six

12. For the same number of pixels in an image, _____.
a. The smaller size of the CCD provides a clearer image
b. The larger the size of the CCD provides a clearer image
c. Image quality is independent of the CCD size.
d. A smaller size of CCD means a smaller focal length of the camera.

13. In reference to the datum, the displacement is inward for the points whose elevation is _____ and the displacement is outward for the points whose elevation is _____.
a. Above and above b. Above and below
c. Below and above d. Below and below

14. In Close Range Photogrammetry, _____ algorithm is not generally used.
a. BBA b. GSIFT c. SURF d. CSIFT

15. For the production of high-accuracy DTM of a smaller area with a limited budget _____ technique is appropriate.
a. Field surveying b. Photogrammetry c. LiDAR d. Map scanning

16. When an image of a red-colored object is captured with a camera having a blue filter, the object appears _____.
a. Black b. Blue c. Green d. Red

17. Which of the following has the highest degree of complexity for photo interpretation?
a. Association b. Color c. Shadow d. Texture

18. Cross-correlation Area-based image matching:
a. Considers the geometric transformation in the corresponding images
b. Deals with translation only
c. Is more accurate
d. The template looks for grey value change and translation as well as the rotational parameters and scale change between the image patch

19. A _____ (left and right) combination is the best for an Analgraph.
a. Cyan Red b. Cyan Blue c. Red Cyan d. Red Green

20. _____ lenses can go as wide as 10mm or even wider in some cases.
a. Narrow-angle lens b. Normal angle lens
b. Wide-angle lens d. Ultra-wide-angle

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2 & 31st 2024

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SECTION "B"
[6 Q. × 4 = 24 marks]

Attempt ANY SIX questions.

1. Describe the latent image. Shortly explain the steps of processing a Black and White emulsion. [2+2]

2. How can the height of a building be estimated using stereo parallax? Describe using numerical calculations and necessary diagrams. [1+3]

3. Explain feature-based matching with an example. For what purpose are image pyramids used? [2.5+1.5]

4. Explain absolute orientation with the necessary formula and diagram. [4]

5. What is the relationship between camera focal length and image scale? Describe with a numerical example. Assume appropriate values. [4]

6. What precautions need to be taken in Close Range Photogrammetry? List out the errors that may take place during image acquisition in order of their occurrence. [2+2]

7. Write short notes on:
   a. Vignetting effect
   b. Advantages of pre-pointing GCP

SECTION "C"
[2 Q × 8 = 16 marks]

Attempt ALL questions.

8. Derive the Collinearity equation. Differentiate true orthophoto and conventional orthophoto. [5+3]

OR

What is the purpose of using differential rectification? Explain the differential rectification process in detail with the necessary diagrams. List out the influencing factors for improved geometric quality of orthophotos. [2+4+2]

9. The scale of an aerial photograph is 1:10,000. The photograph size is 20cm × 20 cm. Determine the number of photographs and exposure interval to cover an area of 15 km × 15 km if the forward overlap is 70%, side overlap is 40 %, and the velocity of the aircraft is 250km/hr. Also, draw a neat diagram to show the locations of the exposure stations.