

Chigee Sharon Chombo

Model Answers

Question 1

- a) - Shape of object, which relates to the general form, configuration of an individual object
- Size, varies with photo scale
 - pattern, relates to the spatial arrangement of objects. The repetition of certain general forms is characteristic of many objects both natural and man made. (parking for cars)
 - Tone, refers to color or relative shades of gray of images. It is related to reflectance of light from objects
 - Texture, the frequency of tone changes in photographic images. It is product of their individual shape, size, pattern, shade, tone
 - Shadows, the shape or outline of a shadow affords a profile view of objects
 - Site or location of objects in relation to other features
- b) - Type of camera has to be suitable for a purpose required
- Camera calibration parameters should be available
 - Type of photographic emulsion, good stable film support, suitable filters
 - Limitation on the amount image blurring due to camera and aircraft motion
 - Selection of suitable flying height due to technique to be employed and nature of terrain
 - Photographic overlap should fit required task. The most common is 60% and 20% for end and side overlap respectively. To increase accuracy of aerial triangulation end and side overlap are sometimes increased
 - Tilt and crab of photos within 3 degrees and 5 degrees, respectively
 - Proper direction of flight lines
 - The use of auxiliary instruments
 - Time of photography
 - Stereoscopic plotter consideration
 - Calibration data

Question 2

- a) Perspective projection is obtained by projecting an object to a projection plane with a bundle of rays from projection center located in finite distance from the projection plane. Angular relations between object features and image features are not the same.
- Orthogonal projection is the parallel projection of an object to the chosen plane (map)

Question 3

- a) - f-number is the ratio of focal length 'f' to a lens opening 'd'
- aperture is a lens opening with a diameter d which regulates the amount of light which enters to the objective and exposes the photographic film
 - illuminance is a degree of brightness received per unit area of the image plane during exposure

Question 5

- a) x-parallax is the change in position of an image from one photo to the next caused by aircraft's motion

Points A and B are imaged on two overlapped photos as a'b' and a''b''. Because point B is higher (closer to camera) than A, the movement of image b'' across the image plane was greater than a''. It means that the parallax of point B, $pxb = x'b - x'b''$ is greater than A, $pxa = x'a - x'a''$. The parallax of any point is related to the elevation of the point (greater for higher points)

Question 4

- b)
- i) Stereoscopic depth perception is a function of the parallactic angles. Parallactic angle is the angle of intersection of optical axes that converge on a certain point. The nearer the object the greater the parallactic angle and vice versa. The depth between object A and B (DB-DA) is perceived as the difference in their parallactic angles (QA-QB)

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