

## **PGD – ASSIGNMENT on Geometry of Aerial Photography**

**Semester 1 - September 2026**

- Q1.** What do you understand by the term “Aerial Photography”? What are factors that influence aerial photography?
- Q2** Differentiate between “Aerial photography” and “Aerial Photogrammetry”.
- Q3** Describe the various type of distortions in an aerial photograph?
- Q4** Explain Relief displacement and its impact on aerial photography with an example.
- Q5** Explain and show with diagram Geometry of tilted photography (indicates the position of principal point, nadir point and isocenter on photograph and ground along with geometrical parameters).
- Q6** Describe the concept of scale of aerial photograph with respect to (a) ground distance, (b) focal length, (c) variable ground elevation. Derive equation for calculation of scale of photograph over varying terrain?
- Q7** A camera with focal length of 152.35mm and a picture size 230 X 230 mm is used to photograph an area from an altitude of 2400m above sea level. The average ground elevation is 420m above sea level.
1. What is the average scale of the photography?
  2. Determine the amount of ground area covered by single photograph.
- Q8.** The distance between two-road intersections on an aerial photograph is 6.50cm, and the same distance measures 2.30 cm on a map with a scale of 1:50,000. What is the approximate scale of photograph?
- Q9** If the length of the shadow measured on the photograph is equal to 2.8mm, the scale of photography is 1:15,000 and the angle  $\Theta$  is equal to  $36^\circ$ . Calculate the height of the tree.
- Q10** If the length of the shadow measured on the photograph is equal to 3 cm, the scale of photography is 1:4,500 and the angle  $\Theta$  is equal to  $60^\circ$ . Calculate the height of the building.
- Q11** Suppose you have an aerial photograph which shows a radio antenna, which is 125m tall. The length of shadow of the antenna on the photograph is 1.68 cm. How tall would a chimney on the same photograph if the length of the shadow of chimney is 1.25cm.
- Q12** Derive the relief displacement formula and show the geometry of relief displacement in a vertical photograph with diagram.

**Q13** Following figure indicates displacement/displaced images of the hypothetical objects.

Scale  $RF = 1/1,500$ ; (focal length of camera)  $F = 6''$  (inches) and height of aircraft above ground level – 500m.

- Object (a) with a radial displacement ( $d$ ) = 0.70mm and radial distance ( $r$ ) = 4.25mm measured on photo.
- Object (b) with a radial displacement ( $d$ ) = 2mm and ( $r$ ) = 1.25mm
- Object (c) with ( $d$ ) = 0.44mm and ( $r$ ) = 4.89 mm
- Object (d) with ( $d$ ) = 1.31 mm and ( $r$ ) = 4.44mm

Calculate the height of each object.

**Q14** On an aerial photograph taken at an altitude of 1,500m, the relief displacement of the image of a flagpole was measured as 1.6 cm. The distance from the center of the photograph to the image of the top of the flagpole is 11 cm. If the base of the flagpole is at an elevation of 200m above datum, what is height of flagpole?

**Q15** The top and foot of a tower is imaged at distance 87mm and 47mm from the center of vertical aerial photograph. The flying height of the aircraft is 1,500 meters. Find the height of tower.

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