

# Unit 7 - Week 5: Error, Accuracy, and Adjustments Computations, GPS & Photogrammetry

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## Assignment 5

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

**Due on 2020-03-04, 23:59 IST.**

1) For a set of observations, the variance matrix is found out to be  $\begin{bmatrix} 2 \\ 3 \\ 4 \end{bmatrix}$  with weights of 2, 3, and 4. The degree of freedom is given as 1. Find the posteriori variance of the observation. **1 point**

- a. 90
- b. 93
- c. 96
- d. 99

No, the answer is incorrect. Score: 0 Accepted Answers: a. 99

2) Consider following two statements: Statement 1: Degree of freedom exists when system of equations are overdeterminate. Statement 2: Degree of freedom for a given set of observations of a variable is given by the formula  $DOF=N-1$ , where N is the number of observations. **1 point**

- a. Statement 1 is true and statement 2 is false
- b. Both statement 1 and statement 2 are true
- c. Statement 1 is false and statement 2 is true
- d. Both Statement 1 and statement 2 are false

No, the answer is incorrect. Score: 0 Accepted Answers: b. Both statement 1 and statement 2 are true

3) For a particular set of observations, the average error for an observation is found out as 43.4 and it is noted that a particular observation has error of 57.71%. What is the standard error of the observation? **1 point**

- a. 43.4
- b. 54.39
- c. 57.71
- d. 50.71

No, the answer is incorrect. Score: 0 Accepted Answers: b. 54.39

4) A distance is measured four times as: 7.96 m, 7.89 m, 7.77 m, 7.98 m Find the average error and the probable error of the observations respectively. **1 point**

- a. 0.054 and 0.0656
- b. 0.064 and 0.0756
- c. 0.0756 and 0.064
- d. 0.0656 and 0.054

No, the answer is incorrect. Score: 0 Accepted Answers: c. 0.0756 and 0.064

5) What is the value of the mean square positional error for a 2D observation with  $\sigma_{min} = 0.0138$  and  $\sigma_{max} = 0.0165$ ? **1 point**

- a. 0.0415
- b. 0.0315
- c. 0.0215
- d. 0.0115

No, the answer is incorrect. Score: 0 Accepted Answers: c. 0.0215

6) Consider following two statements: Statement 1: The standard deviation for a set of observations is the same as the standard deviation for the errors introduced in the observations. Statement 2: The average error of a set of observations is the same as that of the average of the observations. **1 point**

- a. Statement 1 is false and statement 2 is true
- b. Both statement 1 and statement 2 are true
- c. Statement 1 is true and statement 2 is false
- d. Both Statement 1 and statement 2 are false

No, the answer is incorrect. Score: 0 Accepted Answers: c. Statement 1 is true and statement 2 is false

Read the following and choose the correct option for questions Q 7, and Q 8. While plotting a parabola, the following measurements are made for variable x and y:  $(x, y) = (4.6, 5.5), (4.5, 5.5), (4.4, 5.7), \text{ and } (4.7, 5.6)$

7) While plotting a parabola, the following measurements are made for variable x and y:  $(x,y)=(4.6,5.5),(4.5,5.5),(4.4,5.7), \text{ and } (4.7,5.6)$  What is the value of the circular standard error? **1 point**

- a. 0.11235
- b. 0.12435
- c. 0.13635
- d. 0.14835

No, the answer is incorrect. Score: 0 Accepted Answers: a. 0.11235

8) While plotting a parabola, the following measurements are made for variable x and y:  $(x,y)=(4.6,5.5),(4.5,5.5),(4.4,5.7), \text{ and } (4.7,5.6)$  What is the value of the circular probable error? **1 point**

- a. 0.032
- b. 0.132
- c. 0.232
- d. 0.332

No, the answer is incorrect. Score: 0 Accepted Answers: b. 0.132

9) The standard deviation for a set of observations in the 3 dimensional are given as  $\sigma_x = 0.065, \sigma_y = 0.055, \sigma_z = 0.079$  What is the value of the Spherical Accuracy Standard (SAS)? **1 point**

- a. 0.066
- b. 0.098
- c. 0.168
- d. 0.298

No, the answer is incorrect. Score: 0 Accepted Answers: c. 0.168

10) What is the time that is used to track a Medium Earth Orbit satellites from Earth? **1 point**

- a. Solar time
- b. Sidereal time
- c. Average of both sidereal and solar time
- d. Greater of the sidereal and solar time

No, the answer is incorrect. Score: 0 Accepted Answers: b. Sidereal time

11) Suppose we are in a country in the Northern hemisphere. Consider following two statements regarding satellites and choose the correct option: Statement 1: Geosynchronous satellites move in an inclined orbit located in high Earth orbits but completes one revolution in a solar day. Statement 2: Geostationary satellites move over equator in high Earth orbits but completes one revolution in a sidereal day. **1 point**

- a. Statement 1 is correct and statement 2 is wrong
- b. Statement 1 is wrong and statement 2 is correct
- c. Both statement 1 and statement 2 are correct
- d. Both statement 1 and statement 2 are wrong

No, the answer is incorrect. Score: 0 Accepted Answers: b. Statement 1 is wrong and statement 2 is correct

12) Which of the following two GNSS constellations make combinations of Medium Earth Orbit and High Earth satellites? **1 point**

- a. GLONASS and NAVSTAR
- b. IRNSS and GLONASS
- c. NAVSTAR and IRNSS
- d. IRNSS and NAVSTAR

No, the answer is incorrect. Score: 0 Accepted Answers: c. NAVSTAR and IRNSS

13) How much angular distance does an IRNSS satellite system complete from January 1, 2018 at 5:00 PM UTC to January 4, 2018 at 5:00 AM UTC. **1 point**

- a. 180°
- b. 360°
- c. 720°
- d. 900°

No, the answer is incorrect. Score: 0 Accepted Answers: d. 900°

14) If a transmitted signal from a satellite takes 3 milliseconds for travelling through space to Earth surface, what could be the orbit of satellite used? **1 point**

- a. Low orbit satellite
- b. Medium orbit satellite
- c. Geosynchronous satellite
- d. Geostationary satellite

No, the answer is incorrect. Score: 0 Accepted Answers: a. Low orbit satellite

15) Match the following satellite constellations with their corresponding number of satellites: **1 point**

Satellite systems	number of satellites
A. GLONASS	1. 30
B. IRNSS	2. 24
C. Galileo	3. 7
D. QZSS	4. 8

- a. A-4, B-3, C-2, D-1
- b. A-3, B-4, C-2, D-1
- c. A-2, B-4, C-1, D-3
- d. A-1, B-2, C-3, D-4

No, the answer is incorrect. Score: 0 Accepted Answers: c. A-2, B-4, C-1, D-3

16) What can be the accuracy in the horizontal direction if the vertical accuracy in the acquisition of the GPS data is taken as 0.26 m? **1 point**

- a. 0.50 m
- b. 0.30 m
- c. 0.26 m
- d. 0.13 m

No, the answer is incorrect. Score: 0 Accepted Answers: d. 0.13 m

17) Consider following two statements: Statement 1: All images are photographs. Statement 2: All photographs are images. **1 point**

- a. Both statement 1 and statement 2 are true
- b. Statement 1 is true and statement 2 is false
- c. Statement 1 is false and statement 2 is true
- d. Both statement 1 and statement 2 are false

No, the answer is incorrect. Score: 0 Accepted Answers: c. Statement 1 is false and statement 2 is true

18) Consider following two statements: Statement 1: In analog photogrammetry, two relatively oriented images are projected using intersection of rays. Statement 2: In analytical photogrammetry, two digitized images are used for stereoscopic vision. **1 point**

- a. Both statement 1 and statement 2 are true
- b. Statement 1 is true and statement 2 is false
- c. Statement 1 is false and statement 2 is true
- d. Both statement 1 and statement 2 are false

No, the answer is incorrect. Score: 0 Accepted Answers: a. Both statement 1 and statement 2 are true

19) Four optical cameras A, B, C and D have same FOV but different focal lengths of 20 cm, 25 cm, 30 cm and 40 cm respectively. Which of them will be the best fit for scanning a large area? **1 point**

- a. A
- b. B
- c. C
- d. D

No, the answer is incorrect. Score: 0 Accepted Answers: a. A

20) Consider following two statements: Statement 1: f- number determines the image brightness. Statement 2: Aperture size controls amount of sunlight into camera. **1 point**

- a. Both statement 1 and statement 2 are true
- b. Statement 1 is true and statement 2 is false
- c. Statement 1 is false and statement 2 is true
- d. Both statement 1 and statement 2 are false

No, the answer is incorrect. Score: 0 Accepted Answers: a. Both statement 1 and statement 2 are true

21) Suppose we need to take a brighter image that is brighter as compared to other images, which of the following actions is needed to be performed to do this? **1 point**

- a. Decrease the focal length
- b. Increase the shutter speed
- c. Increase the ISO number
- d. Decrease the sensor size

No, the answer is incorrect. Score: 0 Accepted Answers: c. Increase the ISO number

22) Find the focal length of a full frame sensor if the focal length of the cropped sensor is 6 cm and crop factor is given by 2. **1 point**

- a. 2.28 cm
- b. 4.48 cm
- c. 6.48 cm
- d. 8.48 cm

No, the answer is incorrect. Score: 0 Accepted Answers: d. 8.48 cm

23) Consider following two statements: Statement 1: The order of frequency range of Electromagnetic spectrum is of order of  $10^{-4}$  to  $10^{19}$  Hz for photogrammetry. Statement 2: The output of a process where in a light from an object sensitize the light sensitive material is known as photo. **1 point**

- a. Both statement 1 and statement 2 are true
- b. Statement 1 is true and statement 2 is false
- c. Statement 1 is false and statement 2 is true
- d. Both statement 1 and statement 2 are false

No, the answer is incorrect. Score: 0 Accepted Answers: a. Both statement 1 and statement 2 are true

24) Consider following two statements: Statement 1: Analog photogrammetry cannot develop 3D models in a map coordinate system because it uses hardware instrument like stereoplotter and hard copy photographs. Statement 2: Digital photogrammetry cannot use the scanned images (and only images by digital cameras) on digital computers. **1 point**

- a. Both statement 1 and statement 2 are true
- b. Statement 1 is true and statement 2 is false
- c. Statement 1 is false and statement 2 is true
- d. Both statement 1 and statement 2 are false

No, the answer is incorrect. Score: 0 Accepted Answers: d. Both statement 1 and statement 2 are false

25) Consider following two statements: Statement 1: Collinearity equation develops relation between object point on ground, image point on positive and image point on negative. Statement 2: Image point on negative, image point on positive and object point on ground are collinear in an imaging process of photogrammetry. **1 point**

- a. Both statement 1 and statement 2 are true
- b. Statement 1 is true and statement 2 is false
- c. Statement 1 is false and statement 2 is true
- d. Both statement 1 and statement 2 are false

No, the answer is incorrect. Score: 0 Accepted Answers: c. Statement 1 is false and statement 2 is true

26) Consider following two statements: Statement 1: A film that is carrying information about the terrain, can be converted to digital images only through scanning and so the scanning resolution will be final pixel size of digital image. Statement 2: Digital images are acquired by digital camera by generating an electric current from light photons and directly converting it to digital numbers. **1 point**

- a. Both statement 1 and statement 2 are true
- b. Statement 1 is true and statement 2 is false
- c. Statement 1 is false and statement 2 is true
- d. Both statement 1 and statement 2 are false

No, the answer is incorrect. Score: 0 Accepted Answers: b. Statement 1 is true and statement 2 is false

27) Consider following two statements: Statement 1: A small sized image (less than 35mm format) also have small focal length. Statement 2: Consumer grade stereo cameras (digital) acquire two images with some overlap to create 3D information of object surface. **1 point**

- a. Both statement 1 and statement 2 are true
- b. Statement 1 is true and statement 2 is false
- c. Statement 1 is false and statement 2 is true
- d. Both statement 1 and statement 2 are false

No, the answer is incorrect. Score: 0 Accepted Answers: a. Both statement 1 and statement 2 are true

28) Consider following two statements: Statement 1: If a tripod is used as platform to mount a camera and used on a highest point of fort to acquire photographic information, it should be considered as photogrammetry from low altitude. Statement 2: Difference between low altitude photogrammetry and aerial photogrammetry is only because of height of platforms in two types of photogrammetry. **1 point**

- a. Both statement 1 and statement 2 are true
- b. Statement 1 is true and statement 2 is false
- c. Statement 1 is false and statement 2 is true
- d. Both statement 1 and statement 2 are false

No, the answer is incorrect. Score: 0 Accepted Answers: d. Both statement 1 and statement 2 are false

29) Consider following two statements: Statement 1: Resolving power of lens is same as pixel size of an image. This means that higher resolving power of lens will have smaller pixel size of image Statement 2: Dividing or resampling an image pixel into 4 parts will increase the resolution of image. **1 point**

- a. Both statement 1 and statement 2 are true
- b. Statement 1 is true and statement 2 is false
- c. Statement 1 is false and statement 2 is true
- d. Both statement 1 and statement 2 are false

No, the answer is incorrect. Score: 0 Accepted Answers: b. Statement 1 is true and statement 2 is false

30) Consider following two statements: Statement 1: Increase in focal length, decreases the FOV of camera but increases coverage of image for a certain target on object surface. Statement 2: Increase in focal length, increases resolution of image, due to higher resolution of image. However, due to higher resolution each pixel represents smaller distance and overall coverage of the image is smaller **1 point**

- a. Both statement 1 and statement 2 are true
- b. Statement 1 is true and statement 2 is false
- c. Statement 1 is false and statement 2 is true
- d. Both statement 1 and statement 2 are false

No, the answer is incorrect. Score: 0 Accepted Answers: c. Statement 1 is false and statement 2 is true