Q8: A: Choose the correct answer:

1. The Landsat 2 was at Lat 00°00 00 and Long 63°00 00 W on Day 2 orbit 6. The Landsat 2 will pass a point at Lat 00°00 00 and Long 65°41' 54.20'' W in..... The radius of the Earth = 6370 km.

   a) Day 4 and orbit 6.
   b) Day 3 and orbit6.
   c) Day 1 and orbit 6.
   d) Day 5 and orbit 6.

2. For one remote sensing mission, the angle between the scan line and the line between the aircraft and the cell is 43°; the flying height from the terrain is 2000m and the area of the spatial resolution is 300 m^2. The Instantaneous field of view will be.....

   a) 0.0076 rad.
   b) 0.0023 rad.
   c) 0.0009 rad.
   d) 0.0055 rad.

3. After 24 hours the Landsat satellite will have completed ..... orbits.

   a) 16
   b) 22
   c) 14
   d) 20

4. The orbit period for SPOT satellite is.....

   a) 105.8 minutes.
   b) 101.4 minutes.
   c) 103.1 minutes.
   d) 107.5 minutes.

5. The wavelength range of Infrared region is.....

d) Edited easily.

5. In GIS ,..... is a common format which is used for modelling of surfaces or train through (x,y) and value (z).
   a) 2 Dimensional (2D).
   b) 3 Dimensional (3D).
   c) 2.5 Dimensional (2.5D).
   d) 4 Dimensional (4D).

Q7: Answer the followings with **True** or **False**

1. When an electro-magnetic wave enters a denser medium, the wave bends away from the normal.
2. Chlorophyll in green vegetation absorbs mainly in the visible region of the EMR spectrum.
3. The blue color of sky is a result of scattering of blue color waves.
4. When an electron absorbs energy from a photon, it jumps to a lower energy level.
5. Microwaves are more powerful than ultra-violet waves.
6. The energy in one photon depends upon its wavelength.
7. Hyper spectral sensors usually have 4 spectral bands.
8. Compare with most of the Earth surface, water is warmer during the night and cooler during the day.
9. All bodies radiate.
10. Hotter bodies radiate more at all wavelengths.
11. Radiation from a hotter body peaks at a longer wavelength than from a cooler body.
12. A good absorber is a good emitter.
13. A good absorber is a good reflector.
14. when doing an image stretch, pixel value of the original image also changed.
15. purpose of principle components analysis is to compress the much correlated image information into uncorrelated (or less correlated) datasets.

$\theta 10 = 60°32'05''$; $\theta 11 = 118°23'50''$; $\theta 12 = 59°03'10''$

Determine the most probable values of the angles assuming that the angles are of same reliability and have been adjusted for station adjustment and spherical excess.

Q6: Choose the correct answer:

1. In raster data, the cell size can be adjusted according to the .....
   a) Grid structure.
   b) Intensity.
   c) Spatial accuracy.
   d) Feature type.

2. In vector format only..... are stored.
   a) Polylines.
   b) Polygons.
   c) Nodes and vertices.
   d) Cells.

3. In Geographic Information System (GIS), spatial data preparation aims make the acquired spatial data .....
   a) More useful.
   b) More important.
   c) Simple.
   d) Fit for use.

4. The relational databases offer significant advantages over flat file databases because the data can be.....
   a) Linked between fields.
   b) Deleted straightforward.
   c) Updated quickly.

c. 2^h

d. 0°

5. When the maximum altitude of the Sun give a shadow of 1.5 meter long to a range pole 2 meter tall. Compute the minimum width of the Sun-shade slab placed over a window 2 meter high to prevent the Sun rays from interring the room?

   a. 1.5 m

   b. 2 m

   c. 2.5 m

   d. 3 m

Q4: What is meant by the following specifications and their typical values for commercial LiDAR systems:

a. Scan rate/frequency,

b. Pulse rate/frequency,

c. Ground spacing,

d. Wavelength,

e. Scan pattern, and

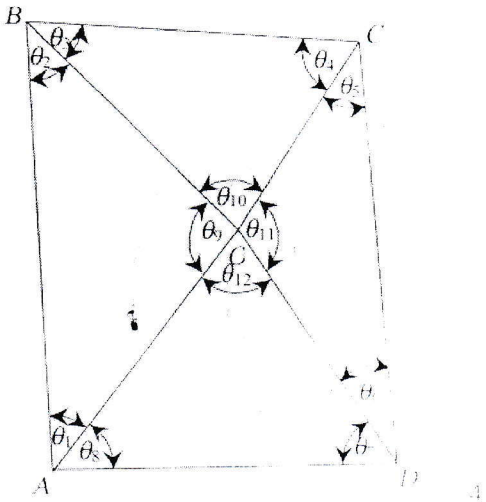
f. Beam divergence?

Q5: The figure on the right shows a quadrilateral ABCD with a central station O. The angles measured are as below:

θ1= 29°17′00″; θ2= 28°42′00″; θ3= 62°59′49″;

θ4= 56°28′01″; θ5= 29°32′06″; θ6= 32°03′54″;

θ7= 59°56′06″; θ8= 61°00′54″; θ9= 122°00′55″;



b. 15 seconds.

c. 5 seconds.

d. 1 second.

5. The basic configuration of the kinematics point positioning with phase ranges is identical with that for ..... .

a. DGNSS with code ranges

b. DGNSS with phase ranges

c. kinematic point positioning with phase ranges

d. relative positioning

B:

1. If the declination "δ" of a star is $50^\circ\ 30'$, compute at what latitude so that leads to make the altitude & the zenith distance of the star are equal?

   a. $5^\circ\ 30'$

   b. $55^\circ\ 30'$

   c. 55°

   d. 90°

2. If the horizontal angle from the flag "M" to Polaris is $232^\circ 30'$, and the declination of Polaris is $88^\circ 30'$. The Azimuth of flag "M" will equal to 126° if Polaris was observed at:

   a. Upper transit

   b. Eastern elongation

   c. Lower transit

   d. Western elongation

3. What is the GMT when the LMT equals to $0^h\ 4^m$ of a place having a longitude of 1° E?

   a. 12^h pm

   b. 0^h am

   c. $0^h\ 4^m$

   d. $0^h\ 4^m$ am

4. What is the Local Hour Angle of the Sun at Longitude of $30^\circ E$ if the GMT is 0^h?

   a. 14^h

   b. 180°

d) Locally.

4. One example of isopleth map is.....

   a) Contour map.
   b) Road map.
   c) Climate map.
   d) Political map.

5. The UTM zone numbers designate..... longitudinal strips.

   a) 5 degree.
   b) 7 degree.
   c) 6 degree.
   d) 4 degree.

Q10: In terrestrial photogrammetry, two-camera stations are located at the ends of a base, which are 191.46m long, measured horizontally. Photographs have been taken in the normal case photography. The height of each camera is 177.82 m. The camera focal length is 172.20 mm. The coordinates of the points A and B are measured on the left and right photographs.

Image coordinates measured on the left hand photograph are;

xa= -27.21 mm. xb= 91.22mm.

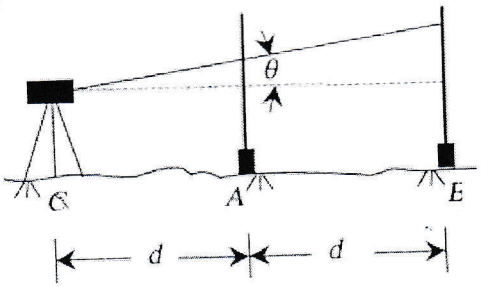
ya= 8.95 mm. yb= -21.80 mm.

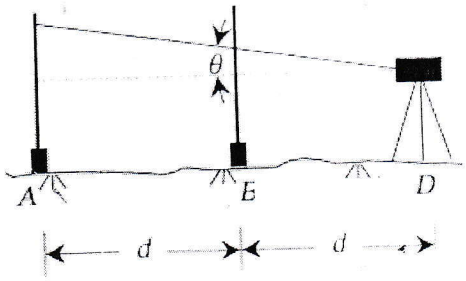
The coordinates of the points A and B measured on the right hand photograph are;

xa'= -81.70 mm. xb'= 50.20 mm.

ya= 8.95 mm. yb= -21.80 mm.

Determine the ground coordinates and elevation of A and B. Calculate the distance between these two points.





Q3: Fill in the blanks with the correct answer:

A:

1. The GPS and GLONASS daily and hourly ground observations are uploaded with sample interval of .....
   a. 15 min
   b. 5 sec
   c. 30 sec
   d. 5 min
2. The coordinates resulting from GPS measurements are in the system of the ..... when broadcast ephemerides information are based for positioning
   a. ITRF
   b. WGS 1984
   c. PZ-90
   d. NAD 83
3. Tracking (minimum) 2 satellites over three epochs ($n_t = 3$) would theoretically be sufficient for ..... .
   a. Kinematic Point Positioning with code range model.
   b. static point positioning with code range model.
   c. kinematic Point Positioning with carrier Phase Model.
   d. relative positioning.
4. Daily and hourly GPS & GLONASS observations can be obtained from the Crustal Dynamics Data Information System (CDDIS) with sampling interval of ..... .
   a. 30 seconds.

d. 5.75 m

5. Two sets of measurement were carried out to measure the length of the line AB. In the first set, 20 meters tape length was used number of times plus fraction distance of 35 cm. where in the second set, 19.98 meters tape length was used and plus fraction distance 51 cm. what is the length of AB?

   a. 160.0

   b. 80.0

   c. 160.35

   d. 80.35

Q9: Answer the followings with the correct choice:

1. The ratio between the area of a map on one scale and its area to another scale will be....., when reducing a map scale from 10,000 to 1:50,000.

   a) 1/36

   b) 1/16

   c) 1/35

   d) 1/25

2. A world map extends the length of a ten-inch atlas map page, and if you know that the earth's circumference is approximately 25000 miles, what's the map scale?

   a) 1:158400000

   b) 1:169200000

   c) 1:144100000

   d) 1:136500000

3. In geographic coordinates system, the z-coordinate is defined.....

   a) Universally.

   b) Geometrically.

   c) Gravitationally.

University of Baghdad
College of Engineering
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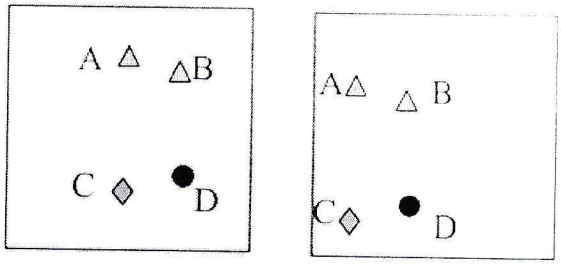
Competition Exam for Post-graduation Study Entry

Year: 2014-2015
Stage : MSc
Time: 3Hours

Note: Answer ALL questions!

Q1: Given the following stereo pair:



Four points were measured on both photos where:

- A and B are full control points (X, Y, and Z values are known),
- C is a vertical control points (only the Z value is known),
- D is a tie point (X, Y, and Z values are unknown).

You have no further information about the camera parameters or the exterior orientation parameters of the images.

1. Compute the balance between the unknown parameters and observations after clearly stating all assumptions you make. Comment on the result.
2. Sketch the structure of the design matrix(regardless of the result of the above balance).

Q2: In figure below, four stations C, A, B, and D were set out in a straight line such that CA=AB = BD = 30 m. A level was set up at C and readings of 2.135 and 1.823 were observed on vertically held staff at A and B, respectively, when bubble was at the center of its run. The level was then set up at Dand readings of 2.026 and 1.768 were again observed at A and B, respectively. Determine the collimation error of the level and correct difference in level of A and B.

a) 0.1 to 100 cm

b) 0.7 to 1000 μm.

c) 0.7 to 0.3 μm.

d) 0.1 to 20 cm.

B: Two grade lines meet in the station 32+15.25. If the slop of the first grade line equals to +3% and the slop of the second grade line equal to -2%, and the elevation of station 0+00.00 equals to 15.50 m. answer the following questions:

1. What is the elevation of the station 32+15.25?
   a. 111.957
   b. 111.914
   c. 111.91
   d. 111.96
2. What is the elevation of the station that is away of 50 m from station 32+00.00?
   a. 111.263
   b. 111.265
   c. 111.26
   d. 111.20
3. You are asked to design a new grade line which contacts station 01+00.00 and station 35+00.00. What is the slop of this new grade line?
   a. 2.58%
   b. -2.58%
   c. 2%
   d. -2%
4. The length of the line AB was measured based on pacing method and equals to 17 m, and then the line AB was divided equally into three parts. What is the length of each part?
   a. 5.67 m
   b. 5.6 m
   c. 5 m