

***** EXAMINATION *****

DEFORMATION MONITORING AND CONTROL SURVEYING

1. **Control survey techniques are used to:**
 - a) formulate accurate, three-dimensional point positions
 - b) set USGS bench marks
 - c) compute construction budgets
 - d) control satellite positions

2. **A control survey establishes the**
 - a) horizontal and vertical positions of points for project control
 - b) location of seismic faults
 - c) positions necessary to generate a contour map
 - d) None of the above

3. **NGRS is:**
 - a) the National Geodetic Reference Survey
 - b) the National Ground Reference Survey
 - c) the National Geodetic Reference System
 - d) the National Ground Reference System

4. **Sufficient accuracy for Army Corp of Engineers construction work is:**
 - a) First-order
 - b) Second-order
 - c) Third-order
 - d) Fourth-order

5. **Control surveys should be monumented:**
 - a) permanently
 - b) temporarily
 - c) replaceable
 - d) None of the above

6. **Surveys performed using the initial control survey may include:**
 - a) levee profiling
 - b) grade control
 - c) environmental studies
 - d) All of the above

7. **Orthometric height is the:**
- a) horizontal distance of a point above or below the geoid
 - b) vertical distance of a point above or below mean sea level
 - c) vertical distance of a point above or below the geoid
 - d) horizontal distance of a point above mean sea level
8. **A horizontal datum may be**
- a) a plane
 - b) an ellipsoid
 - c) a sphere
 - d) Any of the above
9. **Mean low water elevations are utilized for:**
- a) construction surveys
 - b) dredging projects
 - c) geodetic surveys
 - d) topographic surveys
10. **Mean high water elevations are utilized for:**
- a) construction projects involving bridges and tunnels
 - b) geodetic surveys
 - c) topographic surveys
 - d) photogrammetric surveys
11. **State plane coordinate systems were developed to provide a:**
- a) geodetic representation of the earth's surface
 - b) planar representation of the earth's surface
 - c) spherical representation of the earth's surface
 - d) elliptical representation of the earth's surface
12. **Transverse Mercator projections are used in areas with:**
- a) limited north-south dimensions and limited east-west dimensions
 - b) limited north-south dimensions and unlimited east-west dimensions
 - c) unlimited north-south dimensions and limited east-west dimensions
 - d) unlimited north-south dimensions and unlimited east-west dimensions
13. **The origin of NAD 27 is defined relative to:**
- a) the center of the earth
 - b) the north and south poles
 - c) the Greenwich meridian
 - d) a fixed triangulation station in Kansas
14. **The mean radius of the earth is approximately**
- a) 25,000 miles
 - b) 8,000 miles
 - c) 20,906,000 feet
 - d) None of the above

15. **The angle between a true meridian and a magnetic meridian**
- a) at the same point is called magnetic declination
 - b) at the same point is called magnetic drift
 - c) at the same point is called magnetic convergence
 - d) at the same point is called the grid angle
16. **Three-point resection is a form of:**
- a) traversing
 - b) triangulation
 - c) trilateration
 - d) real-time intersection
17. **Direct leveling is often referred to as:**
- a) trigonometric leveling
 - b) differential leveling
 - c) bench mark leveling
 - d) None of the above
18. **Reciprocal leveling is a method used:**
- a) for crossing rivers
 - b) is a form of differential levels
 - c) is used when unbalanced sights are needed
 - d) All of the above
19. **Liquefaction can occur:**
- a) during earthquakes
 - b) in hydraulic fill dams
 - c) in embankments with layers of soils of fine grain size
 - d) All of the above
20. **Concrete deterioration:**
- a) may be caused by expansion
 - b) will not involve chemicals
 - c) is an insignificant factor
 - d) None of the above
21. **The abbreviation FIG stands for:**
- a) Federation of Industrial Surveyors
 - b) Federation of International Geographers
 - c) International Federation of Surveyors
 - d) None of the above
22. **The abbreviation IAG stands for:**
- a) International Association of Geodesy
 - b) International Association of Geografica
 - c) International Association of Geographers
 - d) None of the above

23. **The abbreviation ISM stands for:**
- a) International Survey Members
 - b) International Subsidence Monitoring
 - c) International Surface Monitoring
 - d) International Society for Mine Surveying
24. **The abbreviation ISRM stands for:**
- a) International Surveys of Robotic Monitoring
 - b) International Society of Rock Mechanics
 - c) International Society of Robotic Manufacturers
 - d) International Society of Robotic Mining
25. **Interferometry is used for:**
- a) topographic surveys
 - b) hydrographic surveys
 - c) geodetic surveys
 - d) property surveys
26. **Hydrostatic leveling is used for:**
- a) topographic surveys
 - b) hydrographic surveys
 - c) geodetic surveys
 - d) property surveys
27. **The use of an extensometer is considered:**
- a) a geotechnical measurement
 - b) a geodetic measurement
 - c) a topographic measurement
 - d) a hydrographic measurement
28. **The use of a strainmeter is considered:**
- a) a geotechnical measurement
 - b) a geodetic measurement
 - c) a topographic measurement
 - d) a hydrographic measurement
29. **Geotechnical measurements compared to geodetic measurements:**
- a) tend to be more localized
 - b) tend to be less localized
 - c) tend to be more precise
 - d) tend to be less precise
30. **Geotechnical instruments are:**
- a) less adaptable for automatic monitoring than geodetic instruments
 - b) more adaptable for automatic monitoring than geodetic instruments
 - c) more labor intensive once installed
 - d) None of the above

31. **Three hundred sixty degrees is equal to:**
- a) 100 gons
 - b) 200 gons
 - c) 300 gons
 - d) 400 gons
32. **Electronic theodolite errors include:**
- a) pointing the telescope
 - b) centering
 - c) environmental influences
 - d) All of the above
33. **An example of environmental influence on theodolites is:**
- a) freezing
 - b) ozone gases
 - c) atmospheric refraction
 - d) All of the above
34. **To eliminate the effect of refraction, repeat the surveys with:**
- a) different theodolites
 - b) different circle positions
 - c) inverted and direct readings
 - d) in different environmental conditions
35. **Computerized theodolites set the scale for coordinate systems by:**
- a) EDM
 - b) measuring short invar rods
 - c) trilateration
 - d) triangulation
36. **An advantage of photogrammetry for control monitoring is:**
- a) reduced time of field work
 - b) an unlimited number of points can be monitored
 - c) simultaneous provision of 3-D coordinates
 - d) All of the above
37. **A camera combined with a theodolite is called:**
- a) a geodetic camera
 - b) a stereoscope
 - c) a phototheodolite
 - d) None of the above
38. **A stereocamera system is:**
- a) two cameras mounted on a bar of known length
 - b) used to replace a stereoplotter
 - c) used to replace a stereoscope
 - d) used to replace a analygraph

39. **The accuracy of photogrammetric cameras depends on:**
- a) the accuracy of the determination of image coordinates
 - b) the focal length of the camera
 - c) the number of cameras used
 - d) None of the above
40. **A CCD sensor is:**
- a) a computer-character device
 - b) a computer-camera digitizer
 - c) a charge couple device
 - d) None of the above
41. **Alignment surveys are an application:**
- a) for measuring highway profiles
 - b) of the tooling industry
 - c) for measuring pipelines
 - d) All of the above
42. **An application of the extensometer is to measure:**
- a) distance to determine the compaction of soil
 - b) distance to determine the upheaval of soil
 - c) distance to determine the convergence of walls in structures
 - d) All of the above
43. **An instrument that measures tilt is called:**
- a) an inclinometer
 - b) a level
 - c) an alidade
 - d) a interferometer
44. **A kind of mechanical plumbing used to control vertical structures is:**
- a) inverted plumb lines
 - b) alidade
 - c) level
 - d) None of the above
45. **Deflections of a dam are measured by:**
- a) theodolites
 - b) GPS
 - c) inverted plumb lines
 - d) All of the above
46. **Foundation subsidence and tilts are measured:**
- a) with theodolites
 - b) with geodetic leveling
 - c) with GPS
 - d) All of the above

47. **Strain measurements are performed using:**
- a) strain gauges
 - b) theodolites
 - c) GPS
 - d) leveling
48. **The advantage of computerized data acquisition for measuring is:**
- a) less personnel
 - b) more frequent readings
 - c) retrieval of data from remote or inaccessible locations is possible
 - d) All of the above
49. **The limitation of a computerized data acquisition for measuring is:**
- a) excessive data may be generated
 - b) less speed in acquisition
 - c) less security is need to guard the system
 - d) All of the above
50. **Theodolites in computerized monitoring systems have been replaced by:**
- a) GPS
 - b) levels
 - c) thermocouples
 - d) All of the above
51. **A monument used for deformation monitoring must not move over:**
- a) 0.1 mm horizontally and vertically
 - b) 0.3 mm horizontally and vertically
 - c) 0.5 mm horizontally and vertically
 - d) 0.7 mm horizontally and vertically
52. **The theodolite measuring to prisms is placed:**
- a) on the deformation structure
 - b) on the deformation structure or a reference point
 - c) on a reference point outside of the structure
 - d) None of the above
53. **Deformation monuments shall be:**
- a) installed at a depth equal to the frost line
 - b) installed at twice the depth of the frost line
 - c) installed at three times the depth of the frost line
 - d) installed at four times the depth of the frost line
54. **The nominal diameter of a cast-in-place reinforced concrete pile:**
- a) monument shall have a diameter of at least 20 cm.
 - b) monument shall have a diameter of at least 40 cm.
 - c) monument shall have a diameter of at least 60 cm.
 - d) monument shall have a diameter of at least 80 cm.

55. **The height of the reference point above the ground is approximately:**
- a) 0.5 meter
 - b) 1.0 meter
 - c) 1.5 meters
 - d) 2.0 meters
56. **Leveling for deformation studies shall be made with:**
- a) a Frisco rod
 - b) a Philadelphia rod
 - c) a Lenker rod
 - d) an invar rod
57. **The instrument used for image coordinate measurement may be:**
- a) a monocomparator
 - b) a stereocomparator
 - c) an analytical stereocomparator
 - d) Any of the above
58. **The direction in which deflection observations are made will be:**
- a) parallel to the baseline
 - b) centered on the baseline
 - c) perpendicular to the baseline
 - d) Any of the above
59. **Large variations in theodolite deformation measurements indicate:**
- a) possible poor target centering
 - b) possible parallax
 - c) possible misleveling of the theodolite
 - d) All of the above
60. **All reductions of angular measurements should be checked:**
- a) in the field
 - b) in the office
 - c) by a computer
 - d) None of the above

GEOGRAPHIC INFORMATION SYSTEMS
 GEOGRAPHIC INFORMATION CENTER
 PO BOX 5839
 MC ALLEN, TEXAS 78502-5839

1-800-522-0139
 kh@acnet.net
 Copyright 2010

*** ANSWER SHEET *** U44 DEFORMATION MONITORING AND CONTROL SURVEYING	STATE BOARD	COURSE NO.	VALUE
	NJ LS	cc100013	8 PDH
	TX LS	476-086	8 PDH
Office Use Only			

FILL IN ONE BOX FOR EACH ANSWER.

	A	B	C	D
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

	A	B	C	D
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				

	A	B	C	D
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				

I hereby certify that I studied the course materials, and the above answers are my own. No other person has helped me to complete this exam.

 Signature

 Date

 Printed or typed name

 Seal or Number

**GEOGRAPHIC INFORMATION SYSTEMS
GEOGRAPHIC INFORMATION CENTER
PO BOX 5839
MC ALLEN, TEXAS 78502-5839**

**1-800-522-0139
kh@acnet.net
Copyright 2010**

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____ E-Mail _____

Fax _____ () 24-Hour Fax

() Yes () No If fax and telephone are the same number, shall we call first?

Mail certificates to above address _____ check address _____ envelope address _____

State + Specialty + PE Registration number (i.e. TX EE 12389) _____

State + Professional Land Surveying registration number _____

NC (North Carolina) + Specialty + PE Registration number _____

NC (North Carolina) + Land Surveying Registration Number _____

Professional Affiliations _____

Return this page with your answer sheet and a check or money order for \$100 per course. Use one check for each registrant (in your company) taking one or more courses. We accept company checks (if they are your employer's). We do not accept third-party checks or checks outside of your city of residence. Using third-party checks that do not include your name or company name may invalidate your professional development hours being reviewed by an audit process. Add \$5 for same day processing and priority shipping.

Make checks or money orders payable to Geographic Information Systems.

