Questions for module test №1 on discipline "Engineering geodesy"

1. Represent by horizontals the relief of the terrain with the height of section h=1m using the given elevations of points.

- \( \times 1K,1 \)
- \( \times 12,4 \)
- \( \times 1N,5 \)
- \( \times 11,9 \)

- \( \times 14,4 \)
- \( \times 1L,2 \)
- \( \times 12,1 \)

- \( \times 1L,2 \)
- \( \times 1N,1 \)
- \( \times 1K,4 \)
- \( \times 1L,9 \)

2. Determine the elevation of the point K on topographic map.
3. Determine the rectangular coordinates of the point K on topographic map.
4. Determine the geographic coordinates of the point K on topographic map.
5. Trace on the map the area of watershed for upstream part of the river from line R-S.

1. Modern view about figure and size of the Earth. Geoid. The Krasovsky’s ellipsoid. Radius of the sphere for figure of the Earth.


3. Method of horizontal projection of point of Earth’s surface.

4. Astronomical and geodetic coordinate system.

5. Gaus-Kryuger’s projection.

6. Distortion for Gaus-Kryuger’s projection.

7. The topographical plans and maps. The conventional signs, scales and accuracy of the scale plan and maps.

8. Topographical plans and maps. The image of the relief on topographical plans and maps.

9. Orientation line on terrain. The meridians for orientation line. The angles of the inclination and rapprochement of meridian.
10. Orientation line on terrain. The oriented angles: azimuths, directional angles and points.


12. Theodolite: principle scheme of the measurement of angles by theodolite, design and purposes of the main parts.

13. Theodolite, its design and purposes of the main parts and check.

14. Theodolite: measurement of horizontal and vertical angles and angles of the slopping by theodolite. The main sources of errors.

15. Measuring of distances: methods and accuracy of the distances measurement.


17. Measuring of the distances: optical methods of the distances measurement.


41. The meaning of the line measured by the steel tape is 200.00m. The angle of slope of the area during measurement was +4°00’, temperature of air $t_a = +25^\circ$C. Theoretical length of steel tape under temperature $t_k = +10^\circ$C is equal to 19.992m. Determine the actual length of the tape.

42. The meaning of the line measured by the steel tape is 300.00m. The angle of slope of the area during measurement was +3°00’, temperature of air $t_a = +20^\circ$C. Theoretical length of steel tape under temperature $t_k = +5^\circ$C is equal to 19.995m. Determine the actual length of the tape.

43. The point has ordinate $Y = 3\ 390\ 312$ m in the system of plane rectangular coordinates of Gaus-Kruger. Indicate: number of 6-degree zone; longitude of the central meridian of this zone; distance and direction of disposition (east or west from the central meridian).

44. The point has ordinate $Y = 6\ 690\ 312$ m in the system of plane rectangular coordinates of Gaus-Kruger. Indicate: number of 6-degree zone; longitude of the central meridian of this zone; distance and direction of disposition (east or west from the central meridian).
45. Given a triangle with inner angles: 60°, 70°, 50°. Determine the direction angles of triangle’s sides, if direction angle of the side 1-2 is equal to 60°38’.

46. Given a triangle with inner angles: 40°, 70°, 70°. Determine the direction angles of triangle’s sides, if direction angle of the side 1-2 is equal to 30°25’.

47. Determine length, orientation and inclination of line AB on the topographical map.

48. Determine correction on tape-line calibration, if the real length of comparator base \( D_k = 100.04 \text{m} \), and length, measured with tape-measure \( D_m = 100.06 \text{m} \) (number of measures of tape-measure \( n=5 \))

49. Determine correction on tape-line calibration, if the real length of comparator base \( D_k = 200.04 \text{m} \), and length, measured with tape-measure \( D_m = 200.06 \text{m} \) (number of measures of ruler \( n=10 \))

50. What radius has the Earth in spherical shape, if equally-large ellipsoid has dimensions of half axes \( a=6378 \text{km} \) and \( b=6357 \text{km} \)?

51. Indicate reduced bearings of directions, that have direction angles \( A_1=48° \) \( A_2=140° \) \( A_3=200° \) \( A_4= 290° \)

52. Given a direction angle \( A=40° \) of direction from point 1 to point 2 and left angle \( B=160° \) on point 2 in direction to point 3. Determine the direction angle in direction 2-3.

53. Find the place of zero of theodolite 2T30II, if countings from vertical circle for it’s positions Left and Right are correspondingly -6°56’ and +7°02’? Is the found zero place permissible?

54. Find the place of zero of theodolite 2T30II, if countings from vertical circle for it’s positions Left and Right are correspondingly -6°04’ and +6°02’? Is the found zero place permissible?

55. Determine the direction angle of A-B direction and horizontal distance \( d_{AB} \), if \( X_A=200 \text{m}, Y_A=300 \text{m}, X_B=300 \text{m}, Y_B=200 \text{m} \).

56. Determine the direction angle of A-B direction and horizontal distance \( d_{AB} \), if \( X_A=300 \text{m}, Y_A=200 \text{m}, X_B=200 \text{m}, Y_B=300 \text{m} \).

57. Draw the linear scales with base \( a=1 \text{cm} \) for such numerical scales: 1:1000; 1:5000. Which one of the scales is larger? Indicate the accuracy of these scales.

58. Draw the linear scales with base \( a=1 \text{cm} \) for such numerical scales: 1:2000; 1:25000. Which one of the scales is larger? Indicate the accuracy of these scales.
59. Draw the linear scales with base $a=1\text{cm}$ for such numerical scales: $1:50000; 1:100000$. Which one of the scales is larger? Indicate the accuracy of these scales.

60. Find the place of zero of theodolite T30, if countings from vertical circle for its positions Left and Right are correspondingly $-178^\circ58'\text{ and } +1^\circ08'$? Is the found zero place permissible?

61. Determine inaccessible distance across the river from point 1 to point 3, if the length of the basis, placed on the shore, is $b_{1,2}=100\text{m}$ and meanings of horizontal angles are $b_1=30^\circ\text{ b}_2=60^\circ$

62. Determine inaccessible distance across the river from point 1 to point 3, if the length of the basis, placed on the shore, is $b_{1,2}=100\text{m}$ and meanings of horizontal angles are $b_1=45^\circ\text{ b}_2=60^\circ$

63. Determine inaccessible distance across the river from point 1 to point 3, if the length of the basis, placed on the shore, is $b_{1,2}=100\text{m}$ and meanings of horizontal angles are $b_1=30^\circ\text{ b}_2=45^\circ$

64. Determine the temperature correction in line $D=60\text{m}$ measured by measuring tape under $t_a=+20^\circ\text{C}$. The temperature of calibration $t_k=+2^\circ\text{C}$, coefficient of linear expansion of steel is $1.25*10^{-5}$