Вопросы итогового контроля - зачет
по курсу «Профессиональная подготовка на английском языке»
«Аэрозоли в окружающей среде»
для магистров по направлению 022000 «Экология и природопользование», профиль «Экологические проблемы окружающей среды»

Variant 1

1. What are the sources of aerosols? (5 ball)
2. Why snow is used to study aerosols? (10 ball)
3. The atmospheric aerosol is: (5 ball)
   a) solid particles suspended in a gaseous medium
   b) liquid and solid particles suspended in a gaseous medium
   c) solid particles suspended in a liquid medium
   d) liquid particles suspended in a gaseous medium
4. What types of particles are referred to "fine"? (5 ball)
   a) greater than 2.5 µm in diameter
   b) smaller than 0,3 µm in diameter
   c) smaller than 0,1 µm in diameter
   d) less than 2.5 µm in diameter
5. Match values and the contamination level determined according to dust load value: (5 ball)
   1) less than 250 mg/m2•day: a) high contamination level;
   2) 450–850 mg/m2•day: b) very high contamination one;
   3) more than 850 mg/m2 day: c) middle contamination one;
   4) 250–450 mg/m2•day: d) low contamination one.

6. Calculate of dust load in the impact area of coal and gas fired power plant and analyze data. Background value – 7 mg/m^2 per day (10 ball)
Snow-up day: 01.11.2012
Sampling day 23.02.2013

Distance, m	Size of pit, cm^2	Weight of solid residue, g	P_n, mg/m^2 per day
730	35x34	0,633	
1000	32x30	0,7	
1300	42x32	0,474	
1600	37x30	0,48	
2000	32x30	0,481	

Variant 2

1. What are the sources of aerosols? (5 ball)
2. Characterize method of pit used for snow sampling. (10 ball)
3. How is dust defined? (5 ball)
   a) solid particles produced by disintegration processes
   b) liquid particles produced by disintegration processes
   c) solid particles suspended in a liquid medium
   d) solid and liquid particles produced by disintegration processes
4. What is the main source of tropospheric aerosols? (5 ball)

a) anthropogenic aerosols
b) oceanic and land surface
c) land surface
d) oceanic and land surface, anthropogenic emissions

5. What is coefficient concentration and choose its formula: (5 ball)
   a) $P_n = P_o \ / S \times t$;
   b) $KK = C / C_b$;
   c) $P_{total} = C \times P_n$;
   d) $K_p = P_{total} / P_b$;
   e) $Z_c = \sum KK - (n-1)$;
   f) $Z_p = \sum K_p - (n-1)$.
6. Calculate of concentration coefficient and analyze data. (10 ball)

Element concentration in the insoluble aerosols in snow in the impact area of coal and gas fired power plant, mg/kg

Distance, m	Hg	As	Co	Cr	Sr	Sb	Ba
730	0,32	17,73	18,46	96,81	417,4	6,03	863,4
1300	1,04	11,93	15,36	85,27	536,1	7,36	951,6
background	0.08	0.5	10.3	110	100	2.3	100

Variant 3

1. What classes of aerosol particles on their size are indicated? Give the examples. (5 ball)
2. What types of mineral components does the insoluble fraction of the aerosols in snow consist of? (10 ball)
3. What terms are atmospheric aerosols classified? (5 ball)
   a) in of their origin
   b) in of their mineral composition
   c) in of their chemical composition
   d) in of their origin and chemical composition
4. What are inhaled particles deposited in the nasopharyngeal tract? (5 ball)
   a) Less 10 µm
   b) Above 10 µm
   c) Less 5 µm
   d) Above 5 µm
5. What methods use to carry out snow sampling: (5 ball)
   a) core method full out of snow cover;
   b) pit method full out of snow cover, except 5 cm layer over soil;
   c) depth method full out of snow cover, except 5 cm layer over soil;
   d) with a help of a snow sorter, except 5 cm layer over soil.
6. Calculate of total pollution factor and analyze data. (10 ball)

Element concentration in the insoluble aerosols in snow in the impact area of coal and gas fired power plant, mg/kg

Distance, m	Hg	As	Co	Cr	Sr	Sb	Ba
1000	0,38	12,62	11,43	143,07	383,8	3,81	784,0
2000	0,30	24,71	23,74	73,10	563,3	6,27	841,6
Background	0,08	0,5	10,3	110	100	2,3	100

Variant 4

1. What are aerosols composed from in urban areas? (5 ball)
2. What types of the snow geochemical survey are used for snow contamination monitoring? (10 ball)
3. What is deference between fog and mists? (5 ball)
    a. Mists consist of liquid droplets, fog is dispersion of water close to the ground
    b. Fog consists of liquid droplets, which contain particles, mists is dispersion of water close to the ground
    c. Mists consist of particles, fog is dispersion of water close to the ground
    d. Mists consist of liquid droplets, which contain particles, fog is dispersion of water close to the ground
4. Choose the anthropogenic sources of aerosols: (5 ball)

a) Terrestrial dust
b) Transport
c) Sea spray
d) Fuel combustion
e) Industrial processes
f) Roadway dust

5. What is total pollution factor and choose its formula: (5 ball)

a) $P_n = P_o \ / S \times t$;

b) $KK = C / C_b$;

c) $P_{total} = C \times P_n$;

d) $K_p = P_{total} / P_b$;

e) $Z_c = \sum KK - (n-1)$;

f) $Z_p = \sum K_p - (n-1)$.

6. Calculate of total pollution factor and analyze data. (10 ball)

Element concentration in the insoluble aerosols in snow in the impact area of brickworks, mg/kg

Distance, m	Sm	Ce	Ca ,%	Lu	U	Th	Cr
200	6,6	73,1	2,1	0,46	3,1	9,3	111,4
1000	6,6	74,5	1,8	0,53	3,7	10,6	112,0
background	0,57	10,3	0,82	0,075	0,2	2,9	110

Variant 5

1. How aerosols in the atmosphere measured? (5 ball)
2. What types of anthropogenic components does the insoluble fraction of the aerosols in snow consist of? (10 ball)
3. Choose the natural sources of aerosols: (5 ball)
   a) Roadway dust
   b) Terrestrial dust
   c) Volcanic action
   d) Sea spray
   e) Fuel combustion
4. What types of particles are referred to "coarse "? (5 ball)
   a) less than 2.5 µm in diameter
   b) greater than 2.5 µm in diameter
   c) smaller than 0,1 µm in diameter
   d) larger than 0,01 µm in diameter
5. What is average daily fallout of metals on the city territory and choose its formula: (5 ball)

a) $P_n = P_o \ / S \times t$;

b) $KK = C / C_b$;

c) $P_{total} = C \times P_n$;

d) $K_p = P_{total} / P_b$;

e) $Z_c = \sum KK - (n-1)$;

f) $Z_p = \sum K_p - (n-1)$.

6. Calculate average daily fallout of metals on the city territory and analyze data. (10 ball)

Element concentration (mg/kg) in the insoluble aerosols in snow and dust load in the impact area of brickworks

Distance, m	Sm	Ce	Ca ,%	Lu	U	Th	Cr	Dust load, mg/m^2 per day
200	6,6	73,1	2,1	0,46	3,1	9,3	111,4	215
1000	6,6	74,5	1,8	0,53	3,7	10,6	112,0	134
background	0,57	10,3	0,82	0,075	0,2	2,9	110	7

Variant 6

1. How do aerosols affect our health? (5 ball)
2. What types of methods are used to measure element composition of aerosols? (10 ball)
3. Choose the description of fine particles nuclei mode: (5 ball)

a) medium size, form from condensation of hot vapors during combustion processes
b) small size, formed by mechchanical processes
c) small size, form from condensation of hot vapors during combustion processes
d) large size, formed by mechchanical processes

4. Choose the anthropogenic aerosols: (5 ball)

a) Smokes from biota burning on land
b) black carbon
c) volatile organic compounds
d) aromatic volatile organic compounds
e) industrial dust

5. Choose anthropogenic components in insoluble phase of snow: (5 ball)

a) Al-silicate spherules
b) feldspars
c) quartz
d) soot
e) calcite
f) metallic spherules
g) slag

6. Calculate average daily fallout of metals on the city territory and analyze data. (10 ball)

Element concentration (mg/kg) in the insoluble aerosols in snow and dust load in the impact area of coal and gas fired power plant

Distance, m	Hg	As	Co	Cr	Sr	Sb	Ba	Dust load, mg/m^2 per day
1000	0,38	12,62	11,43	143,07	383,8	3,81	784,0	70
2000	0,30	24,71	23,74	73,10	563,3	6,27	841,6	65
Background	0,08	0,5	10,3	110	100	2,3	100	7

Variant 7

1. What primary and secondary aerosol sources are indicated? (5 ball)
2. Why do we care about aerosols? (10 ball)
3. What are the sources of coarse particles? (5 ball)
   a) man-made and natural dust particles
   b) natural dust particles
   c) man-made dust particles
   d) dust particles

4. What is airborne particles size associated with adverse health effects than other one? (5 ball)
   a) less than 2.5 µm in diameter
   b) smaller than 0,1 µm in diameter
   c) greater than 2.5 µm in diameter
   d) less than 3.5 µm in diameter

5. Choose methods used for studying mineral composition of aerosols: (5 ball)
   a) neutron-activation analysis
   b) scanning electron microscopy
   c) binocular microscopy
   d) atomic absorbing analysis
   e) X-ray analysis
   f) spectrometry
   g) luminescence

6. Calculate of total pollution factor and analyze data. (10 ball)

Element concentration in the insoluble aerosols in snow in the impact area of petrochemical plant, mg/kg

Distance, m	Br	Cs	Tb	Sc	Rb	Fe ,%	Ta	Co	Na,%
200	7,1	5,8	1,40	12,6	68,1	4,5	1,79	18,1	0,59
1000	7,9	5,3	1,06	11,2	63,7	3,6	1,41	17,2	0,48
background	2,9	3,5	0,06	7,1	55	1,87	0,1	10,3	0,15

Variant 8

1. Describe natural sources of aerosols. (5 ball)
2. Why do we use f-radiography method to study aerosols? Describe this method. (10 ball)
3. What are convertible terms of “soot”? (5 ball)
   a) black carbon, elemental carbon
   b) black carbon, graphitic carbon, elemental carbon
   c) black carbon, graphitic carbon
   d) graphitic carbon, elemental carbon
4. What are inhaled particles deposited in alveoli region? (5 ball)
   a) Above 5 µm
   b) Above 10 µm
   c) Above 3 µm
   d) Less 2 µm
5. Choose methods used for studying mineral composition of aerosols: (5 ball)
   a) neutron-activation analysis
   b) scanning electron microscopy
   c) binocular microscopy
   d) atomic absorbing analysis
   e) fluorescence
   f) X-ray analysis
   g) Mass-spectrometry with inductive coupled plasma
   h) spectrometry

6. Calculate of average daily fallout of metals on the city territory and analyze data. (10 ball)

Element concentration (mg/kg) in the insoluble aerosols in snow and dust load in the impact area of petrochemical plant

Distance, m	Br	Cs	Tb	Sc	Rb	Fe ,%	Ta	Co	Dust load, mg/m^2 per day
200	7,1	5,8	1,40	12,6	68,1	4,5	1,79	18,1	51
1000	7,9	5,3	1,06	11,2	63,7	3,6	1,41	17,2	55
background	2,9	3,5	0,06	7,1	55	1,87	0,1	10,3	7