**QESTIONS FOR DIFFERENTIATED CREDIT TEST ON RADIATION AND ECOLOGICAL MEDICINE**

***for the second year students of the faculty for international students***

***Ecological medicine***

1. Environmental medicine: history of development, concept, goal and objectives.
2. Methods of environmental medicine for studying the influence of environmental factors on human health.
3. The concept of «environmental diseases». Environmentally dependent morbidity. Diagnostics, treatment and prevention of environmental diseases.
4. Environmental factors: concept, characteristics, classification. Specific and non-specific mechanisms of organism protection from the adverse effects of environmental factors.
5. Chronobiology and chronomedicine. Biological rhythms: concept, classification, regulation. The concept of individual chronotype.
6. Seasonal affective disorder: reasons of development, clinical manifestations, prevention and treatment.
7. Ultraviolet radiation (UVR): concept, general characteristic. Deterministic and stochastic effects of UVR on human organism.
8. Types of skin sensitivity to ultraviolet radiation (UVR). Protection of human organism from negative effects of UVR.
9. Meteorological sensitivity: definition, classification according the severity of the clinical manifestations and types of meteorological reactions, prevention.
10. Climate: the concept, general characteristics, impact on the human body. Acclimatization: concept, phases and their characteristics.
11. Xenobiotics: concept, classification, general characteristics. Properties of xenobiotics determining their toxicity. Mechanisms of toxic action.
12. Toxicokinetics: absorption of xenobiotics, their distribution in the body, metabolism and excretion.
13. General characteristics and basic mechanisms of xenobiotics detoxication in the human organism.
14. Multiple chemical sensitivity: concept, reasons of the development, clinical symptoms, medical diagnostics, prevention.
15. Atmosphere: structure, chemical composition and role. Main sources of air pollution and their characteristics.
16. Characteristics of the main air pollutants in the city (sulfur dioxide, nitrogen oxide, carbon monoxide) and related diseases. Measures for the atmosphere protection from the sources of pollution.
17. Smog: concept, types, conditions of development, effects of exposure on the human body, prevention.
18. Ozone layer: concept, functions of the ozone layer. Reasons for the destruction of the ozone layer, negative consequences for humanity.

19. Greenhouse effect: concept, reasons of formation, negative consequences for humanity.

20. Hydrosphere: structure and role. Main sources of the hydrosphere pollution and their characteristics. Measures for the protection of the hydrosphere from the sources of pollution.

21. Role of water in spread of diseases (endemic and epidemic diseases, chronic poisonings by chemicals).

22. Criteria of drinking water quality: organoleptic properties, physical, chemical and biological composition.

23. Lithosphere: structure and role. Main sources of the lithosphere pollution and their characteristics. Measures for the lithosphere protection from the sources of pollution.

24. Role of soil in spread of diseases (endemic and epidemic diseases, chronic poisoning by chemicals).

25. Endemic pathology: definition, concept, examples and general ways of prevention.

26. Biogeochemical provinces: concept, role in the occurrence of environmentally depended diseases.

27. Endemic goiter: concept, causes, symptoms, non-specific and specific prevention.

28. Actual ecologically dependent problems of nutrition.

29. Genetically modified organisms: the concept, the risks for the environment and human health.

30. Basic significant xenobiotics, which can be ingested with food. Prevention of possible adverse effects.

31. Nitrates and nitrites: chemical characteristics, the main clinical symptoms of acute and chronic poisoning and its prevention.

32. The role of genetic factors in the occurrence of ecologically dependent pathology.

33. International classification of electromagnetic waves according to their frequency. Characteristics of non-ionizing electromagnetic radiation. Application of non-ionizing electromagnetic radiation in medicine.

34. Electrosensitivity: definition, prevalence among the population, the main clinical symptoms, prevention.

35. Electrosmog: concept, sources, adverse effects on the population, prevention.

36. Ecological characteristics of residential and public buildings: physical, chemical, biological factors of indoor environment affecting human health.

37. «Sick building syndrome»: concept, reasons, main clinical symptoms, prevention.

38. Basic principles of environmental legislation. Laws for the protection of nature and natural resources. Responsibility for the violation of norms of environmental law.

39. Environmental Monitoring: concept, types. Systems of global and local monitoring. The national system of the environmental monitoring.

40. Socio-hygienic monitoring, concept, goals, objectives, stages.

***Radiation medicine:***

41. Radiation medicine: the concept, purposes, tasks, methods, connection with clinical disciplines. The history of radioactivity discovery and radiation medicine development.

42. Radioactivity: the concept, systemic and traditional units of radioactivity, their relationship.

43. The law of radioactive decay. Types of radioactive transformations of nuclei: alpha-, beta-, gamma-transformation of the nuclei.

44. Classification of ionizing radiations, their properties. Conception of linear energy transfer. Interaction of electromagnetic radiation.

45. Basics of dosimetry: exposure dose, absorbed dose, radiation dose equivalent, effective dose. SI and non-SI units of doses, the ratio between them.

46. General and individual dosimetry. The collective dose. Monitoring of external irradiation doses.

47. Detectors and instruments used for ionizing radiation registration and measurement. Principles of radiometric researches.

48. Radiation background exposure of the Earth: its components and their contribution to the annual effective dose of radiation. Characteristics of cosmic radiation and cosmogenic radionuclides.

49. Terrestrial radiation. Radionuclides that form the main exposure on the organism: U-238, Th-232, Ra-226, Rn-222, Po - 210, Bi-210.

50. Radon, its sources and conditions of exposure. Influence on human health, prevention.

51. Natural radionuclides that form internal exposure of human organism.

52. Technologically changed background radiation: the concept, general sources.

53. Stages of radiation injury: direct and indirect action. The radiolysis of water, the main products of radiolysis. The influence of oxygen on the radiolysis.

54. The molecular basis of radiosensitivity. The factors that determine the radiosensitivity at the cellular and tissue levels. Types of cell reactions to irradiation.

55. The Bergonie-Tribondo rule. The factors that determine the radiosensitivity of the organs, organisms and population.

56. Individual and age-specific differences of radiosensitivity. The effect of radiation on the embryo and fetus. Modification of radiosensitivity.

57. The factors that determine the irradiation lesions of the body. The concept of "critical organ".

58. Deterministic effects of irradiation: concept, types, effects, pathogenesis.

59. Acute radiation syndromes. Characteristics of bone – marrow, gastrointestinal and cerebral syndromes: pathogenesis, phases, causes of the organism death.

60. Stochastic effects of irradiation: concept, types, effects, pathogenesis.

61. The concept of «small doses» of ionizing radiation. The effects of «small doses» of ionizing-radiation on the human body. Radiation gormesis and adaptive response.

62. Nuclear power development in the world. Characteristics of the main reactor types. Nuclear fuel cycle: concept, stages.

63. The concept of radiation accidents. Accidents reports in the world.

64. Characteristics of the general radiation accidents types.

65. International classification of the radiation accidents (international nuclear event scale).

66. The concept of population protection from the radiation accidents at the nuclear power plants.

67. Chernobyl disaster: history, the dynamics of emissions in time and space.

68. Affect of Chernobyl radionuclides release on the health of the population. Formation of exposure doses of the population after Chernobyl accident.

69. Radionuclide migration in biosphere: local and global deposition, accumulation of radionuclides in hydrosphere and lithosphere. Basic ways of radionuclides accumulation in organism. Types of distribution.

70. Characteristics (physical and chemical properties, accumulation and distribution in the body, biological effects) of the basic radionuclides of Chernobyl release: Cs-137, Sr-90, I-131, Pu-239.

71. Basic principles of radiation safety. Basic dose limits.

72. Methods of protection from ionizing radiation: the influence of dose, time, distance and shields on the irradiation.

73. A concept of medical irradiation. The principles of radiation dose reduction in patients.

74. The concept of closed and open sources of ionizing radiation. Radiation safety of personnel and population in the conditions of the existing exposure.

75. The decrease of the doses from artificial sources of ionizing radiation in diagnostic medicine. Protection of patients and medical staff from irradiation.

76. The ways to decrease the annual effective dose of external exposure from natural and artificial sources.

77. The ways to decrease the annual effective dose of internal exposure from natural and artificial sources.

78. Radiometry of the environment, food and water. Permissible levels of radionuclides in water and food.

79. Radiation safety monitoring: concept, basic principles and ways to ensure. Radiation contamination of the territory of Belarus.

80. The principles of the population living on the contaminated territories.