

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution
higher education
NORTH CAUCASIAN FEDERAL UNIVERSITY

I APPROVE

Dean of the Faculty of Mathematics
and computer science named after
Professor N.I. Chervyakov,
Candidate of Physical and
Mathematical Sciences, Associate
Professor
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ASSESSMENT TOOLS FUND FOR DISCIPLINE

Deep learning / Глубокое обучение

Direction of training	02.04.01 Mathematics and Computer Science
Directionality (profile)	Training Program for Electronic Information
Year of commencement of studies	2026
Form of study	full-time
It is implemented in semesters	3

Introduction

1. Purpose: The FOS is intended for an objective assessment of the level of development of competencies.
2. FOS is an appendix to the program of the discipline (module) «Deep learning / Глубокое обучение »
3. Developer: A.S. Ionisyan , Associate Professor of the Department of Mathematical Modeling.
4. An examination of the organophosphorus compounds was carried out.

Members of the expert group:

Chairman Lyakhov P.A., Head of the Department of Mathematical Modeling

Members of the commission:

Andrukhiv L.V., Associate Professor of the Department of Mathematical Modeling,

Zhuravleva I.A., Associate Professor of the Department of Mathematical Modeling.

Representative of the employer organization Podoprighora N.B., General Director of LLC "Medicine IT "

Expert opinion

The FOS for a discipline allows us to assess the level of competency development . Begin testing.

5. The validity period of the FOS is determined by the period of implementation of the educational program.

1. Description of the criteria for assessing competence at various stages of its development, description of assessment scales

Competence (ii), indicator (s)	Levels of development of competencies			
	The minimum level has not been reached (Unsatisfactory) 2 points	Minimum level (satisfactory) 3 points	Intermediate level (Fine) 4 points	High level (excellent) 5 points
<i>Competency : P K-1 Able to demonstrate fundamental knowledge of mathematical and natural sciences, programming and information technology</i>				
ID-1 _{PC-1} In his professional activities, he demonstrates fundamental knowledge of mathematics and natural sciences. ID-2 _{PC-1} Solves problems of professional activity using programming and information technology tools	knows nothing about artificial neural networks, supervised and unsupervised learning methods for ANNs, or the TensorFlow library . does not know how to use modern data processing methods in the field of information technology for machine learning	has a satisfactory knowledge of artificial neural networks, supervised and unsupervised training methods for ANNs, and the TensorFlow library. has satisfactory knowledge and ability to use modern data processing methods in the field of information technology for machine learning	has a good knowledge of the basic methods of training artificial neural networks as applied to machine learning, and the TensorFlow library . is proficient in and uses modern data processing methods in the field of information technology for machine learning	has excellent knowledge of the basic methods of training artificial neural networks as applied to machine learning, and the TensorFlow library . is excellent at using modern data processing methods in the field of information technology for machine learning
<i>Competency : P K-6 Able to use modern methods of development and implementation of specific algorithms of mathematical models based on programming languages and application software packages for modeling</i>				

ID-1 PC-6 Using modern software packages for modeling, it explores newly created mathematical models; ID-2 PC-6 Uses modern methods for developing algorithms for mathematical models ID-3 PC-6 Uses modern programming languages to implement specific algorithms and mathematical models	knows nothing about single-layer neural networks , multi - layer neural networks, recurrent neural networks, fully connected networks, convolutional neural networks. does not know how to develop software and information support for computer systems, services, computing complexes, and databases for machine learning	has a satisfactory knowledge of the basic methods of training single-layer neural networks , multi -layer neural networks, recurrent neural networks, fully connected networks, and convolutional neural networks . has satisfactory skills in developing software and information support for computer systems, services, computing complexes, and databases for machine learning	has a good knowledge of the basic methods of training single-layer neural networks , multi - layer neural networks, recurrent neural networks, fully connected networks, and convolutional neural networks . is proficient in developing software and information support for computer systems, services, computing complexes, and databases for machine learning	has excellent knowledge of the basic methods of training single-layer neural networks , multi - layer neural networks, recurrent neural networks, fully connected networks, and convolutional neural networks . is excellent at developing software and information support for computer systems, services, computing complexes, and databases for machine learning
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The assessment of the level of development of competence in the discipline is carried out on the basis of the “Regulations on the current monitoring of academic performance and midterm assessment of students in higher education programs - bachelor's degree programs , specialist programs , master's degree programs - at the federal state autonomous educational institution of higher education "North Caucasus Federal University" in the current version.

ASSESSMENT TOOLS FOR CHECKING THE LEVEL OF DEVELOPMENT OF COMPETENCIES

Task number	Correct answer	Contents of the question	Competence
Form of study - full-time, Semester - 3			
1.	a	Heuristic programming reduces the running time of programs by a) improving the computer algorithm for solving the problem b) the use of high-performance computers c) training personnel to work with a given user computer program	PC-1 PC-6
2.	basic rules of mathematical logic	Logical systems of artificial intelligence are based on the ideas of application "basic rules of mathematical logic" artificial neural networks Bayesian rules of logical inference _____ (type the correct version without quotation marks)	PC-1 PC-6
3.	graph theory	Semantic networks are based on the ideas of application graph theory artificial neural networks Bayesian rules of logical inference _____ (type the correct version without quotation marks)	PC-1 PC-6
4.	a	The frame model of knowledge representation is based on the ideas of application a) special slot-value type dictionaries b) artificial neural networks c) Bayesian rules of logical inference	PC-1 PC-6
5.	a	Multilayer artificial neural networks are based on the ideas of application a) applied mathematical methods for finding a local minimum of a function of several variables b) Bayesian rules of logical inference c) the basic rules of mathematical logic	PC-1 PC-6
6.	above human	Deep learning of artificial neural networks allows to achieve the level of image recognition "above human" "at the human level " "below human"	PC-1 PC-6

		_____ (type the correct version without quotation marks)	
7.	structured and unstructured data	Big data technology is designed to process large volumes of data. "structured and unstructured data" "structured data only" "exclusively unstructured information" _____ (type the correct version without quotation marks)	PC-1 PC-6
8.	a	Computer vision is applied a) as a complement to biological vision b) as a prerequisite for the Turing test c) to create three-dimensional graphic scenes based on their verbal description	PC-1 PC-6
9.	This is a common direction of artificial intelligence and mathematical linguistics	Natural language processing in artificial intelligence systems "This is a common direction of artificial intelligence and mathematical linguistics" "is a prerequisite for the Turing test" "used primarily in computer vision systems" _____ (type the correct version without quotation marks)	PC-1 PC-6
10.	it is the process of converting text to speech or speech to text	Speech recognition and synthesis "it is the process of converting text into speech or speech into text" "used primarily in computer vision systems" "is a prerequisite for the Turing test" _____ (type the correct version without quotation marks)	PC-1 PC-6
11.	a	Intelligent decision support a) is associated with the construction of a mathematical model of the expected development of events b) is associated with the construction of a model of an intuitively understandable development of events c) has not yet been created	PC-1 PC-6
12.	Security and safety systems	The technology "Detection and identification of objects in a complex environment" is being transformed into a solution Security and safety systems "Urban Traffic Data Collection Systems and Analysis" "Ability to integrate data from different types of sensors" _____ (type the correct version without quotation marks)	PC-1 PC-6
13.	a	The technology "Error, Slang and Abbreviation Recognition" is being transformed into	PC-1

		a solution a) "Improving current solutions taking into account the context" b) "Intelligent search in the document database" c) "Automatic systems for literary, technical and business translation"	PC-6
14.	improve the quality of graphic image recognition	The combination of different types of algorithms within computer vision systems allows "to improve the quality of graphic image recognition" "somewhat reduces the quality of graphic image recognition" "does not affect the quality of graphic image recognition" _____ (type the correct version without quotation marks)	PC-1 PC-6
15.	predictive output of results	Pattern recognition with "first try" learning allows you to perform "predictive output of results" "a priori output of results" "a posteriori output of results" _____ (type the correct version without quotation marks)	PC-1 PC-6
16.	Computer vision	The technological task "High-speed identification of a large number of objects in various parts of the electromagnetic spectrum" refers to the tasks Computer vision Natural Language Processing "Advanced Methods of Artificial Intelligence" _____ (type the correct version without quotation marks)	PC-1 PC-6
17.	Computer vision	The technological task "Autonomous semantic segmentation, classification and identification of objects" refers to the tasks Computer vision Natural Language Processing "Advanced Methods of Artificial Intelligence" _____ (type the correct version without quotation marks)	PC-1 PC-6
18.	Computer vision	The technological task "Psychographic and emotional analysis of human and animal behavior based on video analytics systems" refers to the tasks Computer vision Natural Language Processing "Advanced Methods of Artificial Intelligence" _____ (type the correct version without quotation marks)	PC-1 PC-6

19.	Computer vision	The technological task "Event analysis using video analytics systems " refers to the tasks Computer vision Natural Language Processing "Advanced Methods of Artificial Intelligence" _____ (type the correct version without quotation marks)	PC-1 PC-6
20.	Computer vision	The technological task “Generation of images and videos, including photorealistic ones” refers to the tasks Computer vision Natural Language Processing "Advanced Methods of Artificial Intelligence" _____ (type the correct version without quotation marks)	PC-1 PC-6
21.	Computer vision	The technological task “Analysis of information about remote objects using active optical systems” refers to the tasks Computer vision Natural Language Processing "Advanced Methods of Artificial Intelligence" _____ (type the correct version without quotation marks)	PC-1 PC-6
22.	Natural language processing	The technological task “Classification and clustering of individual statements, short and long texts” refers to the tasks Natural Language Processing "Advanced Methods of Artificial Intelligence" Computer vision _____ (type the correct version without quotation marks)	PC-1 PC-6
23.	Natural language processing	The technological task “Search and classification of various types of entities in the text” refers to the tasks Natural Language Processing "Advanced Methods of Artificial Intelligence" Computer vision _____ (type the correct version without quotation marks)	PC-1 PC-6
24.	Natural language processing	The technological task "Extracting facts from texts and systematizing them" refers to the tasks Natural Language Processing	PC-1 PC-6

		"Advanced Methods of Artificial Intelligence" Computer vision _____ (type the correct version without quotation marks)	
25.	Natural language processing	The technological task "Machine translation" refers to the tasks Natural Language Processing "Advanced Methods of Artificial Intelligence" Computer vision _____ (type the correct version without quotation marks)	PC-1 PC-6
26.	search for text documents by analogy or by meaning	Tasks of intelligent information retrieval " search for text documents by analogy or by meaning" "destruction of text documents from the Internet by analogy or by meaning" "modification of text documents by analogy or by meaning" _____ (type the correct version without quotation marks)	PC-1 PC-6
27.	search, identification and classification of advertising	Tasks of intelligent information retrieval "search, detection and classification of advertising" "destruction of advertising from the Internet" "modification with minimal user participation of Internet advertising" _____ (type the correct version without quotation marks)	PC-1 PC-6
28.	Natural language processing	The technological task "Determining semantic errors in the text" refers to the tasks Natural Language Processing "Advanced Methods of Artificial Intelligence" Computer vision _____ (type the correct version without quotation marks)	PC-1 PC-6
29.	Natural language processing	The technological task "Grouping information and constructing flowcharts based on text data" refers to the tasks Natural Language Processing "Advanced Methods of Artificial Intelligence" Computer vision _____ (type the correct version without quotation marks)	PC-1 PC-6
30.	Natural language processing	The technological task "Recognizing various literary devices and styles" refers to the tasks Natural Language Processing "Advanced Methods of Artificial Intelligence"	PC-1 PC-6

		Computer vision _____ (type the correct version without quotation marks)	
31.	Natural language processing	The technological task "Dynamic recognition of meaning" refers to the tasks Natural Language Processing "Advanced Methods of Artificial Intelligence" Computer vision _____ (type the correct version without quotation marks)	PC-1 PC-6
32.	Speech recognition and synthesis	The technological task "Creating multitasking conversational assistants" refers to the tasks Speech Recognition and Synthesis "Advanced Methods of Artificial Intelligence" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
33.	Speech recognition and synthesis	The technological task "Speech Authentication" refers to the tasks Speech Recognition and Synthesis "Advanced Methods of Artificial Intelligence" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
34.	Speech recognition and synthesis	The technological task "Sound and speech recognition in complex conditions" refers to the tasks Speech Recognition and Synthesis "Advanced Methods of Artificial Intelligence" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
35.	Speech recognition and synthesis	The technological task "Recognition of complex semantic constructions and slang in speech" refers to the tasks Speech Recognition and Synthesis "Advanced Methods of Artificial Intelligence" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
36.	Speech recognition and synthesis	The technological task "Creating means of controlling emotions and semantic constructions in synthesized speech" refers to the tasks Speech Recognition and Synthesis	PC-1 PC-6

		"Advanced Methods of Artificial Intelligence" Natural Language Processing _____ (type the correct version without quotation marks)	
37.	Speech recognition and synthesis	The technological task "Speech synthesis in a foreign language" refers to the tasks Speech Recognition and Synthesis "Advanced Methods of Artificial Intelligence" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
38.	Speech recognition and synthesis	The technological task "Recognition of anthropological features based on speech" refers to the tasks Speech Recognition and Synthesis "Advanced Methods of Artificial Intelligence" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
39.	Speech recognition and synthesis	The technological task "Classification and identification of the relative positions of sound sources" refers to the tasks Speech Recognition and Synthesis "Advanced Methods of Artificial Intelligence" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
40.	Speech recognition and synthesis	The technological task "Recognition of emotional shades and sub-emotions of speech" refers to the tasks Speech Recognition and Synthesis "Advanced Methods of Artificial Intelligence" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
41.	Intelligent decision support systems	The technological task "Predictive and prescriptive analysis" refers to the tasks " Intelligent decision support systems" Speech Recognition and Synthesis Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
42.	Intelligent decision support systems	The technological task "Assessing the quality of machine learning models without testing in a real environment" refers to the tasks	PC-1 PC-6

		" Intelligent decision support systems" Speech Recognition and Synthesis Natural Language Processing _____ (type the correct version without quotation marks)	
43.	Intelligent decision support systems	The technological task "Preparing decisions based on open data sources and unstructured information" refers to the tasks " Intelligent decision support systems" Speech Recognition and Synthesis Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
44.	Intelligent decision support systems	The technological task "Intelligent simulation modeling of the behavior of participants in the market of goods, works and services" refers to the tasks " Intelligent decision support systems" Speech Recognition and Synthesis Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
45.	Intelligent decision support systems	The technological task "Management and (or) training of personnel and the construction of personalized career or educational trajectories" refers to the tasks " Intelligent decision support systems" Speech Recognition and Synthesis Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
46.	Intelligent decision support systems	The technological task "Providing decision support based on long-term data" refers to the tasks " Intelligent decision support systems" Speech Recognition and Synthesis Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
47.	Intelligent decision support systems	The technological task "Control of equipment and production systems based on data from measuring systems and historical data" refers to the tasks " Intelligent decision support systems" Speech Recognition and Synthesis Natural Language Processing	PC-1 PC-6

		_____ (type the correct version without quotation marks)	
48.	Intelligent decision support systems	The technological task “Predictive equipment maintenance based on mathematical modeling methods” refers to the tasks " Intelligent decision support systems" Speech Recognition and Synthesis Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
49.	Intelligent decision support systems	The technological task “Forecasting the quality of manufactured products” refers to the tasks " Intelligent decision support systems" Speech Recognition and Synthesis Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
50.	Intelligent decision support systems	The technological task "Visualization of production processes" refers to the tasks " Intelligent decision support systems" Speech Recognition and Synthesis Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
51.	Intelligent decision support systems	The technological task “Control and reduction of harmful emissions and environmental pollution” refers to the tasks " Intelligent decision support systems" Speech Recognition and Synthesis Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
52.	Intelligent decision support systems	The technological task “Personnel management, monitoring of productivity, psychophysical condition and searching for opportunities to optimize personnel workload” refers to the tasks " Intelligent decision support systems" Speech Recognition and Synthesis Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
53.	long training period	Limitations of computer vision systems "long training period"	PC-1 PC-6

		"difficulty recognizing still, high-contrast images" "difficulty removing background in a high-contrast video stream" _____ (type the correct version without quotation marks)	
54.	a	Limitations of natural language processing systems a) the availability of a large amount of information for training is mandatory b) the impossibility of graphical visualization of the results of natural language processing c) the impossibility of audio accompaniment of the results of natural language processing	PC-1 PC-6
55.	a	Limitations of speech recognition and synthesis systems a) the presence of a large volume of unique, non-repeating information for training is required b) the fundamental impossibility of text-to-speech conversion in a reasonable amount of computer time c) the fundamental impossibility of speech-to-text conversion in a reasonable amount of computer time	PC-1 PC-6
56.	a	Limitations of intelligent decision support systems a) the need for multi-stream input of a large amount of diverse data b) the lack of "working" mathematical models of intelligent decision support systems for intelligent decision support systems	PC-1 PC-6
57.	people	Social limitations of artificial intelligence systems concern first of all "people" robots "organizations" _____ (type the correct version without quotation marks)	PC-1 PC-6
58.	people	Moral and ethical limitations of artificial intelligence systems concern , first of all, "people" robots "organizations" _____ (type the correct version without quotation marks)	PC-1 PC-6
59.	organizations	The legal aspects of the use of artificial intelligence systems concern most of all "organizations" robots	PC-1 PC-6

		"people" _____ (type the correct version without quotation marks)	
60.	a	The Three Laws of Robotics a) A robot may not injure a human being or, through inaction, allow a human being to come to harm b) A robot may cause harm to a human being or, through inaction, allow a human being to come to harm c) A robot has the right to decide whether or not to harm a person or, through its inaction, to allow harm to come to a person.	PC-1 PC-6
61.	a	The Three Laws of Robotics a) A robot must obey all orders given by human beings except where such orders would conflict with the First Law. b) A robot must not obey all orders given by a human. c) The robot has the right to decide whether or not to obey all orders given by a person.	PC-1 PC-6
62.	a	The Three Laws of Robotics a) A robot must protect its own safety as long as doing so does not conflict with the First or Second Laws. b) A robot shall not require protection of its own nature to the extent that doing so would conflict with the First or Second Laws. c) The robot has the right to decide on its own safety or self-destruction at any time.	PC-1 PC-6
63.	a	The Three Laws of Robotics a) A robot may not harm humankind or, through inaction, allow humankind to come to harm b) A robot may cause harm to humanity or, through inaction, allow harm to come to humanity c) The robot has the right to decide the fate of humanity or, through inaction, allow harm to come to humanity if it deems it necessary.	PC-1 PC-6
64.	Promising methods of artificial intelligence	The technological task "Development of methods towards the creation of universal (strong) artificial intelligence" refers to the tasks "Advanced Methods of Artificial Intelligence" "Intelligent decision support systems" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6

65.	Promising methods of artificial intelligence	The technological task “Using quantum computers to accelerate the solution of artificial intelligence problems” refers to the tasks "Advanced Methods of Artificial Intelligence" "Intelligent decision support systems" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
66.	Promising methods of artificial intelligence	The technological task “Development of quantum machine learning algorithms, libraries and tools for implementing practical tasks” refers to the tasks "Advanced Methods of Artificial Intelligence" "Intelligent decision support systems" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
67.	Promising methods of artificial intelligence	The technological task "Synthesis (generation) of three-dimensional, two-dimensional images and video objects " refers to the tasks "Advanced Methods of Artificial Intelligence" "Intelligent decision support systems" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
68.	Promising methods of artificial intelligence	The technological task “Using artificial intelligence for designing complex objects (systems, robots, algorithms)” refers to the tasks "Advanced Methods of Artificial Intelligence" "Intelligent decision support systems" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
69.	Promising methods of artificial intelligence	The technological task "Automation of neural network training" refers to the tasks "Advanced Methods of Artificial Intelligence" "Intelligent decision support systems" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
70.	Promising methods of artificial intelligence	The technological task “Learning by doing or by analogy” refers to the tasks "Advanced Methods of Artificial Intelligence" "Intelligent decision support systems" Natural Language Processing	PC-1 PC-6

		_____ (type the correct version without quotation marks)	
71.	Promising methods of artificial intelligence	The technological task “Interpretable models of artificial intelligence and methods for generating justifications for automatically made decisions” refers to the tasks "Advanced Methods of Artificial Intelligence" "Intelligent decision support systems" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
72.	Promising methods of artificial intelligence	The technological task "Processing highly noisy signals" refers to the tasks "Advanced Methods of Artificial Intelligence" "Intelligent decision support systems" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
73.	Promising methods of artificial intelligence	The technological task “Restoring lost information on machine-readable storage media” refers to the tasks "Advanced Methods of Artificial Intelligence" "Intelligent decision support systems" Natural Language Processing _____ (type the correct version without quotation marks)	PC-1 PC-6
74.	direct distribution	Perceptrons are neural networks "direct distribution" counter-propagation "recurrent type" _____ (type the correct version without quotation marks)	PC-1 PC-6
75.	reduce the running time of a complex algorithm	Heuristic programming allows "reduce the running time of a complex algorithm" "increase the running time of a complex algorithm" "does not affect the running time of a complex algorithm" _____ (type the correct version without quotation marks)	PC-1 PC-6
76.	process text information	Logical systems of artificial intelligence mainly allow "process text information" "recognize graphic images" convert speech to text _____ (type the correct version without quotation marks)	PC-1 PC-6

77.	directed graph	The semantic network has the form directed graph "a set of interconnected subroutines" "set of logical formulas" _____ (type the correct version without quotation marks)	PC-1 PC-6
78.	unique within the frame	The name of a slot in a frame-based knowledge representation model must be " unique within the frame" " unique to the entire model" "all slots in the frame model are anonymous" _____ (type the correct version without quotation marks)	PC-1 PC-6
79.	classify images	Multilayer artificial neural networks allow "classify images" "perform arithmetic operations efficiently" "read and save information to the knowledge base" _____ (type the correct version without quotation marks)	PC-1 PC-6
80.	a	Deep learning / Глубокое обучение of artificial neural networks is a) a long process of tuning the coefficients of a multilayer neural network b) fast calculation of coefficients of a multilayer neural network using predetermined formulas	PC-1 PC-6
81.	various tasks	Big data technology allows you to collect and process a large amount of information to solve problems "various tasks" "only highly specialized tasks" "This technology isn't designed to solve problems. It only allows for the collection and storage of large amounts of information." _____ (type the correct version without quotation marks)	PC-1 PC-6
82.	is widely used nowadays	Computer vision "is widely used today" "still remains a rare exotic" "Vision is a quality unique to living organisms. Computers cannot 'see.'" _____ (type the correct version without quotation marks)	PC-1 PC-6
83.	a	Natural language processing a) is actively used in solving artificial intelligence problems	PC-1 PC-6

		b) this problem is still considered difficult to solve and has no practical implementation on computers	
84.	is widely used nowadays	Speech recognition and synthesis "is widely used today" "still remains a rare exotic" "Speech is a quality inherent only to highly organized living organisms. Computers cannot 'talk.'" _____ (type the correct version without quotation marks)	PC-1 PC-6
85.	a	Detection and identification of objects in complex environments a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
86.	a	Context-aware, multi-source image recognition a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
87.	a	Combination of different types of algorithms within computer vision systems a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
88.	a	Pattern recognition with first-time learning a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
89.	a	High-speed identification of a large number of objects in various parts of the electromagnetic spectrum a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
90.	a	Autonomous semantic segmentation, classification and object identification a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6

91.	a	Psychographic and emotional analysis of human and animal behavior based on video analytics systems a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
92.	a	Event analysis using video analytics systems a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
93.	a	Generation of images and videos, including photorealistic ones a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
94.	a	Analysis of information about remote objects using active optical systems a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
95.	a	Classification and clustering of individual statements, short and long texts a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
96.	a	Search and classification of different types of entities in text a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
97.	a	Extracting facts from texts and systematizing them a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
98.	a	Machine translation a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6

99.	a	Identifying semantic errors in the text a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
100.	a	Grouping information and creating flowcharts based on text data a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
101.	a	Recognizing various literary devices and styles a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
102.	a	Dynamic meaning recognition a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
103.	a	Creating multitasking conversational assistants a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
104.	a	Speech Authentication a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
105.	a	Sound and speech recognition in complex environments a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
106.	a	Recognition of complex semantic structures and slang in speech a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
107.	a	Creation of tools for managing emotions and semantic structures in synthesized speech	PC-1

		a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-6
108.	a	Speech synthesis in a foreign language a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
109.	a	Recognition of anthropological features based on speech a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
110.	a	Classification and identification of the relative positions of sound sources a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
111.	a	Recognition of emotional nuances and sub-emotions of speech a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
112.	a	Predictive and prescriptive analysis a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
113.	a	Assessing the quality of machine learning models without testing in a real environment a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
114.	a	Preparing solutions based on open data sources and unstructured information a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
115.	a	Intelligent simulation modeling of the behavior of market participants in goods, works, and services	PC-1 PC-6

		a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	
116.	a	Management and/or training of personnel and creation of personalized career or educational trajectories a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
117.	a	Providing decision support based on long-term data a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
118.	a	Control of equipment and production systems based on data from measurement systems and historical data a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
119.	a	Predictive equipment maintenance based on mathematical modeling methods a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
120.	a	Forecasting the quality of manufactured products a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
121.	a	Visualization of production processes a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
122.	a	Control and reduction of harmful emissions and environmental pollution a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6

123.	a	Personnel management, monitoring productivity, psychophysical condition and searching for opportunities to optimize staff workload a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6
124.	answer any question about the image	systems still can't "answer any question about the image" "recognize moving objects" "recognize colored objects" _____ (type the correct version without quotation marks)	PC-1 PC-6
125.	high-quality works of art	Natural language processing systems are still unable to produce "quality works of art" syntactic analysis of text "spelling analysis of text" _____ (type the correct version without quotation marks)	PC-1 PC-6
126.	maintain a free dialogue with a person in a high-quality manner	Speech recognition and synthesis systems still cannot "to maintain a high-quality, free-form dialogue with a person" "synthesize emotionally charged speech" "recognize a noisy audio stream" _____ (type the correct version without quotation marks)	PC-1 PC-6
127.	require in-depth analysis and resolution in the near future	Social limitations of artificial intelligence systems "require in-depth analysis and resolution in the near future" "This problem has long been solved and is of no interest to developers of artificial intelligence systems." "It has been proven that this problem has no solution, so there is no point in tackling it." _____ (type the correct version without quotation marks)	PC-1 PC-6
128.	require in-depth analysis and resolution in the near future	Moral and ethical limitations of artificial intelligence systems "require in-depth analysis and resolution in the near future" "This problem has long been solved and is of no interest to developers of artificial intelligence systems." "It has been proven that this problem has no solution, so there is no point in tackling it."	PC-1 PC-6

		_____ (type the correct version without quotation marks)	
129.	a	Restoring lost information on machine storage media a) this is one of the priority areas of artificial intelligence development in Russia b) is a rarely used technology, but it may find application in the future c) this technology is used exclusively abroad ; in Russia it is prohibited by law	PC-1 PC-6

Competency assessment criteria *

"excellent" grade is awarded to a student who demonstrates a deep and comprehensive *knowledge* of the subject, presents the material in a coherent and logical manner, *is able to* accurately and logically justify a point of view, and *has a confident* command of methodological concepts and accepted symbols.

"good" grade is given to a student if he demonstrates a solid *knowledge* of the subject and presents the material in a reasoned manner;

knows how to apply knowledge to analyze specific situations, but at the same time slightly violates the sequence of presentation of the material, provides an insufficiently complete, although correct, definition of concepts;

has a command of basic methodological concepts and symbols.

"satisfactory" grade is given to a student if he or she *knows* the subject in general, but presents the program material fragmentarily and inconsistently;

knows how to apply his knowledge in practice, allows for individual mistakes and errors when solving problems;

a poor *command* of basic mathematical concepts and the use of mathematical symbols.

The grade **"unsatisfactory"** is given to a student if he has not sufficiently mastered the main content of the subject and shows *ignorance* of most of the educational material, makes gross errors in formulating definitions and concepts;

is not able to logically analyze and solve practical problems;

does not have sufficient knowledge of mathematical symbols and their correct application.