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MINISTRY OF SCIENCE AND HIGHER EDUCATION

OF THE RUSSIAN FEDERATION

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higher education "NORTH CAUCASUS FEDERAL UNIVERSITY"

APPROVE

Acting Director of the Institute,

Candidate of Technical Sciences,

Associate Professor A.A. Porohnia

ASSESSMENT TOOLS FUND FOR DISCIPLINE

Database tuning

name of the discipline

Direction of training

Focus (profile) Year of

commencement of studies

Form of study

Implemented in a semester

09.04.03 Applied Informatics Knowledge

Management

2026

full-time

1

Introduction

1. Purpose: FOS is intended for an objective assessment of the level formation of competencies.

2. FOS is an appendix to the program of the discipline "Tuning databases / Database tuning»

3. Developer Malikov A.V., professor.

4. An examination of the FOS was carried out. Members of the expert group:

Chairman Azarov I.V., Acting Director of the Department

Members of the commission:

Orlova A.Yu., Associate Professor

Orlinskaya O.G., Associate Professor

Representative of the employer organization Cherevko S.A., General Director of KRAFTKOD LLC
(Full name, position)

Expert opinion: FOS for the discipline allows to assess the level of formation of competencies. Proceed to 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 in various stages of their formation, description of assessment scales

Levels formation And competencies, indicator(s)	Descriptors			
	Minimum level not reached (Unsatisfactory O) 2 points	Minimum level (satisfactory) O) 3 points	Intermediate level (Fine) 4 points	High level (Great) 5 points
PC-1				
ID-1 PC-1. to form strategy informatization applied processes V in accordance with strategy development enterprises.	With difficulty forms strategy informatization applied processes V in accordance with strategy development enterprises	Poorly formed strategy informatization applied processes V in accordance with strategy development enterprises	IN basically forms strategy informatization applied processes V in accordance with strategy development enterprises	forms strategy informatization applied processes V in accordance with strategy development enterprises
ID-2PC-1. to form strategy creations applied IS in in accordance with strategy development enterprises	With difficulty explores forms a strategy creation of applied IS in accordance with the development strategy enterprises	Weak explores forms creation strategy applied IS in in accordance with strategy development enterprises	IN basically explores forms strategy creations applied IS in in accordance with strategy development enterprises	explores forms strategy creations applied IS in in accordance with strategy development enterprises
PC-4				
ID-1 PC-4. manage projects By informatization applied problems	With difficulty controls projects By informatization applied problems	Weak controls projects By informatization applied problems	Generally controls projects on informatization applied tasks	controls projects on informatization applied tasks
ID-2 PC-4 manage projects By creation IS enterprises An organizations	Difficulty managing projects on creation of IP enterprises and dorganizations	Poorly managed projects on creation of IP enterprises and organizations	Generally controls projects on creation of IP enterprises and organizations	controls projects on creation of IP enterprises and organizations
ID-3PC-4 manage projects on reengineering applied and informational	Difficulty managing projects on reengineering applied and informational	Poorly managed projects on reengineering applied and informational	Generally controls projects on reengineering applied and informational	controls projects on reengineering applied and informational
PC-5				
ID-1 PC-5. design informational systems	Designs with difficulty informational systems	Poor design informational systems	Generally designs informational systems	designs informational systems
ID-2PC-5. Modeling informational processes subject areas	Difficulty modeling informational subject processes areas	Poorly models informational processes subject areas	Generally models informational processes subject areas	models informational processes subject areas

PC-7				
ID-1 organize negotiation representatives customer	PC-7. With	Not organize negotiation representatives customer	Maybe With	Allows serious mistakes organizations negotiations representatives customer
ID-2 conduct negotiations with representatives customer	PC-7.	With difficulty conduct negotiation representatives customer	With	Allows serious mistakes conducting negotiations representatives customer
ID-3 Organize professional consultations enterprises and in organizations	PC-7.	Organizes with difficulty professional consultations enterprises organizations	On And	Allows serious mistakes organizations professional consultations enterprises And

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 COMPETENCY DEVELOPMENT

Number tasks	Correct answer	Contents of the question	Competencia
Full-time education, semester 1			
1.	+ data sets under control of management systems	Databases are: - a complex program aimed at recording incoming information - data sets under the control of management systems - an infinite amount of data, constantly managed by a DBMS	PC-1; PC-4; PC-5; PC-7
2.	- data is organized into relationships	The main difference of a relational database: - data is organized into relationships - strictly tree-like structure - presented in the form of graphs	PC-1; PC-4; PC-5; PC-7
3.	- . mdb, .db	The extension of the DB file is: - . f2 - . mdb, .db - . mcs	PC-1; PC-4; PC-5; PC-7
4.	- undefined values	The word Null in the database is used to denote: - undefined values - empty values - zero	PC-1; PC-4; PC-5; PC-7
5.	- a set of pairs of attributes and their values	What is a tuple? - a set of attributes - a set of pairs of attributes and their values - data relationship diagram	PC-1; PC-4; PC-5; PC-7
6.	- the number of tuples in relation	The power of relationships is: - the number of branches in the graph system - the order of data subordination in the tree structure of the database - the number of tuples in relation	PC-1; PC-4; PC-5; PC-7

7.	- the same relationship scheme	The main condition of comparable relations: - the same relationship scheme - the exact number of comparable features - the presence of quantitative features	PC-1; PC-4; PC-5; PC-7
8.	- data selection according to specified attributes	The projection operation is aimed at: - overlaying data from one database on data from another database - data selection according to specified attributes - comparison of databases based on similarity	PC-1; PC-4; PC-5; PC-7
9.	- are present in the database initially	Unlike user-defined data types, basic data types are: - are present in the database initially - must be in any database - have a simpler structure	PC-1; PC-4; PC-5; PC-7
10.	- virtual attribute	If a is the price, b is the mass, then the attribute c, denoting the cost, will be: - basic attribute - virtual attribute - complex attribute	PC-1; PC-4; PC-5; PC-7
11.	- key	A subschema of the original schema, consisting of one or more attributes for which the condition of uniqueness of values in tuples of relations is declared, is called? - global relationship scheme - key - report	PC-1; PC-4; PC-5; PC-7
12.	- composite	An index for a subschema consisting of several attributes is called: - composite - non-unique - difficult	PC-1; PC-4; PC-5; PC-7
13.	- data consistency	For the database to work effectively, the following condition must be met: - data consistency - reliability of data - objectivity of data	PC-1; PC-4; PC-5; PC-7

14.	- it has automatic build-up	The "Counter" field is different in that: - integers must be entered - only the value is stored in the field, and the data itself is stored in another field - it has automatic build-up	PC-1; PC-4; PC-5; PC-7
15.	- symbol *	What character replaces everything when querying a database? - symbol * - symbol " - symbol &	PC-1; PC-4; PC-5; PC-7
16.	- substitution list	What allows you to automate data entry into a table? - sample - default value - substitution list	PC-1; PC-4; PC-5; PC-7
17.	- query masters	Queries are created using: - query masters - query services - client requests	PC-1; PC-4; PC-5; PC-7
18.	- level, node, connection	Basic concepts of a hierarchical database: - table, column, row - level, node, connection - relation, attribute, tuple	PC-1; PC-4; PC-5; PC-7
19.	- contains brief information about the described objects, presented in a strictly defined format	What is special about a factual database? - contains brief information about the described objects, presented in a strictly defined format - contains information of different types - contains information of a certain type	PC-1; PC-4; PC-5; PC-7
20.		Example of a factual database: - legislative act - order for the institution - information about the institution's personnel	PC-1; PC-4; PC-5; PC-7
21.	- a set of DB and DBMS	What is an information system? - a set of DB and DBMS - a set of hardware and software tools designed to work with information	PC-1; PC-4; PC-5; PC-7

		- a set of data	
22.	- facts that have not been processed	Data is: - presentation of information in a formalized form for working with them - information in a specific context - facts that have not been processed	PC-1; PC-4; PC-5; PC-7
23.	- the presence of both vertical and horizontal hierarchical connections	Network DB assumes: - the presence of both vertical and horizontal hierarchical connections - relationships between several tables - relationships between data in the form of a tree	PC-1; PC-4; PC-5; PC-7
24.	- two-dimensional table	The most accurate analogue of a relational database: - two-dimensional table - vector - unordered data set	PC-1; PC-4; PC-5; PC-7
25.	A nonclustered index does not impose any restrictions on the ordering of records in the table, so you can create many nonclustered indexes on a single table, but these indexes have the same restrictions as clustered indexes: - the index cannot cover more than 16 columns; - maximum size of index key – 900 bytes. The leaf level of a nonclustered index contains a pointer to the data. If the table has a clustered index, the leaf level of the nonclustered index points to the clustering key. If there is no clustered index, the leaf level pages point to the data rows in the table.	Non-clustered index	PC-1; PC-4; PC-5; PC-7

26.	Layered indexes can be created based on one or more columns of a table. – such an index is called an index key and it has a number of limitations: - the index cannot cover more than 16 columns; - maximum size of index key – 900 bytes. The columns of a clustered index are called the clustering key. A clustered index has a special effect on SQL Server because it forces it to order the data in the table according to the clustering key. Because a table can only be ordered one way, you can only define one clustered index on it.	Clustered Indexes	PC-1; PC-4; PC-5; PC-7
27.	A composite index can be created based on several fields. In this case, the restrictions described earlier are valid. If the index is built on fixed-size fields, the sum of the lengths of these fields must not exceed these 900 bytes; if the index is built on variable-length fields, the sum of the maximum field sizes can exceed 900 bytes, but the sum itself for each record cannot be greater than 900 bytes.	Composite index	PC-1; PC-4; PC-5; PC-7
28.	Operating system files typically become fragmented over time due to repeated write operations. Indexes can also become fragmented, but index fragmentation is different from file fragmentation. When an index is created, all index key values are stored in sorted order on index pages. When a row is deleted from	Index fragmentation	PC-1; PC-4; PC-5; PC-7

	tables SQL Server must delete the corresponding entry in the index, which creates "holes" in the index page. SQL Server does not reclaim the freed space because the cost of finding and reusing "holes" in the index is too high. If a value in the base table changes, SQL Server moves the record with the pointer to another location, which creates another "hole." When the index pages become full and page splits are needed, the index becomes fragmented again. Over time, the indexes of the table where the change occurs fragmented data, become		
29.	Inner joins return only those rows that satisfy the join condition. Although an inner join can be specified in either the FROM or WHERE clause, it is recommended that you specify the JOIN operator in the FROM clause.	Inner join	PC-1; PC-4; PC-5; PC-7
30.	An outer join can be used to return all rows from one table and data from rows in a second table that match rows in the first, or to return all rows from all tables specified in the JOIN clause. The word OUTER can be omitted from the syntax, but LEFT, RIGHT, or FULL must be specified [1]. Remember that using outer joins defines an unambiguous order of joining tables. If a similar result can be obtained using inner joins, it is recommended to avoid using them.	Outer join	PC-1; PC-4; PC-5; PC-7

	use of external.		
31.	A cross join produces a result called the Cartesian product of the two tables. In the JOIN clause, each row from the first table is joined to each row from the second table. This type of join is used only in exceptional situations. The syntax for the CROSS JOIN operator is the same as for other types of joins, except that this join does not require you to specify the join conditions.	Cross joins	PC-1; PC-4; PC-5; PC-7
32.	A view is a simple SELECT statement with a given name stored in the database. The main advantage of a view is that once created, it acts like a table for all other SELECT statements you want to write.	Presentations	PC-1; PC-4; PC-5; PC-7
33.	A stored procedure is one or more named statements that are stored in a database. Almost any T-SQL command can be included in a stored procedure, making procedures suitable for applications and administrative tasks.	Stored procedures	PC-1; PC-4; PC-5; PC-7
34.	Query execution time is the most variable metric. It is affected by locks and resource contention on the server. Given this, it is especially important to always include query execution time in performance comparisons because this measure can help identify problems missed by other performance metrics. If you run SET STATISTICS TIME ON, SQL Server will return the execution time of all queries in milliseconds.	Request execution time	PC-1; PC-4; PC-5; PC-7

35.	Nested request differently they call inner query or inner select operation, while a statement containing a nested query is called an outer query or outer select operation.	Nested query	PC-1; PC-4; PC-5; PC-7
36.	The main purpose of an unbound subquery is to allow writing more dynamic code that does not require the user to know all the intermediate values that currently exist in the database.	Unrelated nested queries	PC-1; PC-4; PC-5; PC-7
37.	When a subquery is entered using the EXISTS keyword, it acts as an existence test. The WHERE clause of the outer query tests whether the rows returned by the subquery exist. The subquery does not return any data, but returns a TRUE or FALSE value.	Subqueries with the EXISTS keyword	PC-1; PC-4; PC-5; PC-7
38.	The NOT EXISTS operator works the same as the EXISTS operator, except that the WHERE clause that uses this operator is executed if the subquery does not return any rows.	Subqueries with NOT EXISTS operator	PC-1; PC-4; PC-5; PC-7
39.	Special type data, which Can used to store a result set for subsequent processing. The table type is primarily used to temporarily store a set of rows returned as the result set of a table-valued function. Functions and variables can be declared as table variables. Table variables can be used in functions, stored procedures, and packages.	Table variables	PC-1; PC-4; PC-5; PC-7

40.	Transactions are often defined as a set of actions or operations that complete successfully or fail as a unit.	The concept of a transaction	PC-1; PC-4; PC-5; PC-7
41.	Atomicity – if a transaction involves two or more chunks of data, either all are committed or none are committed	Transaction atomicity	PC-1; PC-4; PC-5; PC-7
42.	Consistency - At the end of a transaction, either a new valid view of the data exists, or the data is returned to its original state. Returning the data to its original state is part of the rollback mechanism provided by SQL Server transactions.	Transaction consistency	PC-1; PC-4; PC-5; PC-7
43.	Isolation – During the execution of a transaction (before it is committed or rolled back), data must be isolated and inaccessible to other transactions. The isolation level can be controlled on a per-transaction basis.	Transaction isolation	PC-1; PC-4; PC-5; PC-7
44.	Durability – Once a transaction is committed, the final state of the data is preserved, even if the server crashes or is rebooted. This property of a transaction is ensured by checkpoints and the database recovery process that occurs when SQL Server starts.	Transaction duration or durability	PC-1; PC-4; PC-5; PC-7
45.	Explicit transactions are typically defined in stored procedures. An explicit transaction begins when the BEGIN TRANSACTION statement is executed. The transaction ends when the COMMIT TRANSACTION statement or the ROLLBACK TRANSACTION statement is entered. After the transaction is committed, SQL	Defining Explicit Transactions	PC-1; PC-4; PC-5; PC-7

	Server ensures that data is written to the database even in emergency situations. The ROLLBACK statement returns the data to the state before the transaction was started. Although the ROLLBACK statement returns the data to its previous state, some components, such as initial values for identifying columns, are not restored.		
46.	If transactions are nested by having multiple BEGIN TRANSACTION statements in a session, the ROLLBACK statement rolls back the outermost nested transaction. This is true even if the ROLLBACK statement for the outer transaction is preceded by COMMIT statements for transactions at lower nesting levels.	Special ROLLBACK scenarios	PC-1; PC-4; PC-5; PC-7
47.	XML document consists of from declarations, elements, comments, special characters and directives. XML is a tagged document markup language. In other words, any XML document is a set of elements, with the beginning and end of each element designated by special marks called tags. An element consists of three parts: a start tag, content, and an end tag. A tag is text enclosed in angle brackets "<" and ">". An end tag has the same name as a start tag, but begins with a slash "/". An example of an XML element: <buyer>Sergey Dovlatov</buyer>	Structure of an XML document	PC-1; PC-4; PC-5; PC-7
48.	Majority browsers they are checking XML documents to see if they are in good condition	Valid XML documents	PC-1; PC-4;

	formed. Some browsers can also check whether a document is valid. An XML document is valid if it has a Document Type Declaration (DTD) or XML schema associated with it, and if the document satisfies that DTD or schema. That is, the DTD or schema specifies a set of rules for the internal integrity of the document itself, and if the browser can confirm that the document satisfies those rules, it is valid.		PC-5; PC-7
49.	A static model describes the permissible states of a system. Static models describe the types of objects in a system, their properties and relationships. Describing objects, they define, of course, their names. Reaching Having naming conventions for all objects means winning half the battle, which is why XML information models are sometimes called vocabularies.	Static information model	PC-1; PC-4; PC-5; PC-7
50.	Dynamic models describe, What happens to the information: Examples of such models are workflow diagrams, data flows, and object life cycles. Dynamic models consist of statements such as: “The pathology department will send the test results to the consultant responsible for the patient.” Dynamic models describe the process of information exchange: data is sent from one place to another for a specific purpose.	Dynamic information model	PC-1; PC-4; PC-5; PC-7
51.	Workflow models focus on the role of people and organizations in getting work done, with information storage and processing playing a secondary role. Process Model	Workflow models	PC-1; PC-4; PC-5; PC-7

	describes, For example, What will th traveler if an accident occurs during their vacation. It defines the actions that the local representative at the resort, the agent in the country where the resort is located, and the head office are responsible for. As a result, it becomes clear who should be responsible for organizing medical assistance, transporting the tourist home, and informing relatives.		
52.	Data flow models are very similar to the previous type, but here the focus is on information systems rather than business systems. This model describes <i>data warehouses</i> (data stores), where information is permanently located (this could be a database on a computer or just cabinet folders), <i>processors</i> , manipulating this data, and <i>streams</i> <i>data</i> , transmitting data from one processor to another	Data Flow Models	PC-1; PC-4; PC-5; PC-7
53.	Object models contain both dynamic and static components. The dynamic or behavioral part of an object definition focuses on what each object can do or has done, representing a set of operations or methods that describe its actions.	Object models	PC-1; PC-4; PC-5; PC-7