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LOGICS

**Training manual for test
and examination preparation**

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L84

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PREFACE

In terms of transformation of Ukrainian society along the way of European integration, the issue of increasing the level of self-awareness of Ukrainian nation arises, on which the quality of democratic changes and the rule-of-law state building depends. The main factor in such a process is a human mind, the tool of which is logic. The level of civilization depends directly on the level of intellectual culture of the society. Rationality also determines the quality of legal reality, which is formed, developed and protected by educated lawyers. That is why, within the reform of higher legal education logics proves its traditional value of the instrument of intellectual activity of lawyer.

The purpose of the logics course is to teach the basics of logical analysis through acquisition of knowledge about the forms of thought and laws of correct thinking.

The training manual on logics is based on the programme of general educational course «Logics» for higher education establishments, which is obligatory for future lawyers to study. This manual is intended for students' preparation for the exam on logics.

Structurally the manual is divided into two sections – theoretical and practical. The theoretical section is structured according to the order of questions for the exam and answers to them. Each question is provided with particular theoretical material and sufficient examples for explanation. The practical section contains the tests, doing which the reader can check his/her knowledge of logics independently, and, thus, prepare for the practical questions on logical analysis. Each test task suggests four possible answers, among them only one is correct.

The team of authors believes the manual will be helpful in learning logical theory and getting skills of logical analysis while preparing for the exam on the discipline «Logics».

I. THEORETICAL QUESTIONS AND ANSWERS FOR EXAM

===== 1. Subject of logics as a science

The concept «logics» comes from Greek word *logos*, which means a thought, word, statement, reasoning, law.

The concept «logics» is used for describing:

1) the patterns of the objective world (logic of nature, logic of historical process, etc.);

2) the natural intellectual abilities in everyday thinking (natural logic);

3) the cultural professional thinking;

4) the science which researches human thinking, etc.

The subject of the science of logics is forms of thought with the right thinking and laws on which thoughts in search of truth are formed.

The correct thinking is performed according to logical norms (rules and laws). The principles of correct thinking are: *certainty*, *consistency* and *provability (argumentation)*. Certainty is achieved through the provision of statements to be unambiguous. Consistency becomes possible with the absence of contradictions. Provability means presentation of grounds (arguments) for the main subject of proof.

Incorrect thinking doesn't comply with the logical norms and produces alogisms – logical wrongs.

Basic forms of thought are *concepts*, *statements* and *deductions*.

Basic laws of traditional logics are *the law of identity*, *law of non-contradiction*, *law of the excluded third* and *law of sufficient reason*.

Each thought has a form and content.

The form of thought (logical form) is a way of organization of the content parts of the subject of thought, which corresponds to the subject of reality. The form of thought is invariant, and content is variable.

The truth of the form and content of thought means that a form should be correct (constructed according to the rules), and content should be adequate (appropriate to reality). The thought will be wrong if it has incorrect logical form or inadequate content, or both of them.

Ontological truth means that the object exists in reality.

Epistemological truth means that the subject of thought in content is adequately relevant to the existing object.

Logical truth means that the form of thought is correct.

===== 2. **The concept of thinking. Abstract and concrete thinking, their general characteristics**

The object of logics as a science is a thought and human thinking.

Thinking from a logical point of view is a process of thought formation and establishing relationships between thoughts, that creates certain intellectual structures and is evaluated according to the rules of truth.

Thinking can be: theoretical and practical, figurative and verbal, concrete and abstract, ordinary thinking and scientific thinking.

Legal branch of social activity demands development of different forms of lawyers' thinking. First of all, in legal and legislative activity there is a need for abstract and scientific verbal thinking. In law enforcement activity concrete and figurative thinking matter. A human has one intellect, that is why these forms are indirectly interrelated in the practice of thinking: abstract thinking gains knowledge on the grounds of concrete experience, and knowledge obtained from abstract thinking is used in concrete thinking.

Abstract thinking (from Latin *abstraction* – separate, distract) is a process of creation of generalized objects with distraction from insignificant characteristics and objective form. It is used for theoretical thinking.

Abstract thinking features are: *generalization, indirectness and inseparable connection with language.*

Generalization is an ability of abstract thinking to characterize objects in the aggregate of their essential features. Indirectness fixes relative independence of knowledge from object. Inseparable connection with language means that abstract thinking is not a figurative but verbal one.

Concrete thinking is a process of concept formation in relation to individual objects by essential characteristics and establishing relations among these concepts. It is used for practical thinking. Professional thinking and ordinary thinking should be distinguished. A change of

situational connections has spontaneous uncontrolled influence on concrete ordinary thinking, whereas professional concrete thinking avoids such influence or takes it into account.

Concrete thinking features are: direct connection with practice; operation with single objects that have an imaginary figurative form; detailing; relative dependence on time and contexts.

===== 3. Historical stages of Logics development

The history of science of logics is connected with a public practice of discussion. The stages of development of logics as a science are as follows:

I stage – traditional logics (from the IV century b. c. to the middle of the XIX century);

II stage – modern logics (from the middle of the XIX century to nowadays).

In turn, modern logics is divided into classical (mathematical, symbolic) and non-classical (modal, fuzzy etc.).

The appearance of logics as an independent science is connected with the name of Aristotle. Aristotle is an ancestor of traditional logics. Basic logical theories are the theory of syllogisms (deduction) and theory of proof. The principal complex of works on logics called the «Organon» includes «Categories», «The first and second analytics», «Topic», «About interpretation», «About sophistic refutations» and «Rhetoric». Aristotle didn't use the concept of «logics», he used the term «analytics».

For the first time the word «logics» started to be used by Stoics (Zeno, Diodorus, Ebulid, Philo and others). The development of the theory of expression and studying the problems of modal logics are attributed to them.

The logics of Aristotle and Stoics found its continuation in scholastic logics of the Medieval period. The representatives of this period are: John Roscelin, Pierre Abelard, Peter of Spain, Raymond Lully, Duns Scott, William Ockham and others. In this period logics acquired the status of a university discipline, the first textbooks on logics appeared in Medieval Europe (Peter Spanish).

In the XVII century scholastic logics was strongly criticized. F. Bacon developed «the logics of discovery” and in the work «New Organon» he introduced a new method of induction.

Modern logics stage began with the appearance of mathematical logics. Mathematical logics represents a classical paradigm in logics history. It uses the method of formalization with involvement of special language of logics which is an analogy with the mathematics’ language. It is connected with the name of G. Leibniz, as well as T. Hobbes and R. Descartes. The period of algebra of logics started with the publication of J. Bull work «Mathematical analysis of logics». The method of logical calculations with the use of algebraic symbolism appeared, the deduction process was treated as solving logical equations. Logics became a theory of substantiation of mathematics. German logician Gottlob Frege developed axiomatic constructions of computational expression, quantification theory, basic principles of logical semantics.

Non-classical period of modern logics includes the period from the beginning of the XX century until nowadays. Non-classical logics appeared as a set of different formal systems, in which the apparatus of traditional and formal logics varies, which allows to obtain different models of logical conclusions and logical truth. Among the types of non-classical logics are: fuzzy logic, intuitionistic calculus of statements, linear logic, modal logic, paracontradictory logic, relevant logic and others.

===== 4. The importance of logics for jurisprudence and legal practice

There can be distinguished theoretical and practical importance of logics.

General theoretical significance of logics is in its methodological function. Logics contains laws and rules of design of scientific subjects, logical criteria of truth, which became a formal basis of criteria of scientific truth. It means that despite content difference sciences follow the same rules of formation of scientific objects, laws, they have the same truth criteria. Wrong thinking is also a subject to criticism in any science according to logical criteria of truth.

Creation of the theory of artificial intelligence is evidence of general theoretical significance. The language of logics appeared as a basic symbolic apparatus for programming languages.

Logical knowledge has its methodological significance for jurisprudence science. Law appears in it as a certain logical system. General legal concepts are formed according to the logical criteria. Basic evaluation concepts of law are explored by deontological logics (the logics of norms). Logical methods are used both while creating legal acts, and while interpreting texts of laws. Methods of traditional and modern logics are used in scientific legal researches. Thanks to their use theoretical modelling in jurisprudence theory becomes possible. Traditional and modern logics methods are part of jurisprudence methodology.

General cultural practical significance of logics is in the formation of thinking culture by mastering and applying logical laws and rules of strict thinking. Logical culture is a condition of raising the level of rationality, which is a basis for the growth of the level of civilization and formation of «smart nation».

Logics forms the lawyers' intellectual culture. Knowledge of logical theory of definition is necessary, in particular, for correct legal qualification of offences, interrogative logic is necessary for interrogation, induction and analogy methods are used while constructing investigative versions, deductive method has a great significance both in investigative practice and in court decisions, theory of proof is used at various stages of proceedings, and so on.

5. Thinking and language. Semiotics

Thinking expresses itself in an oral or written language forms.

Language is a system of signs with a relationship determined by the rules of formation and transformation. That is, language is a system of signs with a given interpretation which is used for communication and cognition.

Languages are divided into natural, artificial, hybrid.

Natural languages appear spontaneously in practical activity. They are used as an effective means of communication. All national languages are natural (Ukrainian, English, French, etc.).

Artificial languages are created by humans for fixation, saving and processing of results and means of cognition (ciphers, language of mathematics, logic, programming language and so on). Artificial languages are used for technical communication according to the set rules.

Hybrid (specialized) languages connect natural and artificial languages elements (language of logics of Aristotle, scientific terminology).

Each language is a system of signs.

Semiotics is a science about signs and systems of signs. It was created by American philosopher and logician Charles Peirce in the XIX century. C. Peirce identified the subjects of logic and semiotics.

Sign is a material object which is an object substitute in language, sign represents it symbolically. V. Leibniz supposed that signs make logical operations easier. Signs should be short in form and rich in content.

Signs are divided into: indexes, iconic and symbolic signs.

Signs-indexes (pointers) are items which point to other items. Causal relationship is established between them.

Signs-indexes are divided into: decent indexes (fingerprints, bullets, bruises) and conventional (conditional) indexes (traffic signs).

Iconic signs (images) are similar to the corresponding objects (map, photo robot, metaphor).

Symbolic signs are not connected with items physically and figuratively. The connection is conditional or spontaneous, it is established in practice (trident in Ukrainian symbols). Words of natural language are fixed in an alphabet as symbolic signs. Symbolic signs have different meanings.

Each sign has its objective meaning and significance.

Objective meaning is an object that corresponds to the sign.

Significance is information about the item, on the basis of which a perfect image of the subject is constructed.

Significance can be: 1) *direct*, that separates the item from others; 2) *indirect* (figurative), that is established on the basis of the similarity of objects and 3) *etymological* (literal), indicating the origin of the word.

Semiotics include three theories that represent levels of semiotic analysis of language: syntax, semantics and pragmatics.

Syntax (from Greek *sintaxis* – addition, construction, order) determines types of signs and relationship between signs (sign – sign), develops rules of sign system constructing.

Semantics (from Greek *semanticos* – marked) explores the relationship between item and sign system (sign – meaning). Within semantics there is a theory of interpretation (meaning).

Pragmatics (from Greek *pragmaticus* – practical) explores the relationship between a subject of cognition and sign system (sign – significance). Significance is an object of imagination (but not directly of observation) which is represented meaningfully. Within pragmatics there appeared a pragmatic theory of interpretation (significance).

The relationship between sign, meaning and significance constitutes a semiotic *triangle*. Semantic and pragmatic theories of interpretation are used in legal hermeneutics for interpretation of legal norms and other legal texts.

===== 6. General characteristics of concept as a form of thought. Concept and word

The term «concept» is used: a) for marking a system of knowledge about the items and their relationship (in theoretical meaning) and b) for marking an imaginary action (in practical meaning).

Forming a concept means generalizing sensory knowledge by identifying the essential characteristics of the object.

Each concept corresponds to a specific *object of thought*: material thing, phenomenon, ideal objects (abstractions), symbolic signs, creations of human imagination, etc.

Concept is a form of thought which corresponds to the items of reality with a set of their common essential features.

Concepts can be true or false. False concept doesn't correspond to the reality and can contain contradictions. True concept is meaningfully adequate to reality and correct in logical form.

Logical structure of concept contains: content and scope.

Methods of concept formation are comparison, analysis, synthesis, abstraction and generalization.

Comparison is a recognition of similarity or difference of items.

Analysis is a division of concept into constituent parts.

Synthesis is a combination of components of the object.

Abstraction is a distraction from the insignificant features of the object.

Generalization is the formation of sets of objects by one property by its identification.

Language form of concepts are words and phrases. But not every word expresses a concept, but only: noun parts of speech (nouns, adjectives, numerals, pronouns). Particles, exclamations, verbs and adverbs do not define concepts.

Verbal naming of concepts is called a term. Concepts have objective and semantic meaning. Objective meaning is named denotation. *Denotation* is an object which corresponds to the concept and word (phrase). *Semantic meaning (significance)* is meaningful information about the object. Concepts are unambiguous, and words are ambiguous or residual in relation to the conceptual form of thought. Homonyms are the same words which correspond to different concepts, and synonyms are different words which correspond to the same concept.

===== 7. **Logical structure of concept. Law of inverse relation between concept content and scope**

Concept is a form of thought which corresponds to the objects of reality with a set of their general essential features.

Logical structure of concept contains: content and scope.

Concept content is a quality (intentional) characteristic of concept, which represents a set of essential features of the object of thought.

Content conveys general information concerning the object of cognition (denotation). Concept content is a characteristic of the object of thought. Since concept content consists of a certain amount of essential features that are structured in a certain way, the content of concept cannot be exactly identical to a set of characteristics of the object of reality.

For example, according to the legal definition presented in art. 185 of Criminal Code of Ukraine, the content of concept «theft» contains features of «secret abduction of someone else's property». It is clear that the object of thought is a generalized theft with general features of all

thefts, and concrete characteristics concerning subject, conditions and other possible details in thought are absent.

Concept scope is a quantitative (extensional) characteristic of concept which represents a set (class) of individuals that are covered by thought and appear as its subject. Concept scope is measured with a number: for generalized and abstract concepts with classes with a great number of elements or with an infinite number, and for concrete concepts with a one-element class and small classes of elements. Concepts the class of which doesn't contain elements have exceptional characteristics.

For example, the scope of concept «theft» contains an infinite set of single occasions of thefts, the scope of concept «the 1st year students of the Faculty Training Personnel for Justice Bodies of Yaroslav Mudryi National Law University» contains a finite set of students, and the scope of concept «Yaroslav Mudryi National Law University» contains a set equal to one. The grammatical number («theft» – sing., «thefts» – plural.) doesn't affect the scope of thought.

Patterns of relationship between content and scope of concepts are expressed in *the law of inverse relationship between the content and scope of concepts*: if a scope of concept increases, a content becomes narrower. And, on the contrary, if the content of a concept becomes wider, the scope decreases. This pattern of the inverse relationship has a specific significance for classification constructions and so on.

For example, when comparing concepts «theft» and «theft through the abuse of trust» the concept scope «theft» will be bigger, and a content will be smaller in comparison with a scope and content of the concept «theft through the abuse of trust». Because thought covers more cases of theft than cases of theft through the abuse of trust. In addition, the content of the concept «theft through the abuse of trust» will contain both signs of theft and special characteristics of thefts through the abuse of trust.

8. Types of features that make up the concept content

Concept is a form of thought which corresponds to the objects of reality with a set of their general essential features.

Concept content is a quality (intentional) characteristic of concept, which represents a set of essential features of the object of thought.

As a feature the quality of object or relationship between objects could be displayed. *Feature* is a logical characteristic of presence or absence of quality or relationship of the object of thought.

Types of features, which make up the concept content:

1) By substance can be *significant* and *insignificant*.

Significance is a necessary and sufficient feature (quality or relationship), which allows us to understand an object as a whole and to answer the question «What is it?». For example, significant features of the concept «looting» are «open abduction of someone else's property». Insignificant features will not be included in the definition.

Significant features, in turn, are divided into *basic* and *derivative*. For example, if a significant basic feature of legal specialty students is their studying at a higher educational legal establishment, a significant derivative feature is that they are studying the history of state and law.

Basic features can be *general* and *individual*, *generic* and *specific*.

The general feature characterizes a certain number of items and is a basis for their generalization. For example, the general feature of a crime is «defined by the Criminal Code of Ukraine socially dangerous criminal act (action or omission) committed by the subject of the crime». All specific occasions of crime are generalized exactly on the basis of these characteristics.

The individual feature belongs to one item or to the group of items. For example, personal (fingerprints, facial features) or collective characteristics (groups of bikers, metalheads, etc.).

Generic and specific features are significant in relation to genus and species. For example, the generic feature of theft, looting and robbery is that they are crimes. Generic features are significant, basic and general for these items. Specific features will distinguish theft, looting and robbery within a class of crimes. Specific feature is also significant.

2) The amount of quality can be *simple* and *complex*.

Simple feature is a single feature. For example, yellow. Complex feature is a combination of several features in the characteristics of the object. For example, the yellow-and-blue color of the Ukrainian flag.

3) Quality features can be *positive* and *negative*.

Positive feature is that one which is present in the object. Negative one is a feature which is absent in the object. In this case, moral assessments do not matter. For example, positive features are symmetry, fairness, infectivity etc. Negative features are inaction, ignorance, irresponsibility, disinfection and so on.

Combining such possible logical characteristics of features, it is possible to perform logical analysis of the feature «yellow-and-blue» concerning the Ukrainian flag, which is: significant, basic, individual, complex and positive.

===== 9. **Extensional characteristics of concepts** **(types of concepts by scope)**

Concepts are divided into types by scope and content.

Types of concepts by scope (extensional characteristic).

A. According to the number of elements of scope concepts are divided into:

– *empty concepts* – empty classes correspond to them. Namely, such a concept doesn't correspond to any item in reality. Empty concepts are divided into: *false*, *hypothetic* and *necessary*.

Empty false concepts, in turn, are divided into false in fact (Ukrainian inquisition) and logically false (peaceful war – a concept which contains internal contradiction).

Empty hypothetic concept contains ideal characteristics of an item. They are ideals and several scientific abstractions (ideal state, high law, ideal gas);

– *non-empty concepts* – they contain one or more elements of the class. They reflect items that exist in reality. They are divided into *single* and *general*.

Single concepts contain a class which is equal to one (Kharkiv city, Yaroslav Mudryi National Law University).

General concepts contain a class with more than one item (lawyer, law, court). General concepts are divided into: registering, non-registering and universal. General registering concepts cover a finite set of objects (norms of Criminal Code of Ukraine). General non-registering concepts reflect an infinite number of objects (crime, law). Universal concepts

cover an infinite number of objects which is symbolically equal to one (Universal, Law, truth).

B. By the character (connection / disconnection) of elements of scope concepts are divided into:

– *prefabricated* concepts with connected elements of class which arise as an aggregate integrity of objects.

Prefabricated concepts are divided into: prefabricated single, which cover one totality (Criminal Code of Ukraine) and prefabricated general, which cover a set of aggregates (code);

– *incomprehensible concepts*, in which possible relationships between elements of class (citizen, law) are ignored.

===== 10. Intentional characteristics of concepts (types of concepts by content)

A. By the type of elements of scope concepts are divided into:

– *concrete*, that correspond to objects (sources, lawyer, law);

– *abstract*, that generalize item features with distraction from the object form (Law, cost, freedom).

B. According to the character of features concepts are divided into:

– *positive*, which fix a presence of features in an object (legality, Law, interrogation report);

– *negative*, which point to the absence of features (unemployment, captivity, alogism).

C. According to the connection concepts are divided into:

– *relative*, that contain a feature of relationship (temporal, spatial, family, socially dependent, etc.), don't have autonomous sense and depend on the content of paired concept (for example: cause and effect, plaintiff and defendant, prosecutor and defense counsel);

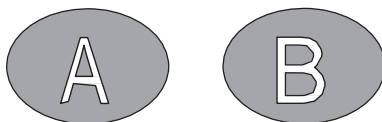
– *irrelevant*, which have autonomous content (law, crime, legal norm).

Carrying out *the complete logical analysis of a concept* means to define all logical characteristics of its scope and content. For example: *law* is a) non-empty; b) general; c) non-registering; d) incomprehensible; e) concrete; f) positive; g) irrelevant concept.

11. The relationship of compatibility between concepts. Its representation using Euler – Venn diagrams

In the process of thinking a correlation between concepts by scope taking into account the content is executed. Logics insists on the strict correlation between concepts. For marking relationships between concepts Euler – Venn diagrams are used.

All the concepts can be *comparable (relative)* or *incomparable (incompatible)*. It means that not every relationship will make sense. For example, concepts A – «pension» and B – «Eiffel Tower» are incomparable (pic. 1). These concepts cannot be found in any definition or classification. That's why logics does not consider incomparable concepts.



Pic. 1

Comparable concepts can be correlated by two criteria: the presence of common elements of scope or a common generic concept.

Comparable concepts are divided into two groups – compatible and incompatible in scope.

Compatible concepts are concepts which have common elements of scope («lawyer» and «prosecutor»). Types of compatible concepts: 1) identical, 2) subordinate and 3) cross concepts.

1. *Identical concepts* have the same scope, joint common denotant but different content. Their scopes completely coincide. For example, A – «Aristotle» and B – «teacher of Alexander the Great» (pic. 2), A – «Constitution» and B – «principal law» (pic. 2).

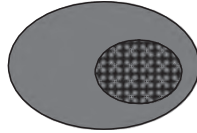
Formula: $A = B$



Pic. 2

2. *Subordinate concepts* have the inclusion of the full scope of one concept into the scope of another, where B is a subordinate (specific), A is a subordinate (generic) concept. For example, «Law» and «civil law» (pic. 3), «specialist» and «lawyer» (pic. 3).

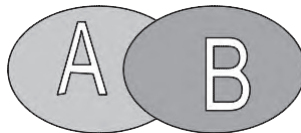
Formula: $B \subset A$ (B belongs to A).



Pic. 3

3. *Cross concepts* have a part of common scope but different content. For example, A – «lawyer» and B – «teacher» (pic. 4), A – «legal relations» and B – «economic relations» (pic. 4).

Formula: $A \cap B$.

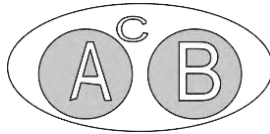


Pic. 4

==== 12. The relationship of incompatibility between concepts. Its representation using Euler – Venn diagrams

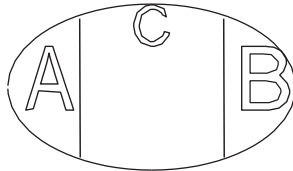
Incompatible concepts are determined by the second criterion of correlation. Their scopes don't coincide, but they belong to the common generic concept. Types of incompatible concepts: 1) subordinate (co-subordinate), 2) counter (opposite) and 3) contradictory.

1. *Subordinate (co-subordinate) concepts* neither have any common class element, nor any common specific features, but their scopes are equally subject to a common generic concept. For example, A – «criminal law» and B – «civil law» (pic. 5), A – «Ukrainian state» and B – «Polish state» (pic. 5).



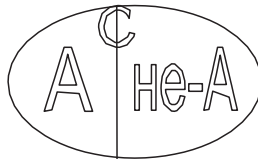
Pic. 5

2. *Counter (opposite) concepts* don't have any common element of scope, opposite meaning (antonyms), but do not exhaust the scope of the common generic concept. Thus, it is possible that in the generic aspect there is another specific type of concept. For example, A – «rich» and B – «pure» (pic. 6).



Pic. 6

3. *Contradictory concepts* don't have any common element of scope, one is positive, another is negative, and a scope of generic concept is completely exhausted. That is, the third concept is impossible. For example, A – «lawful» and non-A – «unlawful» (pic. 7), A – «corrupt» and non-A – «non-corrupt» (pic. 7).



Pic. 7

==== 13. Generalization as a logical operation over concepts

As any concept has two logical characteristics (content and scope), for their clarification it is necessary to perform logical operations over concepts.

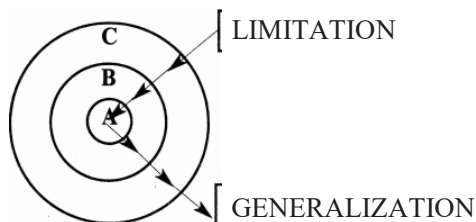
The law on the inverse relationship between the concept content and scope is the basis of the operation of generalization of concepts. Logical operation of generalization usually precedes a logical operation of defining the concept and is necessary to find out the content of the original concept, and limitation for logical operation of division for finding out the scope of this concept. In the process of generalization generic concept is found to the given original concept, and in the process of limitation only one of its types is searched for.

Generalization is a logical operation in which there is a transition from a concept with a smaller scope (specific concept) to a concept with a larger scope (generic concept). In this case, the exclusion of a specific feature from the content of the original concept allows to obtain a generic concept.

For example, generalization of the concept A – «espionage» leads to the concepts B – «crime against basics of national security», C – «crime», D – «offense».

Thus, the process of transition from a specific to a generic concept occurs by increasing the scope and reducing the content of the original concept, that is by rejecting certain features of the class of objects that are in the concept.

The boundaries of operation of generalization are the most general for a particular area of knowledge concepts that are called scientific categories. For example, concepts «Law», «action», «state» are categories of legal science. Concepts «law», «matter», «necessity» belong to the categories of philosophy. Graphically, the relationship between concepts in the process of generalization and limitation can be depicted in diagrams (see pic. 1).



Pic. 1

While conducting a logical operation of generalization, sometimes mistakes can be made, connected with the fact that the transition from

specific to generic can be confused with the transition from “part” to “whole”. For example, the transition from the concept «art. 12 of current Criminal Code of Ukraine» to concepts «general part of current Criminal Code of Ukraine», «criminal code» is not generalized. Besides, during the operation of generalization of concepts it is necessary to avoid «jumps». In other words, this logical operation requires a certain sequence. Each step of generalization should be a transition to the nearest concept type.

==== 14. Limitation as a logical operation over concepts

The law on the inverse relationship between the concept content and scope forms the basis for the operation of concept limitation.

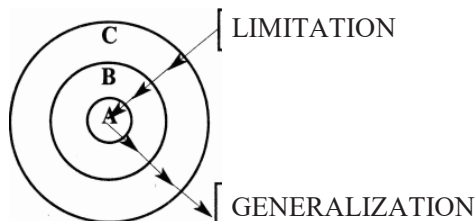
By adding to the set of features which represent the content of some concept new features, the scope of this concept changes accordingly in the direction of reduction. This process causes the transition from one concept to the other original concept. Such inverse logical operation marks the concept limitation.

Concept limitation is a logical operation in which the transition from the concept with larger scope (generic) to the concept with smaller scope (specific) is carried out. In this case, adding a new essential feature to the content of the original concept allows to get the concept of the same type.

For example, limitation of the concept C – «offense» can lead to the concept B – «crime», and then to the concept A – «felony».

The boundaries of the operation of limitation are single concepts.

Graphically, the relationship between concepts in the process of generalization and limitation can be depicted in diagrams (see pic. 1).

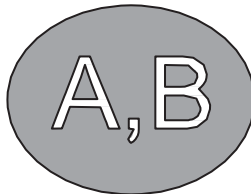


Pic. 1

While carrying out logical operation of limitation mistakes sometimes occur, connected with that fact that the transition from generic to specific is confused with the transition from “whole” to “part”. For example, the transition from the concept «art. 12 of current Criminal Code of Ukraine» to the concept «p. 1 art. 12 of current Criminal Code of Ukraine» is not a limitation. Besides, during operations of limitation of concepts it is necessary to avoid «jumps». In other words, this logical operation requires a certain sequence. Each step of limitation must be a transition to the nearest concept type.

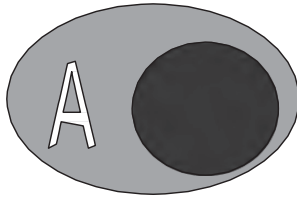
===== 15. Operations with classes (unification, crossing, addition to the class)

Operation of *unification (adding)* of classes is a new class creation, which scope includes all the elements of the source classes. Its result depends on the correlation between the source classes. If the concepts A and B on which the operation of unification is carried out are in the relationship of similarity between themselves, result of this operation still will be the same class (A) (pic. 1).



Pic. 1

If the concepts A and B on which the operation of unification is performed are in the relationship of subordination between themselves, as a result of this operation we will get the class of generic concept (pic. 2). For example, while adding concepts B – “serious crime” and A – “crime” we’ll get the concept A – “crime”.



Pic. 2

If the concepts A and B on which the operation of unification is executed are in the relationship of crossing or incompatibility between themselves, as a result of this operation we will get a new class which includes all the elements of the A-class and all the elements of the B-class (pic. 3, 3a). *For example*, while performing the operation on adding the class of “serious crime” to the class of “particularly serious crime” we’ll get a class of “serious and particularly serious crime”.



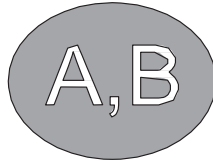
Pic. 3



Pic. 3a

The operation of *crossing (multiplication)* of classes is a creation of a new class which scope includes joint elements of the source classes. An empty plural will be the result of multiplication of incompatible concepts. The result of multiplication of incompatible concepts depends on the correlation between them. If the concepts A and B on which the operation of multiplication is carried out are in the relationship of

similarity between themselves, the same class will be the result of such an operation (A) (pic. 4).



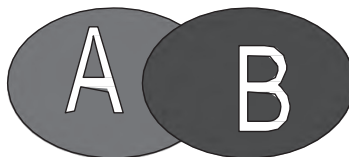
Pic. 4

If the concepts A and B on which the operation of multiplication is performed are in the relationship of subordination between themselves, the result will be a class of specific concepts (pic. 5).



Pic. 5

If the concepts A and B on which the operation of multiplication) is performed are in the relationship of crossing, the result of such operation will be a new class which will include only such elements of the A-class which are the elements of the B-class at the same time (pic. 6).



Pic. 6

For example, while executing the operation on the multiplication of the classes of “serious crime” and “crime” we’ll get a class of “serious crime” (pic. 5), of the classes of “serious crime” and “crime against a person” we’ll get “serious crime against a person” (pic. 6).

When we analyze a concept, we don't think about it as something single and independent. *For example*, if we think about the concept of "advocate", we can't do it in any other way than comparing it to its addition which is the concept of "non-advocate" in the measures of their joint concept of "lawyer". Without comparing concepts of advocate and non-advocate we can't draw a logical measure between them and in the same way we can't decide which lawyers are advocates and which are not. Without thinking about an advocate included into the class of lawyers we can't compare them with all of the non-advocates and thus we also can't define which lawyers are named as advocates. We can't understand, for example, what justice is without comparing it to injustice in all possible relationships between people.

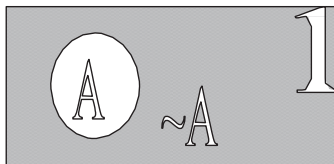
If A marks the considered concept, - A marks addition, 1 marks the unified (A and -A) concept (pic. 7). If to return to the example with advocates, then A will mark advocates, - A will mark non-advocates, 1 will mark lawyers. All these concepts will create a system according to the next equation: $f = A + (-A)$.

The operation of addition to the class A (subtraction) is called the class of non-A, which being added to the A-class creates a universe which is the set of that subject area which is thought by us, and while crossing with the A-class gives an empty plural, that is:

$$A + -A = 1$$

$$A * \text{non-}A = \emptyset$$

from where $-A = 1 - A$ (pic. 7).



Pic. 7

Thus, the elementary mental system, from formation and subsequent enrichment with different transformations of which the thinking of every person begins, consists of this concept, its addition and their joined concept (a universe). The universe is the nearest generalizing class of

things in the terms of which the considered concept is determined. The universe plays the same role that the common denominator when adding and subtracting fractions plays. Just as it is impossible to correctly add simple fractions without first reducing them to a common denominator, it is impossible to make any transformation of a concept without first defining its universe. Diplomats before conducting negotiations firstly necessarily define the meeting format that is the universe of their actions. The concept universe defines a subject area of certain logical operations. The ability to determine a universe of considered thought with the help of creation of its addition is the most important evidence of the development of thinking.

===== 16. Concept division rules

Concept division is a logical operation with the help of which the scope of generic concept is revealed through the list of its types and elements.

For example, the concept of “crime” scope in result of the division operation can be presented as the number of scopes of “crimes of small gravity”, “crimes of middle gravity”, “serious crimes” and “particularly serious crimes”. Three elements are allocated into the structure division that are: a divided concept, a basis of division and members of division. The concept which is divided is called a divisible concept (in a given example is a concept of “crime”), and results of division are particular specific concepts (“crimes of small gravity”, “crimes of middle gravity”, “serious crimes” and “particularly serious crimes”) that are members of division. The feature, according to which the division is carried out, is called its basis or principle (the level of gravity). Some feature can be presented as a basis of division only under condition that it is characteristic of each element of the scope of the shared concept, but is manifested differently in the subclasses of this scope.

Concept division rules.

1. Concept division should be performed according to one basis. The violation of this rule leads to the mistake which is a “replacement of the basis of division”.

2. Division should be commensurate, which means the number of scopes of division members should be equal to the scope of divisible concept. In result of violation of this rule such two mistakes can appear:

a) “narrow division” or “incomplete division”. This mistake occurs when the number of scopes of division members does not completely exhaust the volume of the divisible concept. *For example*, crimes are divided into the crimes of small gravity, crimes of middle gravity, serious crimes. In this example one of the division members is lost that is particularly serious crimes;

b) “broad division” or “division with extra members of division”. This mistake happens when along with the decent members of division, concepts which do not belong to the scope of divisible concept or belong to them only in part are named. *For example*, states are divided into unitary, federal and confederations. As confederations are unions of states, the scope of this concept does not belong to the scope of the divisible concept and there is a mistake of a broad division in a given example.

3. Members of division should exclude each other, that means not to have joint elements. The example of this rule violation: “Crimes are divided into intentional, negligent and economic”.

4. Division should be continuous (gradual), that is division members should be concepts of one order of commonality. In other words, each member of division should be the nearest type of divisible concept. Violation of this rule leads to the mistake called “the jump in division”. Thus, the division “Art consists of such types as music, architects, sculpture, song...” is incorrect, because a song is a variety of musical types of art.

5. The basis of division should be clear, it means that choosing it evaluation concepts and subjective attitude should be avoided. For example, while division of personal relationships into friendly and unfriendly the basis of division is not clear.

===== 17. Concept division types

Traditionally two types of division are distinguished – the division by sort (simple division) and dichotomy.

Division by sort is a division with the help of which divisible (generic) concept in thoughts is divided into types according to specific manifestation of a certain feature in different groups of elements of its scope.

The basis of such a division is a feature which is characteristic for every item, which is thought of as a divisible concept but manifests itself in different ways. *For example*, each student studies (in such a way they are similar), but different students have different levels of success. Such a difference is an objective basis for division of the scope of concept of “student” on “excellent students”, “those who study well” and “those who study satisfactorily”. As a result of concept division through the division by sort, different numbers of members of division are obtained, namely, from two (for example, there exist two forms of guilt that are intent and negligence) to infinity.

Dichotomy division is a division the members of which are two contradictory concepts.

The basis of this division is a presence or absence of particular feature (features) in objects which are thought as divisible concepts. As a result of this division only two members of the division which are always contradictory concepts are considered. *For example*, intent is divided into direct and indirect, states are divided into democratic and non-democratic. The procedure of dichotomy division is technical, but those who carried out a dichotomy division may not be aware of the content and scope of both the shared concept and the members of the division. Dichotomy is usually used as an aid in establishing classifications.

Concept division must be distinguished from the imaginary dismemberment of objects, which is called mereological division. *Mereological division* is a division of the whole into parts, but not division of the concept into types. For example, the Criminal Code of Ukraine consists of the General and Special parts.

18. Classification. Types of classifications

Classification (from Latin *classis* – category and Latin *facere* – perform) is a complex multistage division (that is, the system of divisions)

which is executed with the purpose of achieving new knowledge about members of division and systematization of such knowledge.

Because of classification, the divisible concept imaginary is divided into the specific concepts, each of them (if there is a basis), in its turn, is divided into subsorts etc. Classification is a special occasion of using the concept scope division operation, which is a system of divisions. Continuing the division consistently, that is, dividing the class into subclasses, and subclasses into regular concept sorts and so on, we can finally achieve single concepts. The special feature of classification is a possibility of joining division by sort, dichotomy and mereological division, and opportunity of successive change of the bases of division. Unlike erroneous mixing of bases while using the simple division, their change during classification is always strictly pointed out and motivated. There are two types of classification: natural (scientific) and artificial (technical, auxiliary). Natural classification is based on essential features of objects, and artificial is based on insignificant ones.

For example, codification in law is a natural classification, and incorporation is an artificial one.

===== 19. Operation of defining concepts

In order to avoid vagueness of concepts and for specification of their content, an operation of defining concepts is used. When the scope of a concept is fully or partially unknown, we ask the question: “What is it?”. As an answer we are given the definition of the given concept.

The determining role in concept formation is played by essential features which define qualitative specificity of an object, that is, features connected with discovering the object nature. Each of those features separately is *necessary*, and *all together they are sufficient* to distinguish this object from similar items. *For example*, the essential feature of a square as a geometrical figure is the presence of four equal sides, an essential feature of crime is illegality of the act provided by the Criminal Code.

We have an idea of a thing if and only if we know and can verbally express which conditions are necessary and sufficient for its unambiguous definition (designation). Each condition separates a certain class of things

satisfying it, and these things don't have to be real. For example, dividing integers by 2 creates a class of even numbers; the condition "civil military lawyer" creates a class of fictional characters. All the things that create one class are considered identical (not distinguished) concerning a certain condition. Cities of Kyiv, London, Paris, etc. are identical concerning the condition of "the capital of the European state".

For designing concepts not every, but only necessary and sufficient conditions are necessary. *A necessary condition* for a thing is that one without presence of which it is impossible for this thing to exist. *For example*, the condition "to be an act" is necessary for a crime, because only an act of person's behavior but not his/her thoughts and beliefs are supposed to be a crime. Necessary conditions cannot be excluded, weakened, increased or modified without creation of controversy in the existence of a particular item. Necessary is that one, which can't be in another way (Aristotle).

It is common to call that condition *sufficient* for a thing, the existence of which always implies its existence as a thing with a given feature. *For example*, the condition "to receive a scholarship" is enough to be a student. *Denial of sufficient condition* unlike denial of necessary condition can be compatible with the existence of this thing. For example, the condition "to be a student" is incompatible with the condition "to be a pupil" but sufficient for studying.

Not every necessary condition is sufficient and not every sufficient condition is necessary. *For example*, when it rains in the city it is sufficient for asphalt covering streets to become wet. Rain in the city is a sufficient condition or wet asphalt but not necessary (other reasons except rain are possible). To be a sweet thing is a necessary but not sufficient condition to be a chocolate candy. However, for the concept construction the case when sufficiency is formed from necessary conditions is of special significance. For example, each of the conditions "to be a quadrangle", "to have equal sides", "to have equal corners" is necessary for defining a square. Every pair of named conditions also is only necessary. And only all together they are necessary and sufficient for marking the class of squares. In the most general form, the concept construction process proceeds as a search for necessary conditions which are sufficient for unambiguous designation of the required class of things.

Necessity and sufficiency are also determined in terms of properties. If something cannot exist without a particular feature, then this property is necessary for this thing's existence. For example, the ability to study is a necessary property of a student. Sufficient property of a thing is the one, the presence of which characterizes the existence of this thing in relation to the feature under consideration.

Thus, *definition* is a logical operation which reveals the meaning of a concept by a set of essential features or provides the name of the corresponding denotation. The structure of definition: $dfd = dfn$, in which dfd is a definable concept and dfn is a defining one.

===== 20. Rules of defining and possible mistakes

The following rules govern the construction of definitions:

1. The rule of proportionality: the scope of definable concept (dfd) should be equal to the scope of defining one (dfn), that is, dfd and dfn are identical concepts. Violation of this rule can lead to the next mistakes:

a) *broad definition*, when dfd and dfn are in the relation of subordination, moreover dfn is a *generic concept* regarding dfd . For example, crime is an offence.

b) *narrow definition*, when dfd and dfn are in the relation of subordination, moreover dfd is a *generic concept* regarding dfn . For example, punishment is a measure of state coercion for a crime.

c) *crossing definition*, when dfd and dfn are in the relation of intersection. For example, law is a decision of the Verkhovna Rada of Ukraine which should be executed.

d) *meaningless definition*, when dfd and dfn are incompatible concepts. For example, alibi is evidence of incompetence.

2. The rule of prohibition of vicious circle: prohibition to define dfd through the definition of dfn , which, in its turn, is defined through dfd . The mistake is a "vicious circle". An example of "vicious circle" is in the definition: "Logical thinking is correct thinking". However, this definition will be erroneous, provided that it was preceded by an explanation of correct thinking as logical thinking.

Some variety of “*vicious circle*” is a “*tautology*”, or logical mistake which is also called “*the same through the same*”. *For example*, liberal is a person who has liberal views; law is law. It is necessary to note that at least some of these statements (in particular, the last one) have a certain meaning, however, figurative rather than conceptual.

3. The rule of unambiguity: each dfn must correspond to exactly one dfd, and vice versa. This rule eliminates the phenomena of synonymy, homonymy, use of metaphors and artistic images and is an integral part of the construction of formalized language, in which the content should strictly follow the language form, that is, the definition must be clear in content. In informal contexts, this rule is applied in a weaker version: each dfn must correspond exactly to a single dfd, not vice versa: $dfd = dfn1$, $dfd = dfn2$, etc.

The rule of clarity of definition is a manifestation of the law of identity. The mistakes are: using figurative, artistic means, characteristic features of which are allusion, ambiguity, symbolism.

4. Definition should be affirmative. This rule applies not so much to the necessary conditions of correct thinking but to the wishes because there are concepts the meaning of which can be clarified only in relation to their opposites.

5. The rule of minimum: dfn should be expressed in a descriptive (explicit) concept which characterizes the determination only by its main features. The mistake is redundancy. In classical definitions this rule is observed if: a) genus which is included in dfn is the largest one regarding dfd, that is, so that no other concept subordinate to the genus and subordinate to dfd has been previously defined; b) expressions which are in the relation of following (subordination) are absent in dfn. *For example*, square is a parallelogram with right angles, equal sides and equal diagonals. Crime is a socially dangerous criminal act (action or omission), committed by the subject of the crime, as determined by the criminal law.

6. The rule of competence: only concepts the content of which is already accepted or has been defined previously should be included in dfn. The mistake is to define unknown through unknown.

When there is a necessity to act in the absence of conceptual knowledge about objects, other means of cognition, which resemble

the definition of concepts, are used. They are characteristics, portrait, description, comparison, prescript, etc. In enumerated means of cognition there can be revealed both significant and insignificant features. However, in some of these means of cognition the emphasis is on essential features (properties), in other cases it is on both essential and insignificant features (portrait, description), and in some cases it is usually placed on insignificant features.

===== 21. Types of direct (explicit) definitions

There are different types of concept definitions in science, the nature and structure of which depend primarily on the chosen method of definition. Definitions are divided into direct (explicit) and indirect (implicit) in accordance with the way of identifying the content.

Explicit definitions contain essential features of an object in the defining part, i. e. directly reveal the meaning of the term. Implicit ones do not contain features of an object, but they become clear in another way.

Types of explicit definitions.

According to the function that definitions perform in cognition, explicit definitions are divided into real and nominal. These definitions either reveal the meaning of the term or clarify the name (term) by which the term (and the corresponding denotation) is denoted.

In the real definition the meaning is revealed by listing the essential features of the defined term. For example: “A felony is a crime punishable by imprisonment for a term not exceeding two years, or another, milder punishment other than the main punishment in the form of a fine of more than three thousand non-taxable minimum income».

The nominal definition clarifies the name (term) by which the corresponding term and denotation are denoted. For example: “The term” legal “(from the Latin – legitimus) means one that relates to jurisprudence, legal.”

Real and nominal definitions can be transformed into one another. For example: the real definition is “Logics is the science of forms of thought and the laws of correct thinking” ($Dfd \equiv Dfn$), the nominal definition is “The science of forms and laws of correct thinking is denoted by the term” logics “” ($Dfn \equiv Dfd$).

Types of real definitions. The most common type of obvious real definitions is the definition *by genus and specific difference, or classical*. The structure of such a definition can be represented in the form of the formula $A = Bc$, where A is definable (Dfd is the *definiendum*), Bc is defining (Dfn is the *definiens*), in which B refers to a genus, and c refers to a specific difference. For example, “General Theory of State and Law (A) is a fundamental legal science (B) that studies the essence, the most general laws and trends of origin, development and functioning of law and the state in their relationship, as well as the terms and categories that are essential for all legal spheres (c) “.

Depending on what a specific difference indicates, there are the following types of classical definitions: *attributive, relational (which include functional definitions), genetic*.

In *attributive* definitions the specific difference is a specific property of the term, which is thought about in the defined term. Obviously, this type of explicit definitions is the most common in jurisprudence. For example, “A crime is a socially dangerous criminal act (action or omission) provided by this Code, committed by the subject of the crime.”

In *relational* definitions, a specific feature is its relationship to other objects of the class, distinguished by the defined term. For example, “The judiciary is the guarantor of respect for citizens’ rights and the rule of law.” In *functional* definitions, the specific feature indicates the role relationship of objects of the class, which are distinguished by the defined term in relation to the whole class. For example, “The prosecutor is an official who supports the state prosecution; representation of the interests of a citizen or the state in court in cases specified by law; supervision over observance of laws by bodies conducting operative-search activity, inquiry, pre-trial investigation; overseeing the observance of the law in the execution of court decisions in criminal cases, as well as in the application of other coercive measures related to the restriction of personal liberty of citizens.

In *genetic* definitions the method of origin, creation, construction of objects that are thought in the defined terms are considered as specific features. The origin can be natural or social (historical). All historical definitions in which we talk about the characteristics of objects in relation to time are genetic ones. For example, “The first script is the Sumerian

script, which originated about 5 millennia ago, before the emergence of states” or “Industrial society is a society formed in the process and as a result of the development of machine production, the emergence of adequate forms of labor organization, application of achievements of scientific and technical progress».

It is necessary to follow the basic rules when formulating definitions to reveal the content of a defined term.

===== 22. Types of indirect (implicit) definitions

According to the method of identifying the content the definitions are divided into *direct (explicit)* and *indirect (implicit)*. Explicit definitions contain essential features of the subject in the defining part, i. e. directly reveal the meaning of the concept. Implicit ones do not contain signs of the subject, but it becomes clear in another way.

Types of implicit definitions.

Implicit definitions are divided by semiotic criteria into: syntactic (operational), semantic (through listing) and contextual, which are divided into axiomatic and pragmatic (in particular, ostensive).

Syntactic (operational) is a definition in which the defining part provides an example (description, rules) of operation of the subject. That is, in dfn there is a feature that contains a reference to the operation by which it is possible to reveal the meaning of the concept, and as a result – to recognize objects that are thought in this concept, to distinguish them from all others. Thus, acid can be defined as a substance that gives litmus a red color. Or: «Zero is a number that, when multiplied by any other number, gives zero.»

Semantic (or through a listing) is a definition in which the meaning of a concept is established by listing the individuals of a class. This provides a semantic interpretation. For example, «The concept «Ancient world» includes Ancient Egypt, Babylon, India, China, the Hittite state, Assyria, as well as Ancient Greece, Rome, Carthage and many others» or «The accomplices of the crime, along with the perpetrator, are the organizer, instigator and abettor”.

Contextual is a definition that allows you to understand the meaning of the concept by establishing the context. In particular, this provides a pragmatic interpretation (understanding of meaning). Contextual definitions are divided into axiomatic and pragmatic (in particular, ostensive).

In contextual definition, the context can be a normal passage of any text or social sphere of life in which the subject is. As an example of such definitions, we can consider the translation of any text from a foreign language into the native language, when the meaning of an unknown word is established based on a passage of a text, and not on a dictionary. Investigators form contextual pragmatic definitions about the suspect's identity by interviewing witnesses to the event or his acquaintances. Signs of the context are identified and appear as the content of the concept by transfer to the subject of knowledge.

Axiomatic definition is a type of contextual definition in which the context is a system of axioms, namely the provisions of the theory that do not require justification, because their validity is considered so clear and acceptable. The system of axioms limits the range of possible interpretations. For example, fundamental concepts in geometry (point, line, etc.) are defined through axiomatic definitions. Axioms of law are studied in jurisprudence.

Ostensive definition is a type of pragmatic definition which is given by pointing to an object (its demonstration), which is denoted by this concept. The context in this case is the situation in which this subject occurs. Ostensive definitions are used in identifying the suspect.

===== 23. Judgments and sentences

Human knowledge takes the form of judgments. For example, the linguistic expressions «The branch of law is a structural element of the legal system» and «All branches of law are united in the spheres of public and private law» are expressions of judgments as intellectual forms. Judgment always contains information.

Judgment is a form of thought that records the presence or absence of any sign in the subject.

Judgments can be *true or false*. Meaningful truth of the judgment will mean adequacy, that is, meaningful correspondence to reality. The logical truth of the judgment will mean its correctness, that is, compliance with the rules of construction of its form.

The logical meaning may necessarily be true or probably true depending on the type of judgment. For example, the statement «The binding nature of the rule of law is supported by the threat of state coercion» is necessarily true. And the judgment «Judgment can be appealed» is probably true, because it will either be appealed or not.

The linguistic form of judgment is a *grammatical sentence*. Judgment is present in the utterance in oral language. But not every grammatical sentence expresses judgment. That means that language can express both intellectual rational products and irrational, unconscious mental ones. The task of logic is primarily to establish the reasonableness of expressions, i. e. the presence of thought in language and its logical truth.

These are criteria for identifying judgments in a sentence.

It is necessary to check the set of the following criteria to determine whether a sentence contains a judgment:

1. *Presence of meaning*. If the sentence does not make sense then there is no judgment. The logical meaning of truth cannot be established. For example, the sentences «Mamburbia kergudu», «Агов» do not make sense, they do not express judgments and it is impossible to establish the truth. The first one is completely meaningless and the second one is an exclamation.

It should be noted that in the analysis of spontaneous emotional reactions to such statements (for example, exclamations) during their interpretation, adding of meaning is possible. However, these expressions do not contain a meaning, they express some emotion. This means that the intellect seeks to comprehend, i. e. to give meaning not only to intellectual objects.

2. *Judgment can be expressed only in the narrative form of the sentence*. Interrogative and exclamatory sentences do not express judgment. The latter have neither affirmations nor objections. Therefore, it is impossible to establish the logical truth. For example, the sentence «What time is it?» makes sense but does not express judgment.

Exceptions are rhetorical questions in which the judgment is expressed implicitly. For example, the question «Which of the lawyers does not know Roman law?» expresses judgment because it is transformed into a narrative sentence «All lawyers know Roman law.»

3. *Structural differences of judgment and sentence.* The difference between grammatical and logical structures determines the difference between grammatical and logical analysis. Let's compare the structures of a simple grammatical sentence and a simple judgment. In a simple grammatical sentence (not abbreviated) there is a subject and a predicate, there may be secondary members of the sentence. In grammatical analysis, these structural elements are established by asking questions (Who? What? What does he do? etc.).

The logical structure of a simple judgment always consists of only three elements: the subject, the predicate, and the conjunction. Their functions are as follows:

1. Subject (S) is the subject of thought, named in the judgment.
2. Predicate (P) is a sign of the object.
3. Conjunction (-) is a word / words (is, is n't), expressing statements or objections.

Simple judgment formula is: *S is (is not) P.*

The peculiarity of the grammatical structure of the sentence is based that it is immutable, static in relation to the material of the sentence («What is written with a pen, you cannot cut with an ax», “The pen is mightier than the sword”). For example, under no circumstances the subject and predicate will change their places.

On the other hand, logical structures are quite flexible («Logic is a flexible thing»). This means that the subject can only coincide with the language subject by chance. Defining a logical structure begins with a logical emphasis which always indicates a predicate. Changing the logical emphasis will lead to a change in the logical structure and, consequently, the meaning of the judgment.

Thus, if a grammatical sentence can have only one structure for the same material, then the logical form of judgment can change its structure. The problem of interpreting meaning depends on establishing a logical structure of the judgment.

For example, in the sentence «Borysenko got higher legal education» we have three logical structures that create different meanings of this expression depending on the logical emphasis:

1. A person with higher legal education is Borysenko (Borysenko is a predicate).

2. Borysenko's legal education is higher (higher – predicate).

3. Higher education that Borysenko has is legal (legal – predicate).

One-member sentences in linguistic form shorten the thought. The subject is implicit in this case. It is necessary to unfold the sentence into its full grammatical form to show the full form of judgment.

==== 24. General classification of judgments

Judgments are classified on various grounds.

Classification I. They are divided into simple and complex according to the number of elements.

A *simple* judgment is one that consists of one subject and one predicate. Formula is: $S - P$. The form of a simple judgment consists of the concepts by establishing a logical connection between them.

A *complex* one is a judgment, the structure of which contains more than one judgment. The form of a complex judgment depends on the nature of the logical connection between the simple judgments.

Classification II. Judgments are divided into categorical and non-categorical according to the quality (regarding the existing conditions for logical connection).

Categorical is a judgment in which the predicate refers to the subject unconditionally.

Categorical judgments include: attributive, relative and existential.

Attributive is a simple categorical judgment which expresses the idea of the properties (attributes) of the object. Formula is: $S - P$.

Relative (from the Latin *relativus* – *relationship*) is the judgment about the relationship. Formula is: ARB .

Existential (from the Latin *existential*) is the judgment of the existence / non-existence of the object. Formula is: $\exists x; \neg \exists x$.

Non-categorical judgments are formed depending on the conditions of predicate binding.

Non-categorical judgments include: conditional, divisive and modal.

===== 25. Types of categorical judgments by quantity and quality

Categorical judgments are classified by quantity and quality.

– They are divided by the *quantity* into:

a) general.

Quantitative words (indicating the volume of the subject) are All, Everyone, None, Any, etc. The subject is fully present;

b) partial.

Quantifiers words are Some, Not all, There are, etc. The subject is taken incompletely (part of the class of subjects);

c) single.

Quantifiers words are This, One, That, etc. The subject is represented by a single term.

The peculiarity of individual judgments is that they do not have special rules but they are subject to the rules of general judgments. Therefore, in the future they are not allocated to a separate types.

When considering judgments by their quantity, it should be borne in mind that the grammatical form of expression of judgments, namely sentences, does not clearly indicate to which types of judgments (general, partial or individual) it belongs in most cases. Therefore, to determine the amount of this judgment requires clarification of the content and context of the whole sentence, through which this judgment is expressed. For example, “A person whose rights have been violated may demand full compensation for the damage caused to him”. There is no quantifier, but by default we mean “All”.

– Categorical judgments are divided into affirmative (S is P) and negative (S is not P) by the *quality*.

The affirmative connection “to be” in the judgment in the explicit form is often absent. The negative link may be reduced but the “no” part remains mandatory.

Categorical judgments are divided into four types by quantity and quality at the same time.

1. General affirmative judgments are: general by quantity, affirmative by quality. Formula is: All S is P. Denoted by the letter A (from the first vowel in Latin affirmo – say).

For example: “All prosecutors – lawyers.” “All” is a quantifier word; “Prosecutors” – subject (S), “lawyers” – predicate (P), the relationship is positive (“are”), is taken by default.

2. Generally contradictory judgments are: common by quantity, negative by quality. Formula is: None of S is P. Denoted by the letter E (from the first vowel in Latin nego – I object).

For example: “No crime should go unpunished.”

“None” is a quantifier word; “Crime” – the subject (S); “Must go unpunished” – predicate (P). “No” is abbreviated.

3. Partially affirmative judgments are partial by quantity, affirmative by quality. Formula is: Some S is P. Denoted by the letter I (from the second vowel in Latin affirmo – say).

For example: “Some lawyers are defense lawyers.” “Some” is a quantifier word. “Lawyers” – subject (S), “defense lawyers” – predicate (P). The connecting part is “are”.

4. Partially contradictory judgments are partial by quantity, negative by quality. Formula is: Some S is not P. Denoted by the letter O (from the second vowel in Latin nego – to object).

For example: “Some property is not state-owned.” “Some” is a quantifier word. “Property” means the subject (S). “State” – predicate (P). Connecting part – “is not”.

The quantifier word “some” can be used in two meanings, which indicates the existence of two variants of partial volumes. Depending on the meanings of the word “some” they distinguish:

a) an indefinite partial judgment, when the word “some” is taken to mean “some, and possibly all” or “at least some”.

For example: “Some witnesses testified.” It means that we are not sure whether it is part of the witnesses or all the witnesses. The number remains uncertain.

b) a definite partial judgment when the word “some” is taken to mean “some and only some”. In this case, information is available on both parts

of the witness class. That is, “Only some witnesses testified” (because it is known that “Some witnesses did not testify”).

Definiteness can be enhanced not only for partial, but also for individual and general judgments:

- by highlighting with the word “only” in the quantifier (“Only some witnesses testified”, “Only the Constitution is the basic law”);
- by exclusion with the use of the words “except”, “not counting”, “except” in the quantifier (“All students in our group, except Borisenko, successfully passed the logic exam”).

In order to form a more complete and accurate knowledge, it is necessary to move from an indefinite to a definite volume of the class of the subject.

===== 26. Distribution of concepts in simple attributive judgments

The term ‘judgment’ (S and P) is distributed if and only if it is taken in full and, accordingly, not distributed if it is taken in part, i. e. partially. Thus, the distribution of terms is the relationship between the volume of the subject and the predicate of the judgment.

1. In general affirmative judgments (type A), as well as in general contradictory judgments, the subject is divided, because it is taken in full.

For example: “All the defense lawyers are lawyers” (A); “No religious association in Ukraine is a state institution” (E). In both judgments, the subjects are divided, because we are talking about all defense lawyers and all religious associations.

The predicate in general judgments can be both distributed and not distributed. For example, in the sentence “The Constitution is the basic law”, the predicate (basic law) will be divided, because the subject and the predicate are identical terms. And in the judgment “All prosecutors are lawyers” the predicate (lawyers) is an undivided term, because it is generic to the subject.

2. In general contradictory (negative) judgments (type E) the subject and the predicate are distributed, and their volumes are in relation to

mutual exclusion. For example, in the sentence “No man is sinless”, the predicate “sinless” is denied in relation to the subject in full.

3. In partial affirmative judgments (type I) the subject is not distributed, and the predicate can be both distributed and not distributed. For example, in the judgment “Some lawyers are engaged in entrepreneurial activity” the predicate is not distributed. And in the judgment “Some lawyers are prosecutors” the predicate is distributed, it is a specific term in relation to the subject.

4. In partially contradictory (negative) judgments (type O) the subject is not distributed, but the predicate is distributed. For example: “Some lawyers are not judges.”

Thus, in general judgments, the subject is always distributed, and in partial judgments, the subject is always not distributed. And the predicate is always divided only in negative judgments. In affirmative judgments, it can be both distributed and not distributed (table 1).

Judgment	S	P
General affirmative (A)	+	– in the relationship of subordination between S and P; + with the identity ratio between S and P
Generally negative (E)	+	+
Partially affirmative (I)	-	– at the ratio of the intersection between S and P; + at the subordination ratio between S and P
Partially negative (O)	-	+

===== 27. Compatible relations between categorical judgments. Logical square

There are certain kinds of relations between simple categorical judgments, which can be established only if these judgments have the same subject and predicate, but differ in quantity or quality. The relationship

between such judgments in logic is determined by the “logical square”, which author of which is M. Psyol. Establishing relationships between judgments is necessary to clarify the following questions: can these judgments be both true or false.

All relations between judgments according to the truth are divided into compatible and incompatible. If the judgments can be both true, then they are called compatible.

There are two types of compatibility.

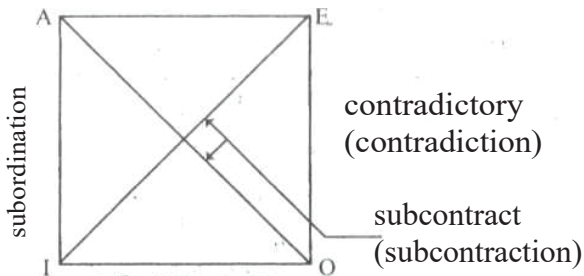
1. Subordination – when one of the judgments is about the logical sequence relative to the other. This applies to the relationship between judgments A – I, E – O.

The rule of subordination. The truth of the general judgment determines the truth of the partial, but not vice versa. The falsity of a partial judgment causes the falsity of the general, but not vice versa. For example, if the judgment “Any law is a normative legal act” (A) is true, then the judgment “Some laws are normative legal acts” (I) is also true. But if the judgment “Some citizens are not law-abiding” (O) is true, then the general judgment “No citizen is law-abiding” (E) will be vague.

2. Subcontraction (partial convergence) – the relationship between the judgments of type I – O.

The rule of subcontraction. Subcontracting judgments cannot be wrong at the same time. For example, if the judgment “Some penguins fly” (I) is false, and then the judgment “Some penguins do not fly” (O) will be true.

contradistinction



28. Incompatible relations between categorical judgments. Logical square

Incompatible are judgments that cannot be true at the same time.

Incompatibilities can be of two types:

1. Contradiction (opposite) – between judgments of type A and E.

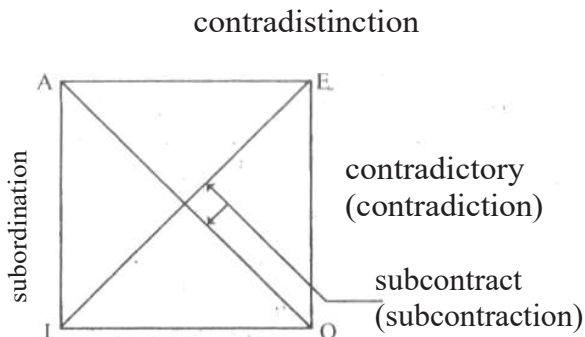
The rule of contradiction: opposing judgments cannot be true at the same time, but they can be false at the same time. For example, if the judgment “Any Constitution is a fundamental law” (A) is true, then the judgment “No Constitution is a fundamental law” (E) is false. On the other hand, if the judgment “All citizens are law-abiding” (A) is false, then the judgment “No citizen is law-abiding” (A) is also false.

2. Contradictory (contradiction) – between judgments of type A and O, E and I.

The rule of contradiction: contradictory judgments cannot be both true and false at the same time. They always have a different logical meaning. For example, if the judgment “No one follows the road rules” (E) is wrong, then the judgment “Some people follow the road rules” (I) is true. Alternatively, if the judgment “All lawyers are lawyers” (A) is true, then the judgment “Some lawyers are not jurists” (O) is false.

To denote these relations, a logical square (author – M. Psyol) is used, which organizes the information on the relations of categorical judgments about the truth.

Its vertices denote simple categorical judgments – A, E, I, O; sides and diagonals – the relationship between judgments.



===== 29. Relative and existential judgments

In addition to attributive judgments categorical ones also include relative and existential judgments.

Relative (from the Latin *relativus* – relationship) is a judgment about the relationship.

Formula: aRb , where a , b – members of the relationship, R – the relationship between them. For example, “Morality arose earlier than law.”

Relative judgments are divided: by capacity, by quantity, and by quality.

By capacity, relative judgments are divided depending on the number of items involved. There are two-membered, three-membered, and n -membered relations. Formula: $R(x_1, \dots, x_n)$.

For example, “Poltava is located between Kharkiv and Kyiv” is a three-membered relation, $R(a, b, c)$.

The number of relative judgments will be divided depending on the quantitative characteristics of each of the objects of relation. Thus, for two-member judgments we obtain the following types:

- single-singular: “Sidorenko is more informed than Borisenko”;
- generally-general: “Each of the witnesses knew each of the kidnappers of the group”;
- partially-partially: “Some specialists in international law know several foreign languages”, etc.

In terms of quality, relative judgments are divided into affirmative and negative. In affirmative judgments, certain relations are established, and in negative ones – the absence of relations is established.

For example: “Morality arose earlier than law” – an affirmative judgment. “Witness Borysenko is not more informed than witness Davydenko” – a negative judgment.

At the highest theoretical level, all relations are generalized to several types. There are several types of relative judgments with the general theoretical significance of relations:

a) the relationship of reflexivity. Reflexivity means the relation of an object to itself. Formula: $x = x$. It is often used in solving the problem of identity. For example, when identifying a person (“I – Petrenko V. V.”).

Antireflective relations are: “more” ($x > x$), “less” ($x < x$), “older”, etc.

The ratio of x to y will be non-reflexive;

b) the ratio of symmetry. This is the relationship between different subjects. If x in some way refers to y , then y , in the same way, refers to x . For example, the relationship of equality or reciprocity.

Asymmetric relations include “more” or “cause”, etc.

c) the ratio of transitivity (for three-membered and n -membered judgments). This relationship is repeated between both adjacent and extreme objects in a certain sequence of objects. Formula: $x > y > z$, then $x > z$.

For example, “If Kharkiv is bigger than Sumy, and Sumy is bigger than Berminvody, then Kharkiv is bigger than Berminvody.”

Non-transitive relations include “loves”, “depends”, “respects”, “hates”, etc. For example, the judgment “Vassal of my vassal is not my vassal” is non-transitive.

d) the equivalence relation. It combines the relations of reflexivity, symmetry, and transitivity at the same time. For example, the relations “equality”, “peers”, etc. are equivalent.

Existential (from the Latin existential – existence) judgments are judgments about the existence of the object. Formulas: $\exists x$; $\sim \exists x$.

Existential judgments by quality can be affirmative or negative. For example, “Evidence on the case existed”, “The address provided by the suspect does not exist.”

===== 30. Compound judgments: general characteristics

Compound judgments are those that contain several simple judgments connected by logical conjunctions.

Although the matter of logical and grammatical conjunctions is the same, their functions are different. The function of grammatical conjunction is to establish a meaningful connection between simple sentences. The function of logical conjunction is to establish the logical meaning of a complex judgment (true or false) regardless of the content.

Logical conjunction is a way of connecting simple judgments in which the logical value of a complex judgment will depend on the combination of the logical values of the simple judgments in its composition.

A tabular method is used to determine the values of complex judgments. The table of truthfulness of complex judgments is a matrix that takes into account all combinations of meanings of simple judgments. The number of combinations is taken into account by the formula $m = 2^n$, where m is the number of combinations of logical meanings for the formula of a complex judgment, 2 is the basis expressing the number of logical values (true and false), n is the number of simple judgments in the formula.

The main logical conjunctions are: “and” (conjunction), “or” (disjunction), “if... then” (implication), “if and only if... then” (equivalence). With the help of these connectors, the corresponding types of complex judgments are formed.

Conjunctive is a unifying proposition (or logical multiplication). It is formed by the conjunction “and”. For example, “The court’s decision must be lawful and reasonable.”

Disjunctive are divisive judgments. They come in two types. The judgment of weak disjunction (or logical addition) is formed using logical conjunction “or / and” in the connecting-separating sense. For example, “This person has suffered moral or physical harm.” A strong disjunction (or logical subtraction) is formed by the logical conjunction “or” in a strict punctuation sense. For example, “By a court decision, a person is found guilty or innocent.”

Implicit – conditional judgment. It displays a causal relationship. It is formed with the help of the conjunction “if..., then...” from only two simple judgments. It is asymmetric because the cause is sufficient and the consequence is necessary. For example, “If a person has committed a crime, he must be punished.”

Equivalent – the judgment of double implication. It is formed by the conjunction “if and only if..., then...” from only two simple judgments. It is symmetrical because both cause and effect are necessary and sufficient. For example, “Only when a person has committed a crime, he is prosecuted.”

===== 31. Connective (conjunctive) judgments

Conjunction (Latin *conjunctio* – unite, connect) is a kind of complex judgment with logical conjunction “and”. It will be true when all the simple judgments in it are true.

A conjunction is logical multiplication. Symbolically complex conjunctive judgment is denoted by the formula: $a \& b$, where a , b – simple judgments, and the sign $\&$ etc. denote the logical conjunction “and”.

Example: “The people exercise their power directly, as well as through public authorities and local governments.” Judgment ($a \& b \& c$) will be true if a is true, b is true, and c is true.

Let’s build a truth table for this judgment. The number of lines is calculated by the formula: $N = 2^3 = 8$. To take into account all possible combinations with the values of simple judgments, we alternate for the first variable in the formula the true value with the false one across the line, and for each subsequent variable, we double the number of alternations. That is, for b – in two lines, and for c – in four. Thus, we took into account all possible 8 combinations. Then we can calculate the value of this formula, which will be true only if all conjunctions take the true value.

№	a	b	c	$a\&b\&c$
1.	i	i	i	i
2.	x	i	i	x
3.	i	x	i	x
4.	x	x	i	x
5.	i	i	x	x
6.	x	i	x	x
7.	i	x	x	x
8.	x	x	x	x

===== 32. Dividing (disjunctive) judgments

Disjunction (Latin disjunction – divide, separate) is a type of complex judgment, in which simple judgments are connected by logical conjunction “or”.

The conjunction “or” is used in two meanings. Depending on the value of the connector, there are two types of disjunction:

1) weak (loose) and 2) strong (strict).

Weak is a disjunction in which the conjunction “or” is used in the conjunctive sense, i. e. simple judgments can be compatible with each other in content and taken together, forming a single structure of one complex judgment.

Symbolically, judgments of non-strict disjunction have the formula: $a \vee b$, where a , b are simple judgments, and the sign \vee denotes a logical conjunction “or”.

A weak disjunction will be true when at least one of the simple judgments contained in it is true. Weak disjunction is a logical addition.

Example: “The state creates conditions under which every citizen will be able to build housing, buy it or rent it” (Article 47 of the Constitution of Ukraine). We formalize this judgment: $a \vee b \vee c$. Construct a table of truthfulness for this formula, for which we calculate the number of rows in the table: $N = 2^3 = 8$. To take into account all possible combinations of values of simple judgments, we alternate for the first variable in the formula the true value with the false one across the line, and for each subsequent variable, we double the number of alternations.

That is, for b – in two lines, and for c – in four. Thus, we took into account all possible 8 combinations. We can then calculate the value of this formula, which will be false if all disjuncts take a false value.

№	a	b	c	$a \vee b \vee c$
1.	i	i	i	i
2.	x	i	i	i
3.	i	x	i	i
4.	x	x	i	i
5.	i	i	x	i
6.	x	i	x	i
7.	i	x	x	i
8.	x	x	x	x

A strong (strict) disjunction is a type of disjunctive judgment in which one of the simple judgments affirms something and the other denies the same. The conjunction “or” is used in a pure punctuation sense. Strong disjunction is the logical exception.

For example, “A crime is committed either intentionally or negligently” (i. e. unintentionally). “War can be fair or unfair.”

Thus, the following examples of judgments of strong disjunction show that it contains simple judgments that are mutually exclusive, it is denoted by the following formula: $a \sqcap b$, where a, b are simple judgments that are part of a complex mutually exclusive judgment, and the sign \sqcap denotes the conjunction “or”.

A strong disjunction is true when only one of its constituent judgments is true.

Let’s make a truth table for the judgments given in the example. The formula for these judgments is the same. Calculate the number of rows in the table: $N = 2^2 = 4$. To take into account all possible combinations of values of simple judgments, alternate for the first variable in the formula true with false values across the string, and each subsequent variable, double the number of alternations. That is, for b – in two lines. Thus, we took into account all possible 4 combinations. Then we can calculate the value of this formula, which will be true only if only one of the disjuncts takes the true value.

№	a	b	$a \vee b$
1.	i	i	x
2.	x	i	i
3.	i	x	i
4.	x	x	x

===== 33. Implicit judgments

Implication (from Latin: *implicite* – connect) is a type of complex judgment, in which simple judgments are connected by logical conjunction “if, ... then”, “because, ... so much” and others.

Implicit judgment is used to form a causal relationship. It is expressed by the formula: $a \rightarrow b$, where a, b are simple judgments that are part of a complex conditional judgment, and the sign \rightarrow denotes the logical conjunction “if, ... then”.

Example: “If a citizen due to a physical disability, illness or illiteracy cannot sign by himself, then at his request, the agreement can be signed by another citizen.”

Implicit judgment is the only kind of asymmetric judgment. It has a special structure consisting of three elements:

1) antecedent – the base, which begins with the particle “if” and ends before the particle “then” (or before it replaces it);

2) consequent – a consequence that begins after the particle “then” and which completes the general meaning of the conditional judgment

3) logical connection – “if, ... then”. The asymmetry of this structure is that the antecedent is only sufficient, and the consequent is necessary for truth.

The logical characteristic of implicit (conditional) judgment is that it is erroneous only in the only case when a false consequence follows from the true basis. In the form of an implicit judgment, a generally negative and generally affirmative judgment can be represented. For example, “All students study” \leftrightarrow “If he is a student, then he learns”. Here the basis (antecedent) – “if he is a student”, the consequence (consequent) – “learns”; “If a person has committed a crime, he must be punished.” Here the basis (antecedent) – “if a person has committed a crime”, the consequence (consequent) – “he must be punished.”

Example: “State social assistance is granted from the month of application (a) if during the month all the necessary documents (b) are submitted” (Law “On state social assistance to low-income families.”) Let’s make a table of truthfulness for the judgment given in the example. Calculate the number of rows in the table: $N = 2^2 = 4$. To take into account all possible combinations of values of simple judgments, alternate for the first variable in the formula true with false values across the string, and each subsequent variable, double the number of alternations. That is, for b – in two lines. Thus, we took into account all possible 4 combinations. Then we can calculate the value of this formula, which will be false only if the antecedent assumes the true value and the consequent – false.

№	a	b	$a \leftarrow b$
1.	i	i	i
2.	x	i	x
3.	i	x	i
4.	x	x	i

34. Equivalent judgments

Equivalence (Latin *aeguallis* – has force; equivalence) is a type of complex judgment in which simple judgments are connected by logical conjunctions such as: “if and only if... when...”, “if and only if..., then...”, etc. Symbolically, the judgment of equivalence is expressed by the formula: $a \leftrightarrow b$, where a and b are simple judgments that are part of a complex equivalent judgment.

Equivalence is a two-way causal relationship, so it is called a double implication. That is, both judgments have the properties of necessity and sufficiency for truth.

For example, “Pre-trial investigation data may be disclosed only with the permission of the investigator or prosecutor and to the extent that they deem it possible.” “A person is subject to criminal liability only for those socially dangerous actions (inaction) and the occurrence of socially dangerous consequences for which his guilt has been proven.”

The judgment of equivalence is true only when the values of both simple judgments included in it coincide.

Example: “Decisions of the Tender Commission may be appealed in court only on compliance with the procedure established by law for the competition for the position of Director of the State Bureau of Investigation.” Let us construct a truth table for the judgment given in the example. Calculate the number of rows in the table: $N = 2^2 = 4$. To take into account all possible combinations of values of simple judgments, alternate for the first variable in the formula true with false values across the string, and for each subsequent variable, double the number of alternations. That is, for b – in two lines. Thus, we took into account all possible 4 combinations. Then we can calculate the value of this formula, which will be true when the values of both variables match.

№	a	b	$a \leftrightarrow b$
1.	i	i	i
2.	x	i	x
3.	i	x	x
4.	x	x	i

===== 35. The concept of modality of judgments. Alethic and epistemic modalities

Modality is additional information about the nature of the predicate's relationship to the subject, which may be contained in a non-categorical judgment.

Judgments in which such information is explicit or implicit are called modal judgments. Designation of modality in judgment: M (S – P).

Some types of modality form different logics: temporal logic (time), epistemic logic (knowledge), the logic of faith, deontic logic (norms), axiological logic (estimates), and so on.

Among other types of modality, the most important are alethic (ontological) modality and epistemic modality (the logic of knowledge).

Alethic (from the Greek – true) modality characterizes the relationship of the predicate to the subject in terms of “necessity”, “chance” and “possibility”.

It is used to describe the real state of affairs. Such judgments include:

- assertive judgments (about facts, cases) – “Ukraine as an independent state was created on August 24, 1991”;

- apodictic judgments (about necessity) – “In the Ukrainian legal order human rights norms necessarily operate”;

- problematic judgments (about the possibility) – “A visa-free regime with the European Union may be introduced in Ukraine this year.”

Epistemic (episteme – the highest type of probable knowledge) modality characterizes the degree of validity of knowledge expressed in the judgment.

According to the degree of validity of knowledge, judgments are divided into probable and possible. Probable judgments contain knowledge that is sufficiently substantiated. Possible judgments contain knowledge that is insufficiently substantiated.

The probability of knowledge is achieved through procedures of verification (confirmation) or falsification (refutation). Probable knowledge is assessed as necessarily true.

Possible judgments are used in the formulation of hypotheses, court versions, projects, assumptions.

==== 36. The logic of norms

Deontic logic – the logic of norms, legal deontic (from the Greek. Deon – “duty”, “correctness”) – is a section of modal logic, which explores the nature, logical structure of normative statements, and the logical relationship between them.

The specificity of the logic of norms is associated, first, with different degrees of commitment (strong, weak, and zero); secondly – with their use (violation) in a real situation. Deontic logic also examines conditional obligations and norms.

The basic deontic concepts are “mandatory”, “forbidden”, “allowed”. For example: “It is allowed to make and use the seals of legal entities voluntarily”, “It is prohibited to use a mobile phone when drawing up the EIT”, “According to the contract, it’s mandatory for the debtor to return the money to the creditor.” These concepts are key to permitting law, prohibition law, and contract law.

The deontic operator F – “forbidden” – expresses a strong negative obligation, the operator O – “mandatory” – a strong positive obligation, and the operator P – “allowed” – has a weak regulatory status. Operator I – (normatively) indifferent – indicates the absence of a normative status in a certain action, i. e. has a zero degree of obligation.

Standards are considered a special case of assessments. Prohibition means a negative assessment of an action, situation, or consequence. Duty expresses a positive social assessment, and permission expresses an arbitrary assessment or no negative assessment. If the action is denoted by P, then with the help of operators O, F, P we can write the laws of the logic of norms:

“If an action is mandatory, it is allowed” ($Op \rightarrow Pp$);

“If an action is forbidden, it is not obligatory” ($Fp \rightarrow \neg Op$);

“Any action cannot be mandatory or prohibited at the same time” – ($Op \ \& \ Fp$);

“Any action is either mandatory or optional” ($Op \ \square \ \neg Op$);

“Any action is either allowed or forbidden” ($Pp \ \square \ Fp$);

“If the action is forbidden, it is not allowed” ($Fp \rightarrow \neg Pp$);

“If the action is allowed, it is not forbidden” ($Pp \rightarrow \neg Fp$);

“Everything that is not forbidden is allowed” ($\neg Fp \rightarrow Pp$).

For example, “You must pay taxes if you are not allowed to pay them.”

Real systems of norms are quite consistent. Conflicting rules (where the same thing is forbidden and then allowed) need to be revised.

===== 37. Interrogative logic: general characteristics

The logic of questions and answers is called interactive. Any doubts, uncertainties in our knowledge raise questions. A question is an opinion aimed at eliminating doubt or uncertainty in knowledge to obtain new, more complete and accurate knowledge.

A question is not a judgment, because it can be neither true nor false. The exception is rhetorical questions, which are an implicit form of judgment.

Any question must have a meaning about which the question is formed. If an expression does not make sense, it can be neither a judgment nor a question.

The structure of the question contains the supply core and the interrogator.

The primary information contained in the question is called the propositional core, or logical premise of the question. For example, the question “What categories of prosecutors have been tested for the level of development of intellectual abilities?” contains a proposal core in the form of a judgment “Some categories of prosecutors have been tested for the level of development of intellectual abilities.” The interrogative functor is the words where? When? How many? etc.

Contrary to judgment, a question can be neither true nor false.

Classification of questions.

1) According to structural differences, the questions are divided into:

a) Simple and complex. A simple question is one question. A complex question contains two or more simple questions. For example, “Which article of the Criminal Code of Ukraine defines the concept of” theft “?” is a simple question. “Which article of the Criminal Code of Ukraine defines the concept of” theft “and when was the new Criminal Code of Ukraine approved?” – is a complex question, which contains two simple questions;

b) Questions to be resolved and questions to be replenished.

Questions to be solved – require finding a true judgment in a given list of judgments. For example: “How will P. be punished for theft: a fine of up to fifty non-taxable minimum incomes or correctional labor for up to two years, or imprisonment for up to three years?”.

A special kind of question to be solved is a dichotomous question. For example: “Was citizen P.: acquitted: yes or no?”

Questions to be replenished – require finding the true answer within a given class of judgments. For example: “At what time will the president begin a meeting with the press?” (the answer is sought within a certain amount of time).

2) According to the differences in the methods of solving, the questions are divided into: a) information questions. They are solved by information retrieval. The answer has already been found and is contained in certain sources of information. For example, “In what year was the city of Kyiv founded?”

b) task. This is the kind of question in which there is no answer. It is about the following of the condition and requires the search for algorithms (formulas, methods) known in science.

It is necessary to distinguish between scientific and educational tasks. Unlike scientific ones, educational tasks already have a ready answer;

c) the problem. This is a type of question that has neither a ready answer nor a specific solution algorithm. The problem question requires the discovery of a new algorithm (method). For example: “How to overcome crime in society?”.

3) About the topic of discussion, the questions are divided into significant and insignificant.

Rules for asking questions:

1. The question must be clear, i. e. all concepts must be defined.

2. The propositional core of the question must be a true judgment.

If the rules are followed, then we have the right question. In violation of these rules, there is an error of the pseudo-question, which indicates the incorrectness of its formulation.

===== 38. Incorrect questions

Questions may be correct or incorrect depending on whether or not the rules for asking questions are met.

Incorrect questions (or pseudo-questions) are different depending on the type of violation. These include, in particular:

1. Stupid questions. These are questions that contain vague concepts and expressions. For example: “Does critical metaphysics of abstractions and discrediting the tendency of cerebral subjectivism lead to ignore the system of paradoxical illusions?”

2. Insufficiently defined questions. They make sense, but they are ambiguous and it is not possible to establish a single meaning in context. For example: “Are you for” or “against” the transfer of land to the people?”. It is unclear in what sense the terms “people” and “transfer” are taken.

3. Provocative questions. This is a question with a false proposition core. Such a question cannot be answered truthfully. For example, the sophistic question: “Have you stopped beating your father: yes or no?” If you answer “yes”, it means that you used to beat your father, but now you have stopped. If you say no, it means that you used to beat your father both and now you are beating your father. The purpose of many provocative questions is not only to provoke a wrong answer but also to the public moral “fall” of the enemy.

4. Tautological question. This question contains a ready answer. For example, “What will be your only positive decision?”

In the practice of interrogation, so-called “leading” questions that impose a certain answer is prohibited. They can be considered a kind of tautological question.

To get the correct question, you need to correct the question form by the rules.

Questions are sometimes called “easy” or “difficult” for subjective reasons. These are terms taken figuratively. They indicate the degree of awareness of the subject of the question. If a person is sufficiently informed, then such a question will be “easy” for him, and if he is not sufficiently informed, then this question will be “difficult” for him.

39. Answers to questions

The answer to the question contains new information about which is being asked. All answers are divided into correct and incorrect.

The correct answers – completely or partially eliminate cognitive uncertainty.

1. Correct simple answers are divided into:

a) a strong (complete) answer that eliminates cognitive uncertainty. For example, “Who is the father of the science of logic?” – “Ancient Greek philosopher Aristotle”;

b) the weak (incomplete) answer does not eliminate cognitive uncertainty. For example, “Who is the father of the science of logic?” “Some Greek philosopher”.

2. The correct answers to difficult questions can also be complete or incomplete.

The full answer contains information on all components of the question. Incomplete answers to a difficult question may contain some information that compensates for cognitive uncertainty. For example, if there are two simple questions in a complex question, then the answer to only one of the two simple questions will be incomplete: “Who won the political race for the presidency of the United States in 2016 and for how long was he elected?” – “Trump won.” Thus, we did not receive an answer to the question about the date of the US presidential election.

3. Correct answers can also be abbreviated. In particular, for dichotomous questions, the answer may be “yes” or “no”.

Wrong answers do not eliminate cognitive uncertainty. They can be:

a) tautological, i. e. may contain repetition of the question instead of answering it. For example, “Will it rain tomorrow?” – “Will or will not”;

b) irrelevant (inappropriate), in which the answer is given not to the question, but some other that may be related to the question. In this case, we get the error “substitution question”.

The answer “I don’t know” can be singled out. It contains neither true nor false information about the subject matter. The paradox of this answer is that it does not answer.

40. Laws of logic: general characteristics

The law of logic is a theoretical position on the correct construction of logical forms and the necessary relations between them to achieve truth. In other words, the law of logic is an identical-true formula.

Logical laws, as well as legal ones, differ from the laws of nature. Unlike the latter, logical laws are normative provisions (prescriptions) that can be violated. Man is unable to violate the laws of nature.

The laws of logic form the basic principles of correct thinking: certainty, consistency, and provability.

The law of identity requires certainty of objects of thought, which contributes to the clarity and accuracy of their understanding. The law of identity denies ambiguity in the expression of opinions.

The laws of non-contradiction and the excluded third require a sequence of thinking, which is possible in the absence of contradictions.

The law of sufficient grounds requires not only to formulate a true opinion in its expression but also to provide grounds for its truth.

Violation of the laws of logic leads to uncertainty, ambiguity, inconsistency, unprovability, confusion arises in the mind and the right cannot be proved. These are signs of weak intelligence, its underdevelopment. As we have the quality of thinking, so is the quality of existence.

Alogisms are logical errors that occur in violation of the laws and rules of logic. Alogisms are divided into:

- paralogisms, i. e. logical errors made by a person unconsciously;
- sophisms, i. e. motivated logical errors that give the false appearance of truth.

==== 41. Law of identity

Any opinion within certain reasoning must remain identical to itself. That is, one cannot change the subject of reasoning during proof or professional discourse.

Terms of operation of the law:

- 1) the subject should be studied only one;
- 2) the time in which the subject is studied should not change;
- 3) relations must also remain unchanged.

The law of identity is not applied in comparative analysis (because not one, but two or more subjects that cannot be identified are studied), in historical analysis (because over time the subject will change) and

contextual analysis (change of context will affect the relationship subject). The given conditions of the law are characteristic of other laws of logic; they create classic rather strict requirements for the logical analysis of scientific subjects.

Formulas of the law of identity: A is A , or $A = A$, or AA , or $A \rightarrow A$.

Violation of the law of identity is of two types: substitution of the concept and substitution of judgment.

Substitution of a concept is a case when one word can correspond to different concepts (homonyms).

Substitution of a judgment (thesis) is a change of the subject or feature of the subject or both elements simultaneously. Judgment substitution is of two types:

1) partial – when the subject of thought changes its number, and in the judgment the quantifier word is replaced;

2) complete – when the subject of thought is completely replaced. A special kind of complete substitution of judgment is the “argument to the person”, in which the object of study is replaced by the subject of discourse.

The Law of Identity, in particular, establishes the following requirement for the use of terms in a legal act: “Terms should be used in a legal act only in one commonly used or established by law meaning; only one term should be used to denote the same object (phenomenon).

Examples of violations of the law of identity are the following considerations:

“6 and 3 are even and odd numbers. 6 and 3 are nine. Thus, 9 is both an even and an odd number “; “New airports reduce the time a person stays on the ground.” They identify non-identical things: in the first – the usual list and combination of numbers, in the second – “stay time” is used in different meanings (expectations and lifespan).

42. Law of non-contradiction

Incompatible judgments cannot be true at the same time; one of them is necessarily false.

The law of non-contradiction is subject to incompatible relations between judgments – a relationship of opposites and contradictions.

Terms of operation of the law:

- a) one subject;
- b) immutability of time;
- c) the invariability of relations.

The formula of the law: A is not non- A or $\neg (A \square \neg A)$.

Violation of the law of contradiction will be in the case when incompatible judgments are assessed as true. For example, “Driver S. violated the job description because he did not take an oral written order when leaving the garage”; “He was a young man of old age.”

==== 43. Law of excluded middle

Contradictory judgments about the same subject cannot be wrong at the same time. One of them is necessarily true. There can be no middle.

If we assume the falsity of two contradictory judgments at the same time, we will not be able to formulate a true judgment.

Unlike the law of non-contradiction, the law of the excluded middle is subject only to the relationship between conflicting judgments.

Terms of operation of the law:

- a) one subject;
- b) immutability of time;
- c) the invariability of relations.

The formula of the law of the excluded third: $A \square \neg A$.

Exceptions. The law of the excluded middle does not work:

a) if a judgment is about the future. That is, this law applies only to the present and past tense;

b) concerning judgments about an “empty” subject (when the subject of thought does not exist or its existence is not established).

c) in intuitionistic logic. It is used only within the framework of Aristotelian ambiguous logic.

For example, the sentence passed on the accused provides for only two options: either he is guilty or he is not guilty, the third is not given.

It will also be a violation of this law for conflicting judgments to be considered both false: “All defendants have the right to defense” and “Some defendants have no right to defense.”

This law also does not apply to the artificial introduction of contradictory objects or features. For example: in the reasoning “Although small, but a good help for a young family” the terms “small” and “good” are not contradictory.

==== 44. Law of sufficient reason

Aristotle formulated the first three laws. The famous philosopher, mathematician, logician and lawyer Gottfried Wilhelm Leibniz defined the law of sufficient reason (XVIII century).

Any true opinion has a sufficient basis.

It is about the need to prove the truth. The basis in the proof is the arguments (evidence). The criterion of the sufficiency of the basis is the truth of these arguments (evidence). The limit of proving the truth of judgments is:

- a) obviousness – the facts of human experience;
- b) axioms – statements that do not require proof; c) laws, principles, rules of science;
- d) reference to authority (citation).

An attempt to argue one’s point of view with the help of:

- a) erroneous judgments;
- b) hypothetical judgments;
- c) judgments accepted on faith (without verification);
- d) Insufficiency in the argument may also occur in violation of the logical rules of causation.

The formula of the law: A is because there is B (A – consequence, B – basis).

Violation of any law of logic leads to loss of common sense.

For example, the reasoning: “Student N. should be given grade because he is going on a business trip”; “Please accept me into a vocational school because I do not want to study (from the application of a 9th-grade student).” In these cases, there is a logical error “does not follow”, which

occurs in violation of the law of sufficient grounds. Neither a business trip is a ground for enrollment, nor is a reluctance to study a ground for admission to a vocational school.

==== 45. Inference as a form of thinking

The ability to conclude is a sign of intelligence.

The inference is a form of reasoning by which a new judgment is derived from one or more judgments according to certain rules.

Example:

All crimes are offenses.

Fraud is a crime.

So, fraud is an offense.

In this example, a new judgment is derived from the two judgments. The general structure of inference consists of the foundations (one, two, or more) and the conclusion. Those judgments in which there is some initial knowledge and from which a new judgment is derived are called bases, and a new judgment derived from the bases is called a conclusion. For greater clarity, the bases are separated from the conclusion by a dash. The logical connection between the basics and the conclusion is called inference.

In ordinary language, the connection of the conclusion with the basics is expressed by the words “therefore”, “because”, etc. The relationship between the basis and the conclusion is the relationship between the basis and the consequence: the basis is the basis, the conclusion – the consequence arising from this basis.

The structure of inference contains three types of knowledge:

1. Derived knowledge – in the basics;
2. Inference knowledge – in conclusion;
3. Substantiating knowledge – is implicit, it is knowledge of the rules of inference contained in the axioms, rules, and laws of logic.

The truth of the conclusion is determined by two rules:

1st rule on the content: the foundations must be true;

2nd rule on the form: you should follow the rules of inference.

Types of inferences

There are two classifications of inferences: by structural differences and by the nature of the conclusion.

1. According to structural differences, inferences are divided into deductive and non-deductive. Instead of deductive, in turn, are divided into inductive and transductive.

In deductive inferences (from the Latin *deductio* – inference) between the bases and the conclusion, there is a relationship of logical sequence, i. e. thought moves from the general position to its partial application.

Inductive inferences (from the Latin *inductio* – guidance) seem to “lead” us to a general opinion based on a series of partial observations, that is, in them, we have the reverse process of deduction from partial to general in comparison with deduction.

Translational inferences (from the Latin *trans* – through + *ducere* – to lead), or inferences by analogy (from the Greek. *Analogia* – proportion), “transfer” to the conclusion the same degree of generality that the foundations had. Most often it is a matter of transferring partial knowledge about a single subject of thought to another, similar to the first, subject.

2. Depending on the nature of the conclusion, inferences are divided into demonstrative (with the necessary true conclusion) and non-demonstrative (plausible, with the probable nature of the conclusion).

Demonstrative include:

1. Deductive inferences in the correct modes;
2. Complete induction.
3. Exact analogy.

Non-demonstrative include:

1. Incomplete induction.
2. Translation.

==== 46. Direct inferences: transformation

Deductive (from the Latin *deductio* – inference) is an inference in which we obtain knowledge about a part of the subjects or a single subject based on knowledge of the total number of subjects in the class. In this case, there is a logical sequence between the bases and the conclusion.

In correctly constructed deductive inferences, we get the necessary true conclusions. The necessary true conclusion is unquestionable and enforceable.

Depending on the number of bases, deductive inferences are divided into direct – with one base and indirect – with two and an unlimited number of bases. Indirect inferences, in turn, are divided into simple and complex.

To obtain a conclusion in the form of direct inference, in contrast to direct knowledge, it is necessary to use reasoning.

Direct inference is a deductive inference in which the conclusion is obtained only from one basis.

The function of direct inference is to clarify the content of the foundation. Clarification occurs by transforming the baseline during derivation.

To build the correct direct inference requires knowledge of certain rules.

There are several types of direct inferences, namely:

- 1) direct inference according to the rules of the logical square;
- 2) according to the rules of modal judgments;
- 3) according to the rules of judgment transformation;
- 4) according to the rules of inversion of judgment;
- 5) according to the rules of opposition to the predicate.

Since the rules of the logical square and the rules of modal judgments are considered above, we provide three types of direct inferences: transformation, inversion, the opposition of the predicate.

Transformation is a direct inference in which the subject remains unchanged in the conclusion, and the predicate and the connection change to contradictory. At the heart of this inference is the law of double negation: the negation of negation is identical with the assertion, i. e. it is not true that non-p is identical with p: $\sim\sim p \leftrightarrow p$.

When performing logical operations with judgments, the content of the judgment must remain unchanged. To do this, we must follow these rules: the transformation changes the quality of judgment but never changes its quantity. For example, “Any crime is a criminal offense” – “No crime is a non-criminal offense.”

Schemes: 1) SAP (all S is P) \rightarrow SEP (no S is not P);

2) SEP (no S is P) \rightarrow SA \sim P (all S are not P);

3) SIP (some S are P) \rightarrow SO \sim P (some S are not P);

4) SOP (some S are not P) \rightarrow SI \sim P (some S are not P).

Example: "All contracts are agreements" (A) becomes a judgment "No contract is a disagreement" (E). SAP \rightarrow SEUP.

==== 47. Direct inferences: inversion

Direct inference is a deductive inference in which the conclusion is obtained only from one basis.

The function of direct inference is to clarify the content of the foundation. Clarification occurs by transforming the baseline during derivation.

Inversion is such a direct inference in which the terms in the conclusion change places. However, the connection remains unchanged.

This logical operation allows moving from the subject-relationship-predicate (S-P) judgment to the predicate-relationship-subject judgment (P-S). The main requirement of the operation is to leave the content of the judgment unchanged, and this is possible only when the distribution of terms in the judgment does not change.

For example, "All prosecutors have higher education" – "Some of those who have higher education are prosecutors." There are pure inversion, inversion with restriction, and increment.

1) Pure inversion is an inference in which the terms change places in the conclusion without changing the type of judgment given in the base.

Schemes:

a) A (all S + are P +) \rightarrow A (all P + are S +). Example:

Any Constitution is a Basic Law

Thus, any Basic Law is a Constitution

b) E (no S + is P +) \rightarrow E (no P + is S +) For example:

No man is sinless

Therefore, no sinless being is human

c) I (some S- are P-) \rightarrow I (some P- are S-)

Example:

Some lawyers are entrepreneurs

So, some entrepreneurs are lawyers

2) Inversion with restriction is an inference in which when changing the places of terms in the conclusion, the scope of the judgment, which is the conclusion, is limited.

Scheme:

$A (\text{all } S + \text{ are } P-) \rightarrow I (\text{some } P- \text{ are } S +)$

Example:

All lawyers are jurists

So, some jurists are lawyers

3) Inversion with an increment is an inference in which the terms change places in the conclusion, but the scope of the judgment, which is the conclusion, becomes larger.

Scheme:

$I (\text{some } S- \text{ are } P +) \rightarrow A (\text{all } P + \text{ are } S-)$

Example:

Some lawyers are counsels

All counsels are lawyers

Exception: partially negative judgments (type O) are not subject to inversion.

===== 48. Direct inferences: opposition to predicate

The direct inference is a deductive inference in which the conclusion is obtained only from one basis.

The function of direct inference is to clarify the content of the foundation. Clarification occurs by transforming the baseline during derivation.

Predicate opposition is a type of direct inference in which logical operations of transformation and inversion are synthesized.

That is, it is a logical operation that allows you to move from the judgment “subject – relationship – predicate” (S – P) to the judgment “denial of predicate – relationship – subject” (non-P is not S). Thus, we perform two previous operations in succession: from the judgment S is P we pass first to S is not non-P (we make transformations), and then we rotate the received judgment: S is not non-P \rightarrow non-P is not S.

Schemes:

a) A (All S is P) \rightarrow E (No non-P is S)

Example:

Every law-abiding citizen pays taxes on their income

So, none of those who do not pay taxes on their income are law-abiding citizen

b) E (No S is P) \rightarrow (Some non-P is S)

Example:

No prosecutor has an enterprise

So some who don't have a business are prosecutors

c) O (Some S is not P) \rightarrow I (Some non-P is S)

Example:

Some lawyers are not prosecutors

So, some of those who are not prosecutors are lawyers

Exception: partially affirmative judgments (type I) are not opposed to the predicate.

==== 49. Categorical syllogism: definition and general structure

Syllogism (syllogismos) is translated from Greek as a collection of logos, i. e. judgments.

A categorical syllogism is called so because all the judgments that are part of it are categorical. There are three judgments in the categorical syllogism: two of them are bases and the third judgment is a conclusion.

An example of a categorical syllogism is:

1. Any crime is a socially dangerous act. 2. Robbery is a crime.

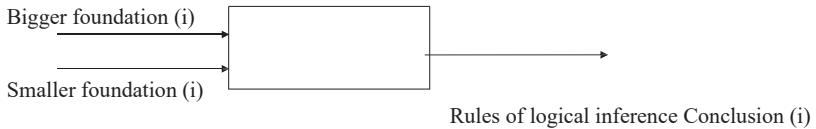
Thus, robbery is a socially dangerous act.

Summing up, the most interesting for us is the conclusion that contains new knowledge. Let us denote the term that stands in the place of the subject in the conclusion ("robbery"), with the letter S, and call it a smaller (in volume) term. The term that stands in the place of the predicate in the conclusion ("socially dangerous act") is denoted by the letter P and will be called a larger term. On both bases there is a term "Crime", which is absent in the conclusion. Let us call it the middle term

and denote it by the letter M (from the Latin *medias* – average). Smaller and larger terms are called “extreme”.

In a categorical syllogism, a base which is in a larger term is called a larger base, and the one which is in a smaller term is called a smaller base.

The structure of the categorical syllogism, in general, can be represented as follows:



50. Axiom and general rules of categorical syllogism

Axiom of a categorical syllogism.

There is an axiom for a categorical syllogism, i. e. a position that is accepted without proof due to its obviousness. Depending on what we are interested in – the scope or content of the conclusion in a categorical syllogism, we use one of two formulations of the axiom:

1. The axiom about volume. Everything that is asserted or denied about the whole class of objects is asserted or denied about each object of this class (extensional wording).

2. Axiom of content. The sign of the sign of the thing is the sign of the thing itself; that which contradicts the sign of the thing contradicts the thing itself (intentional formulation).

General rules of a categorical syllogism.

Among the general rules of categorical syllogism, there are rules of terms and rules of foundations.

Rules of terms.

Rule 1. In a categorical syllogism, there should be only three terms.

If there are only two terms in the syllogism, then such a conclusion can only be direct. If the terms in the syllogism are four, not three, then there is an error called the “error of quadruple terms” (*quaternio terminorum*). This error is because homonyms are used instead of the middle term: they

sound the same but define different concepts so that instead of one middle term, two different ones appear.

Rule 2. The average term must be distributed in at least one of the bases.

Rule 3. If the deadline is not distributed in the base, it cannot be distributed in the conclusion.

Rules of foundations.

Rule 4. From two negative bases, the true conclusion does not follow.

Rule 5. From two partial bases, the true conclusion does not follow.

Rule 6. If one of the principles is a negative judgment, then the conclusion will be negative.

Rule 7. If one of the bases of the judgment is partial or single, then the conclusion will be a partial or single judgment.

In violation of these rules, the conclusion in the categorical syllogism necessarily does not follow.

We always assume that the foundations in a categorical syllogism are true judgments. If the syllogism is constructed correctly, the conclusion will always be a true judgment. This is guaranteed by logic. If at least one premise is wrong, then even though all the rules will be followed, the conclusion can be both true and false.

===== 50. Axiom and general rules of categorical syllogism.

Axiom of categorical syllogism.

For a categorical syllogism there is an axiom, a position that is accepted without proof due to its obviousness. Depending on what we are interested in – the scope or content of the conclusion in a categorical syllogism, we use one of two formulations of the axiom:

1. *Axiom about volume.* Everything that is asserted or denied about the whole class of objects is asserted or denied about each object of this class (extensional wording).

2. *Axiom regarding content.* The sign of the sign of the thing is the sign of the thing itself; that which contradicts the sign of the thing contradicts the thing itself (intentional formulation).

General rules of categorical syllogism.

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Rule 2. The average term must be distributed in at least one of the bases.

Rule 3. If the predicate is not distributed in the base, it cannot be distributed in the conclusion.

Rules of foundations.

Rule 4. From two negative bases the true conclusion does not follow.

Rule 5. From two partial bases the true conclusion does not follow.

Rule 6. If one of the principles is a negative judgment, then the conclusion will be negative.

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In violation of these rules, the conclusion in the categorical syllogism necessarily does not follow.

We always assume that the foundations in the categorical syllogism are true judgments. If the syllogism is constructed correctly, the conclusion will always be a true judgment. This is guaranteed by logic. If at least one premise is wrong, then regardless of the fact that all the rules will be followed, the conclusion can be both true and false.

51. Figures and moduses of PKS: general characteristics

Depending on the place occupied by the middle term, there are four figures of categorical syllogism:

Figure I	Figure II	Figure III	Figure IV
M – P	P – M	M – P	P – M
S – M	S – M	M – S	M – S
S – P	S – P	S – P	S – P

The bases and conclusion in the categorical syllogism are formed by categorical judgments A, E, I, O. A specific set of these judgments is called a modus (from the Latin modus – method, type): AAA, AOO, EEC, etc.

For each of the figures there is a theoretical possibility to build 16 variants of foundations. Accordingly, for only four figures – 64. But not all of them meet the general rules of categorical syllogism. Therefore, to obtain true modes, there are special rules for each of the figures, limiting the number of combinations of categorical judgments of different quantity and quality.

Examples:

I figure: All students receive higher education. S. – student.

Thus, S. receives higher education.

II figure: All students receive higher education. S. does not receive higher education.

So, S. is not a student

III figure: All students receive higher education. All students take exams.

So, some of those who take exams are students.

Figure IV: All students take exams.

Everyone who takes the exams gets grades

To make it easier to remember the medieval modes scholastics gave a name to each mode and composed a poem that includes all moduses of four figures:

Barbara, Celarent, Darii, Ferioque prioris;

Cesare, Camestres, Festino, Baroco secundae;

Tertia Darapti, Datisi, Disamis, Felapton, Bocardo, Ferison habet;

quarta insuper addit Bramantip, Dimaris, Camenes, Fesapo, Fresison.

Moduses can be strong or weak. Thus, each of the four figures has 6 moduses, a total of 24 true moduses are possible: 19 strong and 5 weak.

The names of the moduses have not only a mnemonic meaning (for memorization), but also carry information about how to convert modes of II–IV figures to modes of I figures (on it indicate consonant letters). Vowels in the names of modes of correspondence know the quality and quantity of judgments that take the place of the foundations and conclusion in syllogism. So the AAA modus was named Barbara. Modus AAI – Barbari, etc.

===== 52. Figure I of categorical syllogism: rules and modus

Figure I is a structure of categorical syllogism, in which the medium (middle term) takes the place of the subject in the larger base and the place of the predicate – in the smaller base.

Figure diagram:

M – P

S–M

S – P

Rules of figure:

A bigger foundation is always a common judgment.

A smaller basis is always an affirmative judgment.

The first figure has 4 strong *modus*: AAA, EAE, AII, EIO (Barbara, Celarent, Darii, Ferio) and 2 weak: AAI, EAO (Barbari, Celaront). The latter two moduses are called weak ones because they “weaken” the corresponding moduses with general conclusions (AAA and EAE).

Aristotle called the first figure exemplary, referring to the following:

Only in Barbara’s modus it gives the general conclusion necessary for the formulation of scientific laws.

1. Categorical judgments of all types A, E, I, O in turn take the place of the conclusion in its modus.

2. It is in the modes of the first figure that the axiom of categorical syllogism is clearly observed. The first part of the axiom can be seen in the Barbara modus, and the second part in the Celarent modus.

The first figure in reasoning is used more often than all the other figures combined. The AAA modus is of particular importance, which

gives a general conclusion. In particular, the court decision is based on this modus.

Examples:

1) No law-abiding citizen is a criminal.

P law-abiding citizen.

Thus, P. is not a criminal.

Scheme:

M E P

SAM.

S E P

Figure I, Celarent modus. Construction corresponds to the rules, conclusion follows with necessity.

2) All law-abiding citizens pay taxes.

P. – illegally obedient citizen.

P. – does not pay taxes.

P. – does not pay taxes:

M A P

SEM

S E P

Figure I. The conclusion does not follow necessarily because the second rule of figure I is violated.

===== 53. Figure II of categorical syllogism: rules and modus

Figure II is a structural kind of categorical syllogism, in which the middle term is in the place of the predicate in both bases.

Figure diagram:

P – M

S–M

S – P

Rules of figure II:

1. A larger basis is always a common judgment.

2. One of the foundations is a negative judgment.

Thus, the *modus*es of the second figure have 4 strong: EAE, AEE, EIO, AOO (Cesare, Camestres, Festino, Baroco) and two weak: EAO, AEO (Cesaro, Camestro).

Figure II emphasizes the incompatibility of concepts. By modus of the second figure, as a rule, refutation of certain statements is used, in particular, in acquittals on criminal cases.

Examples:

1) No law-abiding citizen is a criminal.

P. – criminal.

Thus, P. is not a law-abiding citizen.

Scheme:

P E M

SAM

S E P

Figure II, Cesare modus complies with the rules, the conclusion follows with necessity.

2) All law-abiding citizens pay taxes.

P. – pays taxes.

P. is law-abiding.

Scheme:

P A M

SAM

S A P

Figure II. The conclusion does not necessarily follow, because the second rule of figure II is violated.

===== 54. Figure III of the categorical syllogism: rules and modus

Figure III is a structural kind of categorical syllogism, in which the middle term takes the place of the subject in both bases.

Rules of the third figure:

1. A smaller foundation is always an affirmative judgment.
2. The conclusion is always a partial judgment.

The correct *modus*es of this figure are the following six: AAI, AII, IAI, EAO, OAO, EIO (Darapti, Datisi, Disamis, Felapton, Bocardo, Ferison). There are no weak moduses, because there is nothing to weaken – there are no general conclusions.

Figure III is used to show exceptions to the general rule.

Examples:

1) All law-abiding citizens pay taxes.

Some law-abiding citizens are vacationing outside Ukraine.

Thus, some of those vacationing outside of Ukraine pay taxes.

Scheme: MAP

MIS

S I P

Figure III, Datisi modus. The conclusion follows with necessity, because the syllogism corresponds to the rules of figure III.

2) All law-abiding citizens pay taxes.

Some law-abiding citizens do not work.

So some of those who work do not pay taxes.

Scheme:

M A P

MOS

S O P

Figure III. The conclusion does not follow with necessity, because the second rule of the figure is violated.

===== 55. Figure IV of categorical syllogism: rule and modus

Figure IV is a structural type of categorical syllogism, in which the middle term takes the place of the predicate in the larger base and the place of the subject in the smaller one.

Aristotle believed that the conclusions of the fourth figure are used in intellectual practice very rarely, so it has a purely theoretical significance. Although the conclusions from Figure IV are correct, it is considered artificial. But his students Theophrastus and Eudemus analyzed several of its correct moduses, and the Roman physician Galen, who was interested in logic, formulated the rules of the fourth figure 500 years later.

Rules of figure IV:

1. If the larger basis is an affirmative judgment, the smaller one is a general one.

2. If one of the principles is a negative judgment, then the larger one is general.

According to the fourth figure, there will never be general affirmative judgments in the conclusion.

This figure has 5 strong *modus*: AAI, AEE, IAI, EAO, EIO (Bramantip, Camenes, Dimaris, Fesapo, Fresison) and one weak AEO (Camenos).

Examples:

1) All law-abiding citizens pay taxes.

All those who pay taxes, benefit society.

Some of those who benefit society are law-abiding citizens.

Scheme:

P A M

M A S

S I P

Figure IV, Bramantip modus. The conclusion follows with necessity, because the syllogism corresponds to the rules.

2) All law-abiding citizens pay taxes.

All those who pay taxes, benefit society.

All those who benefit society are law-abiding citizens.

Scheme:

P A M

M A S

S A P

Figure IV. The conclusion does not necessarily follow, because the third rule of terms is violated: S is not distributed in the base, but distributed in the conclusion.

===== 56. A simple conditional syllogism

A simple conditional (purely conditional) syllogism is a deductive inference, the foundations and conclusion of which are conditional (implicit) judgments. The structure of such a syllogism:

$a \rightarrow b$ $b \rightarrow c$ $a \rightarrow c$

The conclusion in a purely conditional syllogism is based on the rule: the consequence of the consequence is the consequence of the basis.

In the form of a formula, a purely conditional syllogism can be represented.

thus: $(a \rightarrow b) \wedge (b \rightarrow c) \rightarrow (a \rightarrow c)$. This is identically true formula, which in the classical sense is the law of logic

Example:

If a citizen is law-abiding, he obeys the law. If he obeys the law, he has legal awareness.

If a citizen is law-abiding, then he has legal awareness.

It is clear that a purely conditional syllogism can be constructed as a fairly long chain of conditional syllogisms.

===== 57. Conditional categorical syllogism: structure and moduses

The very name of this type of syllogism indicates its composition. *A conditionally categorical syllogism is a deductive inference in which one of the bases is a conditional judgment, and the second base and conclusion are categorical.*

There are *two moduses* of conditional-categorical syllogism: affirmative (modus ponens) and negative (modus tollens).

We know that the conditional judgment is asymmetric and consists of two simple ones: the antecedent (cause) and the consequent (consequence). Depending on the purpose – to assert or deny the causal relationship – the antecedent and the consequent will be located in the inference in different order. This is due to the different weight of cause and effect, i. e. the fact that the antecedent is only sufficient and the consequent is necessary.

1st modus – *affirmative (modus ponens, MP)*.

In the structure of the *modus ponens*, the first basis is a conditional judgment. In the second ground, the reason is asserted, and in the conclusion, is a consequence of the first foundation.

Scheme:

$a \rightarrow b$, a

b

b

Example:

If the claim is filed by a minor (a), the court leaves action without consideration.

The lawsuit was filed by a minor (a).

Consequently, the court dismissed the action (b).

In the presence of negative judgments in the structure of the inference order. The statement (from the basis to the consequence) does not change.

Scheme:

$$\frac{\sim a \rightarrow b, \sim a}{b} \quad \frac{a \rightarrow \sim b, a}{\sim b} \quad \frac{\sim a \rightarrow \sim b, \sim a}{\sim b}$$

Theoretically, there is an opportunity to build another version of this modus according to the scheme:

a → b, b a

Example:

If the claim is filed by a minor (a), the court leaves action without consideration (b).

The court left the claim without consideration (b).

Therefore, the action was brought by a minor (a).

We see that violating the rule of affirmative modus, conclusion does not follow with necessity.

2nd modus – *negative (modus tollens, MT)*.

In the structure of *modus tollens* the first premise is implicit judgment, in the second ground denies the conclusion on implicit basis, and in the conclusion its basis is denied.

Scheme:

Схема:

a → b, ~b

~a

Example:

If the claim is filed by a minor (a), the court leaves action without consideration.

The claim was not left without consideration (~b).

Therefore, the claim was not filed by a minor (~a).

Theoretically, there is an opportunity to build another version of this mode according to the scheme:

$a \rightarrow b, \sim a$

$\sim b$

Example:

If the claim is filed by a minor (a), the court leaves the claim without consideration (b).

The claim was not filed by a minor ($\sim a$).

Therefore, the court does not leave the claim without consideration ($\sim b$).

We see that in violation of the rule of negative mode you the snap does not follow with necessity.

General rule of conditional-categorical syllogism:

The assertion of implication comes from cause to effect, but not vice versa. Denial of implication occurs from consequence to basis, but not vice versa.

Violation of this rule will result in a logical error.

An error in a conditional-categorical syllogism is called a *pseudo-causal connection*. If events follow one another over time, they may appear to be causal, but this is not always the case.

===== 58. Equivalent-categorical syllogism

An equivalent judgment, or double implication, is characterised by the fact that a consequence can follow from only one basis and there are no other bases for such a consequence. Cause and effect are necessary, so it is a symmetrical judgment.

An equivalent-categorical syllogism is a type of complex syllogism in which the first base is an equivalent judgment, and the second base and conclusion are categorical.

The equivalent-categorical syllogism has two affirmative and two negative modes. The procedure of assertion and the procedure of denial can be free – either from the ground to the consequence, or from the consequence to the ground.

Schemes of affirmative modus:

1) $a \leftrightarrow b, a$ 2) $a \leftrightarrow b, b$ a

The presence of negative judgments in the structure of this syllogism does not affect the order of confirmation.

Examples:

If and only if a person has no signs of life ($\sim a$), then he/she dies (b).

P. has no signs of life ($\sim a$).

Thus, P. died (b).

2) If and only if a person has no signs of life ($\sim a$), then he/she dies (b).

Thus, P. has no signs of life ($\sim a$).

Schemes of negative modus:

1) $a \leftrightarrow b, \sim a$ 2) $a \leftrightarrow b, \sim b$
 $\sim b$ $\sim a$

The presence of negative judgments in the structure of this syllogism does not affect the order of denial.

Examples:

1) If and only if a person has no signs of life ($\sim a$), then he/she dies (b).

P. has signs of life (a).

Therefore, P. did not die ($\sim b$).

2) If and only if a person has no signs of life ($\sim a$), then he/she dies (b).

P. did not die ($\sim b$).

Thus, P. has signs of life (a).

===== 59. **Dividing-categorical syllogism: structure and modus**

The name “divisive-categorical” also reflects the composition of this deductive inference: *the first basis – a divisive judgment, the second basis and conclusion – categorical judgments.*

The divisive-categorical syllogism has two correct moduses: affirmative-negative and negative-affirmative.

The modus ponendo tollens (MPT) is constructed from the assertion of one disjunct in the second ground to the denial of other disjuncts in the conclusion.

Scheme:

$a \vee b. a$

$\sim b$

Example:

Tomorrow I will either stay in Kharkiv (a) or go to Poltava at 8 o'clock in the morning (b).

I decided to stay in Kharkiv (a).

So, it is not true that I will go to Poltava at 8 o'clock in the morning (~b).

Negative-affirmative mode (modus tollendo ponens, MTP) ranges from the objection of the disjuncts in the second basis to the assertion of one of the disjuncts in the conclusion.

Scheme:

$a \vee b. \sim a$

b

Example:

Tomorrow I will either stay in Kharkiv (a) or go to Poltava at 8 o'clock in the morning (b).

I decided not to stay in Kharkiv (~a).

So, I will go to Poltava at 8 o'clock in the morning (b).

Rules of division-categorical syllogism:

1. Dividing judgment should be a strong disjunction.
2. All possible disjunctions must be taken into account in the separation judgment.

When violating the rules of divisive-categorical syllogism, logical errors arise.

Example:

The student can get “excellent”, “good” or “satisfactory” on the exam.

A student did not receive “good” or “satisfactory”.

So, the student got “excellent”.

But here lies a mistake: in the first principle, the opportunity to get a grade of “unsatisfactory” is missed. Therefore, the conclusion will be impossible, because the student could actually get not “excellent”, but “unsatisfactory”.

==== 60. Conditional-separating syllogism

The conditional-divisive syllogism contains in the first basis a conditional judgment, and in the second – a divisional judgment (disjunction). Conditional-participle syllogism is called a *lemma* (from the Latin lemma – assumption), or lemmatise inference. Depending on the number of assumptions (implications) in the larger basis, *lemmas* are divided into: *dilemmas* – two assumptions, *trilemmas* – three assumptions, *polylemics* – more than three assumptions.

The rules of conditional-syllabic syllogism combine the rules of conditional-categorical and divisive-categorical syllogisms:

1. The assertion of implication comes from cause to effect, but not vice versa. Denial of implication comes from consequence to cause, but not vice versa.

2. The disjunction (in the case of a strong disjunction) should list all the disjunctions.

Types of dilemmas.

According to the number (causes and consequences in the implication) dilemmas are divided into simple and complex.

In terms of quality (assertion or denial) dilemmas are divided into constructive and destructive.

The combination of quantitative and qualitative characteristics gives four types of dilemmas: simple constructive, complex constructive, simple destructive and complex destructive.

1. A simple constructive dilemma: in a larger foundation, the same consequence follows from two different grounds. In a smaller basis both bases are confirmed, and in smaller – the consequence is confirmed.

Scheme:

$a \rightarrow b, c \rightarrow b$

$a \vee c$

b

Example:

If a person is a thief (a), he/she commits a crime (b); if a person is a murderer (c), he/she commits a crime (b).

P. is thief (a) or murderer (c).

P. committed a crime (b).

2. *A complex constructive dilemma*: in a larger foundation, two different consequences follow from two different grounds. The lesser basis confirms both grounds, and the conclusion confirms both consequences.

Scheme:

$a \rightarrow b, c \rightarrow d$

$a \nabla c$

$b \nabla d$

Example:

If the ruler is wise (a), then the country is rich (b); if the ruler is a rascal (c) – the country is poorer (d).

The ruler is wise (a) or deceit (c).

A country can be either rich (c) or poor (d).

3. *A simple destructive dilemma*: in a larger base, different consequences follow from one ground, in a smaller ground, both consequences are denied, and in the conclusion, both grounds are denied.

Scheme:

$a \rightarrow b, a \rightarrow c$

$\sim b \nabla \sim c$

$\sim a$

Example:

If a person has committed a crime (a), he/she has broken the law (b); if a person has committed a crime (a), he/she should be held criminally liable (c).

P. did not violate the law ($\sim b$) and should not be criminally prosecuted ($\sim c$).

P. did not commit a crime ($\sim a$).

4. *A difficult destructive dilemma*: in the larger basis of the two on different grounds, two different consequences follow. In the lesser ground, both consequences are denied, and in the conclusion, both grounds are denied.

Scheme:

$a \rightarrow b, c \rightarrow d$

$\sim b \nabla \sim d$

$\sim a \nabla \sim c$

Example:

If a person jumps out of window (a) in a fire, he can get hit (b); if a person tries to go up the stairs (c), he can get burns (d).

P. received neither bruises (\sim b) nor burns (\sim d).

P. did not jump out of the window (\sim a) and did not walk up the stairs (\sim c).

===== 61. Abbreviated syllogisms (entimemes)

In reasoning, we use both complete syllogisms and syllogisms, where one of the principles or conclusion is omitted (implied). Such syllogisms are called abbreviated, or *entimemes* (from the Greek “in thought”).

Types of entimemes. In the categorical syllogism there are three types of entymes: with the omitted larger base, with the omitted smaller base and with the omitted conclusion.

Examples:

Kharkiv is a proper name

Therefore, “Kharkiv” is written in capital letters.

This is an entheme with an omitted capital letter (All proper names are capitalised).

1. All proper names are written in capital letters. Therefore, “Kharkiv” is written in capital letters.

This is an entheme with an omitted minor base (“Kharkiv” is a proper name).

2. All proper names are capitalised.

“Kharkiv” is a proper name.

This is an entheme with an omitted conclusion.

The entimem is used for purely conditional, conditionally categorical, divisive-categorical and other syllogisms, but with one exception: it is impossible to miss a larger basis for them.

In practice, even more reductions can be made (for example, both bases). But this complicates mutual understanding.

===== 62. Polysyllogisms. Sorit and epicherema

Reasoning is rarely limited to one syllogism. Several syllogisms that follow one another can form a chain of successive conclusions linked

by logical necessity. A sequence of syllogisms connected in a logically connected reasoning is called a *polysyllogism* or a *complex syllogism*.

The structure of polysyllogism. An elementary polysyllogism consists of two syllogisms. A syllogism that provides the basis for the foundation of the next syllogism is called a *prosylogism*. A syllogism in which the base is the conclusion of the previous syllogism is called an *epislogism*.

Types of polysyllogism. Depending on the order of the logical connection between the judgments, there are two types of polysyllogisms.

1. *Progressive* – if the conclusion of the previous syllogism becomes a greater basis for the next. In this case, the reasoning goes from more general concepts to smaller concepts.

Scheme:

a is b – prosylogism.

c is a

c is b

c is b – epislogism.

d is c

d is b

Example:

Every citizen (a) must abide by the laws of his or her country (b).

All lawyers (c) are citizens (a).

All lawyers (c) must abide by the laws of their country (b).

All judges (d) – lawyers (c).

All judges (d) must abide by the laws of their country (b).

2. *Regressive* – if it contains the conclusion of the previous syllogism becomes a smaller basis for the next syllogism.

Scheme:

a is b – prosylogism.

c is a

c is b

d is c – epislogism.

c is b

b is d

Example:

Every citizen (a) must abide by the laws of his or her country (b).

Every lawyer (c) is a citizen (a).

Every lawyer (c) must abide by the laws of his country (b).

Advocates (d) are lawyers (c). Every lawyer (c) must abide by the laws of his state (b). Some of those who must abide by the laws of their country (b) are advocates (d).

Polysyllogisms can take abbreviated forms.

Soritos is a polysyllogism consisting of abbreviated syllogisms (from the Greek *soritos* – heap). It consists of several syllogisms and has two forms – *progressive* and *regressive sorita*.

There are complex abbreviated syllogisms, in which each base is an *entimem*. This syllogism is called an *epichieremia*.

Polysyllogisms, both in full and in abbreviated forms, appear as a logical form of substantiation in proofs.

===== 63. The concept of induction

Probabilistic inferences are non-deductive reasoning in which the conclusions are not fully plausible. Therefore, they are also called non-demonstrative, i. e. unprovable, because the truth of the foundations does not guarantee the truth of the conclusions, although such truth is possible. However, very often we do not have any other means of substantiation at all, except for probabilistic inferences, so they are used as aids in the procedures of proof. The conclusions in them only with one or another degree of probability confirm the conclusion, which has the character of a hypothesis. The degree of probability of confirmation is not a constant value, but changes as new facts are established that confirm or refute the conclusion. Therefore, in modern logics, the study of non-demonstrative inferences is conducted on the basis of concepts and methods of calculating probabilities. The effectiveness of probabilistic inferences largely depends on the number of cases enshrined in the foundations: a) more, b) more diverse, c) more typical. The more diverse and numerous the observations from which the facts underlying the generalization are derived, the less the danger that the property we have observed has no basis in the properties of the whole class and depends on random circumstances. Inductive inferences and inferences by analogy are non-demonstrative inferences.

The term “induction” (from the Latin *inductio*) means “guidance”, ie, refers to the process of suggesting, approaching the truth. The main function of inductive conclusions in the process of cognition is generalization, i. e. obtaining general judgments. In their content and cognitive value, these generalizations can be of different nature – from the simplest generalizations of everyday practice to empirical generalizations in science or universal judgments that express general laws. The real problem is to find a basis for generalization in cases where the considered facts do not represent all possible examples, because it is not known whether the considered examples, on the basis of which the general judgment is verified, reveal properties inherent in the whole class.

The specific problem of induction is to establish the extent to which the examples considered are representative. Thus, despite the fact that induction and deduction are not opposite forms of inference, deduction, however, does not consider the question of the truth or falsity of the foundations, while the characteristic feature of induction is the consideration of this issue. Therefore, induction can be considered as a method by which the material truth of the foundations is established. The real difference is not between deductive and inductive conclusions, but between necessary and probabilistic, because the grounds for general judgments that describe the facts are always only probabilistic. An inductive argument, although not strictly speaking, proves a general judgment, can nevertheless provide evidence that this judgment is better substantiated than all the other hypotheses proposed.

Depending on the completeness and completeness of the empirical study, there are two types of inductive inferences: *complete and incomplete induction*.

==== 64. Complete induction

Complete induction occurs when the conclusion is made on the basis of a study of all elements of the class in question. Inductive inferences of this type are used only

in cases dealing with closed classes, the number of elements in which is final and easily accessible for review (the number of countries in Europe,

the number of industrial enterprises in the region, the number of subjects in the autumn semester, etc.). There are *empirical* and *mathematical* complete inductions. Empirical complete induction is a reasoning based on direct (experimental, empirical) research on a relatively small number of class elements. In this case, the reasoning has the following scheme:

Subject S 1 has characteristic P.

Subject S 2 has characteristic P.

Subject Sn has characteristic P.

Subject S 1 , S 2, ..., Sn - are elements of class K.

{S1 , S2 , ..., S }=K

All objects of class K have the characteristic P.

For example, establishing that each of the documents necessary to assess the readiness of a criminal case to be sent to court is available allows us to conclude with good reason that the case should be sent to court.

Mathematical induction is the acceptance of proofs of general propositions in the deductive sciences. The substantiation of the general provision here is based on the study of the formal possibility of its application to each of the individual cases.

===== 65. Incomplete induction: structure and types

Incomplete induction is an inference under which a conclusion (generalization) is made on the basis of a study of only a part of the elements of the class for which the reasoning is constructed. In this case, the reasoning is carried out according to the following scheme:

Subject S1 has characteristic P.

Subject S2 has characteristic P.

...

Subject Sn has characteristic P.

Subjects S 1, S 2, ..., Sn are elements of class K

{S 1 , S 2 , ..., Sb} ∈K

All objects of class K have the characteristic P.

Incomplete induction is divided into: popular and scientific.

Incomplete induction is called *popular* (due to a simple enumeration of facts) if its application does not use scientific methodology. It is characterized by the fact that only known objects of a certain class are studied, as a result of which such inferences are most exposed to risky refutations.

English thinker of the XVI–XVII centuries. Francis Bacon perfected induction by enumeration, combining it with experiment. *Scientific induction* is the establishment of the recurrence of a trait in some phenomena of a class on the basis of identifying the causal dependence of this trait on certain properties of the phenomenon. *Scientific induction* can be of two types: *induction through selection (selection)*, when the conclusion about the belonging of a class feature is based on knowledge of the sample (class), obtained by methodical selection of phenomena from different parts of this class, and *induction by exclusion (elimination)*, in in the process of which conclusions about the causes of the studied phenomena are built by identifying confirmatory circumstances and excluding circumstances that do not satisfy the properties of causation.

66. Methods of scientific induction (canons of Bacon – Mill)

Methods of scientific induction (Bacon-Mill canons) are inductive methods of establishing causal relationships that clarify the reasons for the recurrence of the sign in many subjects.

There are five main methods of establishing causal relationships: the method of single similarity (similarity); single difference method; combined method of similarities and differences; method of accompanying changes; residue method.

1. Similarity method – if some condition F constantly precedes the occurrence of the studied phenomenon X while other conditions change, and this condition is probably the cause of the phenomenon X.

The method of similarity is called the method of finding common ground in different ways, because all cases are markedly different from each other, except for one circumstance.

2. *Difference method* – if some condition F occurs when the studied phenomenon X occurs, and is absent when this phenomenon does not, and the other conditions remain unchanged, then F is the cause of the phenomenon X .

The method of difference is called the method of finding differences in similarity, because the compared cases coincide with each other in many properties. According to the method of difference, two cases are compared, in one of which the phenomenon under study occurs, and in the other it does not occur; the second case differs from the first by only one circumstance, and all the others are similar.

The logical mechanism of inference by the method of difference takes the form of a tollendo ponens mode of divisive-categorical inference. Reasoning by the method of difference acquires evidentiary knowledge only if there is accurate and complete knowledge of the previous circumstances that make up a closed set. Since in the conditions of empirical knowledge it is difficult to claim a comprehensive statement of all the circumstances, conclusions by the method of difference in most cases give only problematic conclusions. However, the most plausible inductive conclusions are reached by the method of difference.

3. *Combined method of similarities and differences* – if two or more cases when a given phenomenon X occurs are similar in only one condition F , while two or more cases when this phenomenon X is absent, differ from the first cases only in that there is no condition F , then this condition F is the cause of X .

This method is a combination of the previous two methods: the type obtained by the method of similarity is repeated using the method of difference. In this way, by analyzing the plurality of cases, *both similarities in different and different in similarities are detected*.

The probability of a conclusion in such a complex reasoning increases markedly, because the advantages of the method of similarity and the method of difference are combined, each of which separately gives less reliable results.

4. *The method of concomitant changes* – if with the change of the condition F to the same degree changes some phenomenon X , and other circumstances remain unchanged, it is likely that F is the cause of X .

This method is used in the analysis of cases in which there is a change in one of the previous circumstances, accompanied by a change in the studied action.

The application of the method of concomitant changes also involves compliance with a number of conditions: the necessary knowledge of all possible causes of the phenomenon under study; from the above circumstances should be eliminated (excepted) which do not satisfy the unambiguous properties of causation; among the previous ones there is a single circumstance, the change of which accompanies the change of action.

5. Residue method – if complex conditions perform a complex action and it is known that part of the conditions causes a certain part of this action, then part of the remaining conditions causes part of the remaining actions.

Remaining reasoning is often used in the process of investigating crimes, mainly in cases where it is established that the causes of the investigated actions are clearly disproportionate. If the action in its scope, scale or intensity does not correspond to a known cause, then the question of the existence of some other circumstances arises.

The considered methods of establishing causal relations by their logical structure belong to the complex considerations in which the actual inductive generalisations are built with the participation of deductive conclusions. Based on the properties of causation, deduction is a logical means of elimination (exclusion) of random circumstances, thus it logically corrects and directs the inductive generalization.

The truth of the conclusion in non-demonstrative inferences may have varying degrees of probability. In some cases (with full induction) it reaches one, i. e. the conclusion becomes reliable.

Among the conditions for increasing the probability of conclusions in the case of non-deductive conclusions, the most important is the significance of the connections fixed in these conclusions. Connection A is more important than connection B if and only if the statements about connection A follow the statement about connection B. Using this definition, we can formulate the following statement: the more essentially fixed in the foundations of the connection, the conclusion will be more probable. The study of the principles of calculating the probability of

conclusions with non-deductive inferences led to the formation of a special logical-mathematical discipline – probability theory, which operates with statistical generalizations, i. e. inferences of incomplete induction, which set in the basics quantitative information about the frequency of a group transferred in conclusion to the whole set of phenomena of this kind. The logical transition from the basics to the conclusion, which has the character of a hypothesis, gives here only problematic knowledge.

===== 67. Analogy: general characteristics

Considerations based on the study of similarities or similarities between phenomena play a significant role in both scientific knowledge and in everyday reasoning. The analogy involves the transfer of knowledge from one subject and phenomenon to another. The results of inferences by analogy are only plausible, as a result of which such considerations are considered probabilistic inferences. The degree of their probability can vary widely, ranging from false to near probable.

Each specific object or phenomenon, having a plurality of properties, is not a random combination of features, but a certain unity. No matter how insignificant this or that sign is, its existence and change are always conditioned by the state of other aspects of the object or external conditions. In science and practice, individual phenomena are often studied for which generalizations have not yet been obtained. In these cases, an unknown feature of the phenomenon is established, based on previously acquired knowledge about another similar single phenomenon, i. e., one phenomenon is likened to another. When *assimilating* knowledge about new features of the subject is obtained not by simple observation, but by logical transfer of the feature from one subject to another. It is based on the assumption that a property that belongs to the objects of a known group and occurs in them together with some set of other properties, will belong to these objects another object similar to group objects, because it has the same set of properties. It is possible not only to move from the properties of one object to the properties of another, but also from the properties of a group of objects to the properties of an individual object. In this case, there is an inference from the already clarified partial

similarity between the objects of the group and a single subject to a more complete and deeper similarity between them.

An analogy is a non-demonstrative inference about the belonging of a certain feature (property or relation) to an object, which is called transferable, on the basis of similarity in essential features with another object, which allows to find the similarity of different.

Establishing similar features in the compared objects or relationships is the main prerequisite for inference by analogy. The conclusion will be capable only if it is revealed and fixed similarity not in any, but only in essential features. The absence of such similarity makes inference by analogy impossible. The ability of inferences by analogy is determined mainly by the nature of the initial knowledge of the objects being compared; about the similarity of similar objects, the differences between them, the relationship between the signs of similarity and the transferred sign.

Y In the case of analogy between individual subjects, inference does not always give completely reliable conclusions, because it is difficult to compare them in the presence of significant features. In the case of an analogy from a group to a single subject, the conclusions are more capable, because the group itself is pre-selected for a separate set of essential features.

An important condition for the validity of the conclusions by analogy is to take into account the features that distinguish similar objects. In some cases, the difference may be insignificant, i. e. a compatible transferred feature. But there may be properties that prevent the transfer of features from one object to another. They are incompatible with the properties or relationships being transferred. If in the object B, along with the signs of similarity P, K, C, a sign M is found incompatible with the sign T that is transferred, or a special condition that prevents its manifestation, then this circumstance generally excludes the use of analogy. The more complex the studied systems, the more imperceptible their incompatible characteristics may become.

===== 68. Inferences by analogy: structure and types

In traditional logic, there are analogies of properties and analogies of relations. In the first case, objects are compared by their properties. In the

analogy of relations, although the objects may be dissimilar, the relations to which the elements are related are similar (or similar).

The analogy of properties is an inference by analogy, in which the role of the transferred sign is played by the sign-property. The logical basis for the transfer of features in analogies of this kind is the similarity of similar objects in essential features.

The scheme of analogy of objects in general is as follows: The subject A has properties. *a, b, c, e, p.*

The subject B has properties. *a, b, c, e.*

Presumably, subject B also has the properties of *p.*

For example, the analogy of studying different types of offenses allows us to draw conclusions about their common grounds, signs, patterns.

The analogy of relations is an inference by analogy, in which the transferred sign is a sign-relation. The analogy of relations underlies the method of modeling widely used in science, technology and business practice, when the study of the relationship between the parameters of the model is transferred to a real object or process.

The scheme of reasoning by analogy of the relationship is as follows:
Subject A is in relation to K to subject B.

Subject M is in relation to the subject T.

Presumably, the properties underlying the relationship A to B and M to T are also similar.

Example:

1. X is the father (ratio R1) of the minor son Y; M is the grandfather (ratio R2) and the only relative of the minor grandson N.

2. It is known that in the case of a parental relationship (R1), the father is obliged to maintain his minor child. In view of the certain similarity between the relations R1 and R2, we can conclude that for R2 there is also a certain characteristic, namely: the duty of the grandfather to support the grandson in a certain situation.

The degree of plausibility of inferences by analogy, which are relations, can be increased if these relations are precisely formulated in mathematical language, and when transferring them from the model to the prototype, the requirements of the theory of similarity. In this regard, the analogy is divided into: accurate (strict) and inaccurate (non-strict).

The division of inferences by analogy into exact and inaccurate is carried out on the basis of differences in the nature of inference knowledge. The main feature that characterizes the *exact analogy* is the presence of the necessary connection of signs of similarity with the transferred sign. If the subject A has the signs P, K, C, E, and the subject B – the signs P, K, C and from the set of signs P, K, C necessarily follows E, then the subject B necessarily has the sign E.

An exact analogy is the only type of inference by analogy that gives reliable (necessary) knowledge when the probability of inference $P(a) = 1$. The exact analogy is used in scientific research, in mathematical proofs.

An inaccurate analogy is a similarity in which the relationship between similar traits and the traits being transferred is thought to be necessary only with a greater or lesser degree of probability. In this case, having found in another subject a sign of similarity, it is possible only in a logically weakened form to draw a conclusion about the belonging of the last transferred sign. If the false judgment is denoted by 0, and the true – by 1, then the degree of probability of inference by inaccurate analogy is in the range from 1 to 0: $0 < P(a) < 1$.

Inaccurate analogies are often found in the humanities, when modeling real objects.

The conclusion by inaccurate analogy has no probative value. Whatever the degree of probability, the conclusion is only a guess about the as yet unconfirmed features of the object or phenomenon. But in the development of conjectures about the similarity between phenomena and objects of nature, analogy is often an extremely fruitful form of reasoning.

To increase the probability of conclusions by inaccurate analogy, a number of conditions must be met:

a) the number of common features for the sample and the subject of analogy should be as significant as possible, although the number itself does not ensure the reliability of the conclusion;

b) similar features that serve as a basis for analogy should be essential for the compared objects (analogy based on the similarity of insignificant features is typical for unscientific and undeveloped thinking);

c) the general features should be as heterogeneous as possible; d) it is necessary to take into account the number and significance of points of difference;

д) the transferable sign Q must be of the same type as the same signs. P1, P2, ..., Pn, which form the basis of the analogy, and have to be associated with them.

As with induction, it is expedient to distinguish the *scientific analogy* from the *popular one* in the degree of probability of their conclusions. In the scientific analogy, a careful selection is made of the properties and relations that are transferred, according to the degree of their significance, as well as the internal connection of the sign (property or relationship) that is transferred with other signs. In the popular analogy the properties and relations which have no internal connection, but in the explicit form of beware, and therefore in many cases such an analogy is false or incorrect.

Examples of false analogies are the assimilation of society to a living organism, social conflicts – the struggle of biological species for existence, and so on. Although they seem clear and convincing at first glance, they do not reveal the essence of social processes, their differences from the phenomena occurring in the organic world, and thus do not bring us closer to the truth, but lead from it. If the analogy is built scientifically, it serves as one of the effective means of heuristic search, especially when it is combined with material or conceptual *modeling* of the studied processes.

===== 69. Analogy of law and analogy of statute

The analogy also has a fairly wide scope of application in legal theory and practice. Considerations by analogy are used, in particular, in conducting a legal assessment, in the investigation process, in conducting forensic examinations. The analogy in the legal process arises from the objective contradiction between the existence of specific social relations that require legal regulation, and the lack of relevant direct rules. In law, the reflection of this contradiction is the concept of gap, and analogy is one of the means of resolving such a contradiction. Depending on the nature of the gap in the theory of law, the concepts of “analogy of law” and “analogy of statute” are used.

The analogy of law is a legal assessment of an act not provided by law, according to the norm, under some features of which the act falls. The analogy of law means the application of general principles and principles

of legal regulation in the absence of the possibility to apply to a particular case a rule that would reflect such cases, that is, when it is impossible to use the analogy of law.

The application of the analogy of law and the analogy of statute in Ukraine is limited and regulated by relevant legislation. In the criminal law of Ukraine, the analogy of law and the analogy of statute are not allowed (Article 3, paragraph 4 of the Criminal Code of Ukraine). The decision, which is reduced to the legal assessment of this criminal act according to the norm, which sometimes contains only some of its features (and insignificant), is not free from arbitrariness and subjective discretion of judges. If the act is not provided by this or that norm, it cannot be considered criminal, despite the external similarity of its individual features with the features of any *corpus delicti*.

In civil, family and other areas of law, where it is necessary to decide not on responsibility but on rules of conduct, the analogy of law and the analogy of statute are permissible. Thus, Article 8 of the Civil Code of Ukraine enshrines the application of the analogy of law and the analogy of statute. This is due to the complexity of economic life, the inability to take into account all types of civil relations. For example, in civil law, the court cannot but resolve a property dispute due to the absence of a rule or its incompleteness. In the absence of a law governing the disputed relationship, the court applies the law governing similar relationships.

The analogy can be applied to certain limits in labour and administrative law.

According to the theory and legal practice, the analogy in legal assessment is allowed under certain conditions:

- 1) There is a lack of a norm in the legal system that would directly provide for a certain type of relationship;
- 2) The norm of law applied by analogy should provide for the relations similar on the essential signs at insignificance of differences.

For example, the logical structure of inference by analogy in assessing the act in court:

1. Action provided by law d1 has characteristics P, Q, M and the legal output S.
2. Unforeseen by law d2 has signs P, Q, N.

Thus, similar for actions d1 and d2 signs P1 and Q should be legal but significant, determining the nature of the legal relationship.

In addition to signs, M and N are also subject to comparative analysis. In this case the legal consequence S will be justified them only if the features M and N are species, and sign N will not contradict the legal consequence of S.

The analogy of law includes those cases where the court due to absence of direct instructions in the law on the method of resolving this issue refers to existing solutions on similar issues. The analogy in process of investigation is allowed when comparing a particular case with previously investigated isolated cases in order to find out the similarities between them and on this basis, likening one event another, to find previously unknown signs and circumstances of the crime. For example, in the case of burglary, the investigator drew attention to the fact that the criminals broke into the apartment at the time when the landlady was hanging laundry in the yard. In several other cases of burglary, criminals used a similar circumstance to break into an apartment. The conjecture based on the analogy was further confirmed: it turned out that the burglaries were committed by the same criminal group.

The analogy in the case of a forensic examination is allowed subject to the following basic conditions:

1. Detection of similarities in stable, recurring signs with random differences.
2. Detection of qualitatively unique, individual dependence between similar signs.

For example, the analogy is valid when conducting the following types of forensic examinations:

- when identifying a person on the basis of appearance, fingerprints, footprints, hands, teeth, etc.;
- when establishing the executor of the text or signature;
- when installing weapons on bullets and shell casings;
- when installing tools, hacking tools;
- when installing vehicles in their footsteps, etc.

The value of analogy in legal theory and practice is determined by the fact that it expands the scope of application of existing rules of law and thus serves to strengthen the rule of law, its application allows to limit

the number of existing rules of law. The solution of a specific issue by analogy is strictly individual and is not binding on other similar cases. However, the use of analogy in appropriate cases is mandatory. The court may not evade the issue if there is no relevant rule or it is incomplete.

===== 70. The structure of proof

In scientific knowledge there are two types of knowledge testing. The first is gained through practice (for example, an investigative experiment). Practice is the criterion of truth. The second is purely intellectual, with the help of a logical procedure, where the criterion is logical truth.

The logical mechanism for substantiating the truth is contained in the theory of proof, the ancestor of which was Aristotle.

Proof is a logical operation of substantiating the truth of a certain judgment with the help of other true judgments related to it.

The overall structure of the proof contains three mandatory components.

1st – thesis – is a judgment, the truth of which must be proved. The thesis is the main component of proof, which has the form of judgment. The thesis may be the prosecutor’s judgment of the defendant’s guilt or the lawyer’s judgment of his innocence.

2nd – arguments (arguments, grounds, reasons) are the primary theoretical provisions or factual data with which the thesis is substantiated.

The following can be used as arguments: axioms, true theoretical positions, empirical generalizations, facts of experience, material evidence, authoritative points of view (citations). Arguments are structured into a system of argumentation.

Arguments cannot be: erroneous judgments, hypothetical judgments, incompatible judgments, unrelated judgments.

3rd – demonstration (justification) is a logical connection between arguments and thesis. Most often it has the form of a polysyllogism. All types of inferences can be used in substantiation, either in pure form or in combination. To a greater extent, depending on this, the result of proof can be probable or probable (problematic).

Proof formula: $(a_1 \ \& \ a_2 \ \& \ \dots \ a_n) \rightarrow T$

The peculiarity of the form of proof is that it has a similar inverted inference structure. That is, the thesis performs the function of the conclusion, and the arguments – the function of the foundations. Thought moves from conclusion to basics.

===== 71. Types of proofs

Proof is a logical operation of substantiating the truth of a certain judgment with the help of other true judgments related to it.

According to the method of substantiation of the thesis, there are two types of proof: *direct and indirect*.

Direct proof is a form in which the thesis is substantiated by arguments compatible with it.

Direct proof is most often used in cases where a single fact can be brought under the general position.

Indirect proof is a type of proof in which the thesis is substantiated by incompatible assumptions (antitheses).

Antitheses are divided into two types:

1. *Contradictory antithesis*, on the basis of which the *apogogic proof is built* (proof from the opposite).

Let T be the thesis that needs to be proved. Suppose that T is false, then $\sim T$ is true. We have $T \vee \sim T$. From this assumption $\sim T$ we deduce consequences that are contrary to common sense. That is, we get that $\sim T$ is false, so his denial of T is true, which was necessary

Proof formula: $\sim (T \wedge \sim T)$ – the law of logic.

2. *The opposite antithesis*, on the basis of which the dividing line is built proof.

Separative proof is built on the negative-affirmative mode of divisive-categorical syllogism. His conclusion will be true if the separation judgment provides all possible alternatives, i. e. it is closed (complete).

Formula:

$\langle A \vee B \vee C \vee D \vee T \rangle, \sim A \wedge \sim B \wedge \sim C \wedge \sim D$

T

===== 72. Rules and errors in proof and refutation

The rules of proof are based on the laws of logic, the rules of inference, and others.

There are separate logical rules for each of the main elements of proof.

Thesis rules:

1. *The thesis must be clearly stated.*

This rule is similar to one of the rules for defining concepts. In violation of this rule there is an error of uncertainty, ambiguity or inaccuracy of the thesis.

2. *The thesis must remain unchanged throughout the proof.*

This is a requirement of the law of identity. In violation of this rule, the error “substitution of the thesis” occurs – when it is proved or disproved not a thesis, but another statement.

Argument rules:

1. *Arguments must be true, previously proven judgments.*

In violation of this rule, errors occur:

a) “main mistake” – substantiation of the thesis with false arguments;
b) “hypothetical grounds” – when probable judgments that require proof are used as arguments.

2. *The truth of the arguments is established earlier and regardless of the proof of the thesis.*

“Circle in proof” is a logical error, when the thesis is substantiated by arguments, and arguments – by thesis.

3. *Arguments must substantially correspond to the thesis (principle of relevance).*

In violation of this rule, errors occur:

a) “arguments to the person” – when instead of arguments are provided moral assessments of the individual, proving the thesis;

b) “arguments to the public” – instead of arguments, judgments with the modality of feelings are used for psychological influence on the listeners, so that they believe in the truth of the thesis without proving the merits

4. *Arguments should not contradict each other (the law of contradiction).*

It would be a mistake to make contradictory arguments. In this case, the construction of the argumentation system becomes impossible.

5. *Arguments must be sufficient for this thesis (the law of sufficient grounds).*

Errors in violation of this rule:

- a) “hasty proof” – occurs when there are insufficient arguments;
- b) “excessive proof” – occurs in the presence of excess arguments.

Demonstration rules:

1. *The substantiation in any proof or refutation should be based on the rules of the relevant type of inference.*

In violation of this rule, errors of this kind are called

“*Imaginary consequence*”. Imaginary consequences can be obtained for various reasons. Types of imaginary consequence:

a) “hasty generalization” – if a popular induction is used, i. e. there is an unjustified transition from a small number of individual cases to a general conclusion about the subjects of the class as a whole;

b) “from a conditional statement to an unconditional one” – if the statements are true in certain circumstances, they are presented as true in any circumstances;

c) “women’s (female) argument” – reduction to the absurd (most often by exaggeration);

d) “double-entry bookkeeping” (“Hottentot morality”) – a double assessment of the same statement in order to use the one that will be most profitable;

e) unproven assessment of the arguments of the enemy;

e) “pocket arguments” – substituting the question of the truth of the allegations with the question of its harmfulness or safety;

e) “after that, i. e. because of this” – a simple sequence of events in time is taken as their causal relationship;

g) “stick arguments” – threats, intimidation of the enemy.

73. Refutation

Rebuttal is a logical operation that aims to destroy the structure of the proof by establishing the falsity or unfoundedness of the thesis.

The strategy of refutation is aimed at destroying the proof. The tactic of refutation is aimed at questioning the components of proof.

Types of refutation:

- 1) criticism of these;
- 2) critique of arguments;
- 3) criticism of the demonstration (justification).

In the process of refutation, these types of criticism can be used in conjunction.

A false rebuttal is an indication of a non-existent error. False refutation can be unmotivated if it arises due to insufficient understanding of the subject of proof, or motivated for various reasons.

The logical form of refutation often corresponds to the structure of proof.

==== 74. The concept of hypothesis. Structure and types of hypotheses

A hypothesis (from the Greek hypothesis – a basis, an assumption) is an assumption that we believe to be true in order to derive from it the consequences consistent with the actual facts or other verified provisions. This agreement with the facts or with the verified provisions serves as proof of the hypothesis.

In order to give an explanation of as yet unexplained facts, events, phenomena, a hypothesis is created.

The hypothesis has a complex structure formed by a system of judgments, concepts and inferences. *There are the following stages of construction and proof of the hypothesis: 1) gathering facts, 2) logical clarification and clear formation of the hypothesis, 3) derivation of consequences from the hypothesis, 4) verification of these consequences in practice and 5) conclusion about the truth or falsity of the hypothesis.*

The hypothesis assumes the existence of a causal relationship between groups of facts. A hypothesis is a probabilistic knowledge, an assumption that requires empirical confirmation and it formulates new knowledge, so it can be considered true only if it leads to true results (theoretically and empirically) after its clarification and verification. *The hypothesis*

can consist simultaneously of different types of inferences: analogies, inductions, deductions.

The logical method of substantiating the hypothesis is its derivation from other propositions, the truth of which has already been established. The logical method of cognition, which consists in the deduction of conclusions from hypotheses and other principles, the true meaning of which *has not yet been clarified*, is called *hypothetical-deductive*. Conclusions in accordance with this logical method of reasoning are probabilistic. Therefore, the criteria of a substantiated hypothesis is its consistency with the *existing ones data* (laws of science, scientific theories, etc.); *verifiability* (the hypothesis must allow for the possibility of assertion or refutation); *verification of applicability* to a wider class of objects to be studied in the relevant field of science.

Types of hypotheses. According to the object of study, hypotheses can be general and partial.

General hypothesis is an assumption that explains the cause of a phenomenon or group of phenomena as a whole.

A partial hypothesis is an assumption that explains a particular aspect or particular property of a phenomenon or event.

Also, in addition to general and partial hypotheses, there are scientific and working hypotheses.

The scientific hypothesis is a hypothesis that explains the regularity of the development of nature and society (the hypothesis of the origin of the solar system, the hypothesis of the origin of life, etc.).

The working hypothesis is an assumption made in the first stages of the study, which is conditional, allowing to group the results of observations and give them an initial explanation.

Hypotheses in legal practice are called *versions* (*from the Latin versare – to modify*). The version in legal practice is one of the possible assumptions that explains the legally significant event as a whole (general version) or a separate circumstance (partial version).

Versions have all the logical characteristics of a scientific hypothesis.

Both probabilistic reasoning by analogy or induction and deductive reasoning can be used in proposing versions.

Inductive circuit of extension version:

Fact A related to person K is established in the case.

Fact B related to person K. is established in the case.

Fact C related to person K. is established in the case.

Facts (A, B, C) are signs of an event directly related to the case.

Legally significant event in general is related to the person of K. *Deductive scheme of the version:*

ABC are signs of crime N.

This case has signs of ABC.

Therefore, this case is a crime of N.

In addition to induction and deduction, versions are often put forward by analogy. The broadest analogy is used when proposing versions about the subject of the crime based on the similarity of several crimes in the way they are committed.

The proposed version should be tested in two stages: 1) deductive derivation of consequences from the advanced version, 2) comparison of consequences with facts, which allows the version to be recognized as a true explanation of a certain event or its rejection due to established error.

===== 75. Dispute. Types of disputes

Since ancient Greece, political controversy has been the focus of controversy. *Heuristics* is the art of arguing (from the Greek *eris* – dispute).

Dispute is a process of exchanging different opinions on one subject with the desire to achieve a certain result on the truth of the thesis by persuasion.

The parties to the dispute are the individual parties to the dispute and the collective subject – the audience. In the course of a dispute, the audience may be influenced by individual parties to the dispute.

The main forms of dispute are discussion and controversy.

Discussion is a type of dispute in order to reach an understanding as to the truth of the thesis.

Discussions on the number of participants can be: bilateral and multilateral. The members of the discussion are called the proponent and the opponent. *The proponent* is the one who puts forward and defends

the thesis. *The opponent* is the one who refutes the thesis. During the discussion of the thesis, the members of the discussion may change places.

Controversy is a kind of dispute in order to win by proving the truth only of his point of view.

The members of the controversy are called *opponents*.

Sometimes in real life the elements of discussion and controversy meet in one dispute. There are other types of disputes, such as disputes and debates.

Rhetorical dispute is an extreme case of controversy, when the subject of discussion and the truth of the point of view are no longer important, and only victory over the opponent at any cost is important.

Among *the general provisions for litigation* are the following: a) it is not necessary to start a dispute unnecessarily;

b) there is no need to be afraid of disputes and avoid them, if necessary;

c) it is impossible to start a pointless dispute;

d) it is necessary to have primary knowledge about the subject of the dispute;

e) the contexts and dignity of the person must be taken into account;

f) you can use some correct non-logical techniques (for example, to joke);

g) it is necessary to admit your mistakes;

it is necessary to know the measure in the discussion of the subject;

h) it is impossible to use incorrect methods (sophisms), etc.

76. Paradoxes

In addition to completely correct (logical) or incorrect (illogical) conclusions, which are unambiguously true or false, in the process of reasoning sometimes there are special forms of conclusions, called “paradox”

A paradox (from the ancient Greek παράδοξος – unexpected, strange from the ancient Greek παρα-δοκέω – I think) is a reasoning that seems logically correct, but leads to a conclusion with a double meaning, which can be both true and false at the same time. The contradiction created by

the paradox may be true, but it does not have a strictly logical solution. However, the paradox can be analyzed and explained.

Logical paradoxes can take the form of aporia or antinomy.

Aporia is a reasoning in which the argument is contrary to common sense. Therefore, the aporia can only be theoretical. For example, the aporia of Zeno (“Arrow”, “Achilles and the Turtle”).

Antinomy is the presence in reasoning of two contradictory judgments, the truth of which can be proved.

Paradoxes arise both in life situations and in science and law.

Paradoxes in law can arise both in legal theory and in practice.

Some examples of paradoxes:

1. *The paradox of “Liar”*. If a person says “I lied”, then he is lying and telling the truth at the same time.

2. *The paradox of unexpected execution*. One Sunday, the head of the prison told the prisoner that he had been sentenced to death: “The execution will take place next week at noon. This will be unexpected for you.” The prisoner’s opinion was as follows: “I will not be executed on Sunday, because I will know about it on Saturday. If I am executed on Saturday, I will know about it on Friday. “ He thus ruled out Friday, Thursday, Wednesday, Tuesday, and Monday, and then concluded that he could not be executed in such unexpected conditions. But the following week, at noon on Wednesday, the executioner came to him, and it came as a surprise to the prisoner. Everything the warden said came true.

3. *The paradox of the death penalty*. In some countries, murder is punishable by death. But, fulfilling the sentence, the state (all its inhabitants) become murderers and must be sentenced to death.

4. *The paradox of control*. Man cannot be free from control, because in order to be free from control, he must control himself.

5. *The paradox of the Internet*. The probability of the existence of the necessary information on the Internet increases, but the possibility of finding it decreases.

6. *The paradox of the right to revolt*. People’s opposition to the government (for example, uprising, revolution) is the defence of their rights by illegal methods.

7. *The paradox of two murderers*. The first killer poisoned the water of his victim, who was travelling in the desert. The second tried to shoot

the victim with a sniper rifle, but missed and fell into a flask of poisoned water. The water leaked and the victim died of thirst in the desert. Thus, both killers did not commit murder, but achieved their goal, the victim died. In this case, it is not possible to intuitively establish causal links between the act and the consequence.

II. TEST TASKS

===== TEST TASKS ON THE TOPIC “CONCEPT”

1. Which of the following concepts is zero (vacuous) in essence:

- A. President of Great Britain
- B. President of the United States
- C. President of Ukraine
- D. President of France

2. The concept of “Current Criminal Code of Ukraine” in a essence:

- A. General, collective
- B. Single, collective
- C. General, non-collective
- D. Single, non-collective

3. The concept of “judicial body of Ukraine” is:

- A. Single
- B. Universal
- C. General, registering
- D. General, non-registering

4. The concept of “rule of law” in essence is:

- A. General, collective
- B. Single, collective
- C. General, non-collective
- D. Single, non-collective

5. The concept of “law that has lost force” by the meaning is:

- A. Concrete, positive
- B. Abstract, positive
- C. Abstract, negative
- D. Concrete, negative

6. The concept of “gun” by the meaning:

- A. Concrete, positive
- B. Abstract, positive
- C. Abstract, negative
- D. Concrete, negative

7. The concept of “law” by the meaning:

- A. Concrete, positive
- B. Abstract, positive
- C. Abstract, negative
- D. Concrete, negative

8. The concept of “unemployment” by the meaning:

- A. Concrete, positive
- B. Abstract, positive
- C. Abstract, negative
- D. Concrete, negative

9. Find the contradictory concept in relation to the concept of “current law”:

- A. Good law
- B. Invalid law
- C. Signed law
- D. Implemented law

10. Determine the relationship between the concepts of “mistake” and “envy”:

- A. Subordination
- B. Crossing
- C. Incomparability
- D. Opposites

11. The concept of “summer” and “the warmest time of a year”:

- A. Are in relationship of intersection
- B. Match in essence (identical)
- C. Are in a relationship of subordination
- D. Are in relationship of exception

12. Which pair of concepts is in relationship of subordination:

- A. “Lawyer” and “non-lawyer”
- B. “Monarchy” and “aristocracy”
- C. “Constitution” and “Article of the Constitution”
- D. “Judiciary” and “administrative proceedings”

13. In the relationship of intersections are the concepts:

- A. Guilty, innocent
- B. Legal, illegal
- C. Lawyer, attorney
- D. Lawyer, scientist

14. The concepts of “criminal law”, “civil law”, “administrative law” are in the relationship of:

- A. Contrasting (opposite)
- B. Subordination (subject)
- C. Contradictory (inconsistent)
- D. Identities (equivalence)

15. Define contrasting (opposite) concepts:

- A. A good specialist, a bad specialist
- B. Freedom, captivity
- C. Constitution, basic law
- D. Advocate, lawyer

16. The concepts of “guilty” and “innocent” in essence are:

- A. Contrasting (opposite)
- B. Subordinate (subject)
- C. Contradictory (inconsistent)
- D. Cross

17. Determine the correct complete logical analysis of the concept “law”:

A. The concept of “law”: a) vacuous; b) single; c) non-collective; d) specifically

B. The concept of “law”: a) not vacuous; b) general; c) non-collective; d) specifically; e) positive; g) irrelevant

C. The concept of “law”: a) not empty; b) single; c) collective; d) abstract; e) negative

D. The concept of “law”: a) empty; b) general; c) collective; d) abstract; e) positive; g) relative

18. Determine in which examples there is a relationship of genus and species, and in which – the relationship of part and whole: 1) The law, the article of law; 2) The law, the law on advertising?

A. 1 – genus / species, 2 – whole / part

B. 1 – whole / part, 2 – genus / species

C. 1,2 – whole / part

D. 1,2 – genus / species

19. The definition of “The population of Ukraine is citizens of Ukraine, stateless persons, foreign citizens” is the definition:

A. Classic, attributive

B. Through the list

C. Nominal

D. Classical, genetic

20. Determine what error is contained in the following definition: “Agreement – an agreement aimed at terminating civil relations”?

A. $D_{fd} < D_{fn}$ is a broad definition error

B. $D_{fd} > D_{fn}$ is a narrow definition error

C. $D_{fd} = D_{fn}$ – no error

D. Circle error

21. Establish the type of definition: “Legal nihilism – a deformed state of legal consciousness of the individual, society, group, characterized by deliberate disregard of the law, the values of law, contempt for legal principles and traditions, which excludes, however, criminal intent.”

A. Classic

B. Through the list

- C. Nominal
- D. Ostensive

22. The logical operation “Monarchy is absolute or constitutional” is:

- A. Dichotomous division
- B. Simple division
- C. Mereological division
- D. Artificial classification

23. Establish the type of division of the concept “Securities may exist in documentary and non-documentary form in accordance with the law.”

- A. Dichotomous
- B. Genus-specific
- C. Mereological
- D. Artificial classification

24. The tautology error is contained in the definition:

- A. Liberal – a person who adheres to liberal views
- B. Victim behavior is the behavior of the victim, who by his actions pushes the offender to commit a crime
- C. Criminal investigation is one of the most important police units
- D. Gas spray is personal protective equipment

25. An error was made in the definition of “Advocacy – a professional association of lawyers”:

- A. Cross-definition
- B. Too narrow definition
- C. Too broad definition
- D. Meaningless definition

26. Establish the type of classification “Types of legal liability: constitutional, administrative, civil, disciplinary, material, criminal”:

- A. Natural
- B. Classical
- C. Artificial
- D. Mereological

27. The division of the concept of “Language is oral, written, confusing and intelligent” is carried out:

- A. Right
- B. Wrong – disproportionate, narrow
- C. Wrong – not on one basis
- D. Wrong – disproportionate, wide

28. Logical operation “Functions of the state in social orientation are divided into general social and protection of group interests; by territorial orientation to internal and external; by the degree of social significance and the main and derivatives; by time of action on permanent and temporary “represents:

- A. Dichotomous division
- B. Genus-specific division
- C. Mereological division
- D. Classification

29. Which class will be obtained as a result of the operation of multiplying the concepts of “legal” and “illegal”?

- A. Illegal law
- B. Normative legal act
- C. Legal normative legal act
- D. Vacuous

30. What class will be obtained as a result of the operation of adding the concepts of “lawyer” and “notary”?

- A. Notary
- B. Lawyers, except notaries
- C. Lawyer
- D. Specialist

31. What class will be obtained as a result of the operation of multiplying the concepts of “lawyer” and “notary”?

- A. Notary
- B. Lawyers, except notaries
- C. Lawyer
- D. Specialist

32. What class will be obtained as a result of the operation of subtracting the concepts of “lawyer” and “notary”?

- A. Notary
- B. Lawyers, except notaries
- C. Lawyer
- D. Specialist

33. Find out the correctness of the given definition “Law-making is a form of state activity”:

- A. The definition does not contain errors
- B. Broad definition error
- C. Narrow definition error
- D. Circle error in definition

34. Find out the correct definition of “Heir is always heir”:

- A. The definition does not contain errors
- B. Broad definition error
- C. Narrow definition error
- D. Circle error in definition

35. Specify the concepts that are the result of generalisation of the concept

“crime”:

- A. Socially dangerous action
- B. Theft
- C. Legal term
- D. The result of generalisation for this concept does not exist

36. Specify the concepts that are the result of the constraint of the concept “law”:

- A. Document
- B. Legal term
- C. Constitution
- D. There is no restriction result for this concept

37. In which of the following examples the division of the concept is performed correctly: 1) crimes are divided into crimes that were committed intentionally, negligent and petty offences; 2) the angles in the triangle can be sharp, straight and obtuse; 3) high school students are divided into excellent students, those who study well, “C” students and graduates; 4) the academic year is divided into 2 semesters; intent is divided into direct and indirect?

- A. In examples 1), 2), 3), 4), 5)
- B. In examples 2), 4), 5)
- C. In examples 2), 5)
- D. In examples 2), 3), 4), 5)

38. Indicate correctly constructed explicit definitions: 1) lawmaking is the process of creating laws; 2) housewife is not a profession; 3) theft is a property crime; 4) the fault is the mental attitude of the person to the act or omission provided by the Criminal Code, and its consequences, expressed in the form of intent or negligence; 5) instigator is a person who by persuasion, bribery, threat, coercion or otherwise persuaded another accomplice to commit a crime.

- A. In examples 1), 2), 3), 4), 5)
- B. In examples 2), 4), 5)
- C. In examples 1), 3), 4), 5)
- D. In examples 4), 5)

39. Indicate in which of the following examples the operation of generalisation of concepts was correctly performed: 1) theft – property crime; 2) lawyer – specialist; 3) a special part of the Criminal Code of Ukraine – the Criminal Code of Ukraine; 4) accomplice – perpetrator; 5) Constitution – The basic law of the state.

- A. In examples 1), 2), 3), 4), 5)
- B. In examples 1), 2), 5)
- C. In examples 1), 2), 3)
- D. In examples 1), 2)

**TEST TASKS ON THE TOPICS
“JUDGMENT”, “BASIC LAWS OF LOGIC»**

40. “Man has the right to life” is a judgment:

- A. Generally affirmative
- B. Generally negative
- C. Partially affirmative
- D. Does not belong to any of these species

41. The judgments “Some lawyers are attorneys” and “No lawyer is an attorney” are in relation of:

- A. Contrast
- B. Subcontracting
- C. Contradictory
- D. Identity

42. Define the type of the judgment: “No convict should be innocent”:

- A. Attributive general affirmative
- B. Existentially generally negative
- C. Attributive generally negative
- D. Existentially partially negative

43. Indicate the relationship between the judgments “All judges should be guided by the law” and “Some judges should not be guided by the law”:

- A. Contrast (opposite)
- B. Contradictory (contradictions)
- C. Subordination
- D. Subcontracting (sub opposition)

44. Indicate the relationship between the square of opposition “Some crimes are official” and “Some crimes are not official”:

- A. Contrast (opposite)
- B. Contradictory (contradictions)
- C. In no relationship
- D. Subcontrant (sub opposition)

45. Indicate the relationship between the judgments of types “E” and “O”, in which subjects and predicates are different in content in accordance with the square of opposition:

- A. Subcontrant (sub opposition)
- B. Subordination
- C. In no relationship
- D. Contrast (opposite)

45. The judgment “Many civil disputes are disputes over the conclusion of the contract” are:

- A. Partially negative
- B. Generally affirmative
- C. Partially affirmative
- D. Generally contradictory

46. The judgment “Many civil disputes are disputes over the conclusion of the contract” is:

- A. Partially negative
- B. Generally affirmative
- C. Partially affirmative
- D. Generally contradictory

47. The judgment “The threat of war exists” is:

- A. Judgment of existence
- B. **Judgment of** relationship
- C. Attributive judgment
- D. Complex judgment

48. The sentence “The main function of the legislature is the legislative regulation of public relations, i. e. the adoption of laws” expresses the judgment:

- A. Attributive
- B. Existential
- C. Does not express judgment
- D. Relative

49. The judgment “In Kiev Rus, the emergence of feudal relations was similar to such processes in Poland” is:

- A. Attributive judgment
- B. Judgment of existence
- C. **Judgment of relationship**
- D. Complex uniting

50. The judgment “Notaries – lawyers” is:

- A. Generally contradictory
- B. Partially affirmative
- C. Generally affirmative
- D. This opinion is not a judgment

51. The judgment “Until the III millennium BC. in Egypt, written sources of law did not exist” is:

- A. Attributive judgment
- B. Existential judgment
- C. Complex judgment is conjunctive
- D. Complex judgment is disjunctive

52. The judgment “Italy – a parliamentary republic” is:

- A. Generally affirmative
- B. Generally contradictory
- C. Partially negative
- D. Singularity affirmative

53. The judgment “A crime committed intentionally or negligently” is:

- A. Weak disjunction
- B. Strict disjunction
- C. Conjunction
- D. Implication

54. The judgment “Success in science is achieved by talent or hard work” is:

- A. Unifying

- B. Distributive with strict disjunction
- C. Distributive with weak disjunction
- D. Not a judgment at all

55. The judgment “The Constitution of Ukraine has the highest legal force and is applied throughout Ukraine” is:

- A. Conjunctive
- B. Distributive with strict disjunction
- C. Distributive with weak disjunction
- D. Not a judgment at all

56. Define the formula of the statement “If you follow the logical rules and means of rule-making techniques, it will ensure the formation of the logical basis of the normative legal act”:

- A. If a, then not-b
- B. If a, then b
- C. If not-b, then a
- D. If no-a, then no-b

57. The judgment “Monarchy can be constitutional or unconstitutional” is:

- A. Distributive with strict disjunction
- B. Conditional
- C. Distributive with weak disjunction
- D. Not a judgment at all

58. The judgment “If these are collections of normative legal acts, united by thematic features, then these are collections of legislation” are:

- A. Conjunctive
- B. Implicit
- C. Distributive with strict disjunction
- D. Not a judgment at all

59. The judgment “The victim will either win the lawsuit or lose it” is:

- A. Unifying
- B. Distributive with strict disjunction
- C. Distributive with weak disjunction
- D. Not a judgment at all

60. In the judgment “A person guilty of a crime is subject to criminal liability”:

- A. Subject – “person”, predicate – “guilty of a crime”
- B. Subject – “person guilty of a crime”, predicate – “criminal liability”
- C. Subject – “person guilty of a crime”, predicate – “subject to criminal liability”
- D. Subject – “crime”, predicate – “subject to criminal liability”

61. Define the type of modality in the judgment “The subjects of legal relations can only be people or associations of people”:

- A. Alethic modality
- B. Epistemic modality
- C. Deontic modality
- D. Temporal modality

62. Specify the modal operator of temporal logic in the judgment “Sometimes popular sovereignty is exercised through a referendum”:

- A. National
- B. Sovereignty
- C. Sometimes
- D. Referendum

63. Which of these judgments contains temporal modality?

- A. It is obligatory to pay taxes if it is forbidden not to pay them
- B. The United Nations was established in 1945 at the initiative of the victors of World War II.
- C. At the inauguration of the president, the anthem of the country is always performed
- D. The accused is not obliged to prove his innocence

64. Which of these judgments contains epistemic modality?

- A. The debtor is obliged, according to the contract, to return the money to the creditor
- B. The victim felt better today than yesterday
- C. The guilt of citizen N. was proved by the court
- D. The witness accidentally got to the crime scene

65. Define the judgments of deontic modality:

- A. Perhaps the criminal's manual was at the crime scene
- B. It is better to have an alibi than not to have one
- C. The conclusions allegedly presented by the commission were insufficiently substantiated
- D. In the UK, the use of old aircraft at airshows was banned

66. Which of the deontic operators should characterise the relation of the predictor to the subject in the sentence "...? to apply and use firearms at considerable accumulation people, if it may affect strangers, as well as women with obvious signs of pregnancy, the elderly or with severe signs of disability and minors (except in cases of group attack that threatens life or health citizens, or armed attack or armed resistance) "?

- A. Necessarily
- B. It is forbidden
- C. Allowed
- D. Not necessarily

67. Determine the modality operator in deontic judgment

"Approval of the budget with a deficit is allowed in the presence of reasonable sources of budget funding, taking into account the features defined by Article 72 of this Code" (Budget Code. Chapter 3. Article 14):

- A. Necessarily
- B. Not allowed
- C. Allowed
- D. Forbidden

68. Which of these judgments conforms to the law of the logic of norms “If an action is obligatory, it is permissible”?

A. If a person has a legal obligation but does not want to fulfil it, he may not fulfil it at will.

B. Military duty does not apply to foreigners and stateless persons residing in Ukraine

C. In case of force majeure, the bank is not obliged to return the deposit to all customers in full

D. The debtor is obliged, according to the contract, to return the money to the creditor

69. Which of these judgments conforms to the law of logic of norms “If an action is forbidden, it is not obligatory”?

A. It is obligatory to pay taxes if it is forbidden not to pay them

B. The debtor is obliged, according to the contract, to return the money to the creditor

C. Border guards may notify the debtor of the ban on his travel abroad

D. In Part 2 of Article 21 of the Labor Code of Ukraine, the law allows employees, in addition to the main employment contract, to enter into employment contracts for part-time work

70. Which of these judgments violates the law of logic of norms “Any action cannot be mandatory and prohibited at the same time”?

A. According to the contract, the debtor is not obliged to return the money to the creditor, i. e. he does not return it

B. According to contract, the debtor is obliged to return the money to the creditor, i. e. he is not prohibited from returning it.

C. According to the contract, the debtor is obliged to return the money to the creditor, i. e. he is prohibited from returning it.

D. According to the contract, the debtor is obliged to return the money to the creditor, i. e. he must return it

71. Which of the laws of logic corresponds to the law of logic of norms

“Any action is either mandatory or optional “?”

A. The law of identity

B. The law of contradiction

- C. Law of sufficient grounds
- D. The law of the inverse relationship between the content and scope of concepts

72. Which of the basic formal and logical laws is violated in the statement “No one can be found guilty of a crime except according to a court verdict, apart from cases when the criminal nature of the actions is obvious and unquestionable”?

- A. The law of identity
- B. The law of contradiction
- C. The law of the excluded middle
- D. The law of sufficient grounds

73. On what law of logic do lawyers base their reasoning: “You remember that Semenov, when asked if he pleaded guilty, replied: “I got the money and gave it to Liubomudrov. I am sorry for what I have done. But I had no idea to assist him in the theft”. In these simple words, which have no tricks, contains content that has serious legal significance. “And there was no idea” – this means in the language of law – “there was no intent” (V. O. Rossels). “Judicial defence speeches”):

- A. The law of identity
- B. The law of contradiction
- C. The law of the excluded middle
- D. The law of sufficient grounds

===== TEST TASKS ON THE TOPIC «DEDUCTION»

**74. Indicate what mistake was made in this categorical syllogism:
Dad is a close relative of mine. John Paul II – Pope.
So, John Paul II is my close relative**

- A. Both principles are negative judgments
- B. Error of quadruple terms

C. The first ground is a partially affirmative judgment, the second ground is a half-negative judgment

D. Both principles are partial judgments

75. To which of the forms of thinking does the expression belong “If a person has committed an actual illegal act, he has committed contrary to law. The person acted against the law, so he committed an actual illegal act”?

A. Concept

B. Judgment

C. Inference

D. This is not a form of thinking

76. Establish the mistake made in the categorical syllogism:

Some birds fly. Chickens are birds. So, chickens fly.

A. Both principles are negative judgments

B. Both principles are partial judgments

C. The rule of the first figure is violated – the greater basis must be a general judgment

D. The rule of the second figure is violated – one of the assertions must be negative

77. To establish the mistake made in the categorical syllogism: Tax fraud is possible only with direct intent.

A direct intention was established in the actions of officials of the closed joint-stock company “Factor M”. Therefore, the actions of the officials of the closed joint-stock company “Factor M” are qualified as fraud.

A. Both principles are negative judgments

B. Both principles are partial judgments

C. The rule of the first figure is violated – the greater basis should be a general judgment

D. The rule of the second figure is violated – one of the assertions must be negative

78. To establish the mistake made in the categorical syllogism: No young man under the age of 18 is called up for military service. Mykola is not called up for military service. So, Mykola was not 18 years old.

- A. Both principles are negative judgments
- B. Both principles are partial judgments
- C. The rule of the first figure is violated – the greater basis should be a general judgment
- D. The rule of the second figure is violated – one of the assertions must be negative

79. Indicate the type of inference “Witnesses in Ivanov’s case are citizens A., V., S., D., E. Witnesses A. and E. were interviewed on Tuesday. The next day, the rest of the witnesses. So, in the case of Ivanov, all witnesses were interviewed “:

- A. Deductive
- B. Inductive
- C. Abductive
- D. Traductive

80. Which of the following conclusions from the assertions will correspond to this categorical syllogism: “No man can escape from himself. Everyone is an enemy to himself “?

- A. No man can escape from the enemy
- B. No man can escape from himself
- C. Anyone will run away from the enemy
- D. You can’t run away from some enemies

81. The logical operation that allows us to move from the idea “Every lawyer has a high level of moral culture” to the idea “None of those who do not have a high level of moral culture is not a lawyer” is called:

- A. Transformation
- B. Inversion
- C. Predicate opposition
- D. Inference by the square of opposition

82. Which of the following conclusions from the assertion “Freedom of thought is an inalienable right of everyone” can be obtained by reversal?

- A. Any of the inalienable rights of everyone is the right to freedom of thought
- B. Some of the inalienable rights of everyone are the right to freedom of thought.
- C. Some of the inalienable rights of everyone are not the right to freedom of thought.
- D. Any inalienable right of everyone is not a freedom of thought

83. The judgment “Some crimes are committed intentionally. Everything that is done intentionally is planned. So, some of what is planned – crimes “is a syllogism:

- A. The first figure
- B. The second figure
- C. The third figure
- D. The fourth figure

84. The American logician E. Berkeley writes: “Mistakes are often vindicated by people who have to understand logic. For example, the former Senator J. McCarthy said: “All communists are attacking me. Someone is attacking me. So, he is a communist. “ Identify the error in this syllogism:

- A. The larger assertion should be partial.
- B. One of the assertions must be negative.
- C. Both principles must be negative.
- D. One of the assertions must be partial.

85. The judgment “People are slim and fat. N – slender. Therefore, N is not fat “is:

- A. Dividing-categorical syllogism according to the negative-affirmative modus
- B. Dividing-categorical syllogism according to the affirmative-negative modus
- C. Conditionally categorical syllogism according to the negative modus

D. Conditionally categorical syllogism according to the affirmative modus

86. The judgment “If a person quits smoking, his health will improve. Bogdan did not quit smoking, so his health did not improve “is:

- A. The correct affirmative modus
- B. The incorrect affirmative modus
- C. The correct negative modus
- D. The wrong negative modus

87. The judgment “If at least 2/3 of the constitutional composition of the Verkhovna Rada is elected, it is empowered. If the Verkhovna Rada is empowered, it has the right to pass laws. Therefore, if at least 2/3 of the constitutional composition of the Verkhovna Rada is elected, it has the right to pass laws” is:

- A. Purely conditional syllogism
- B. Dividing-categorical syllogism
- C. Conditionally categorical syllogism
- D. Categorical syllogism

88. The judgment “If the 1st draft of the Law “On the State Budget for 2007” is adopted, then the middle class will suffer. If the 2nd draft of the Law “On the State Budget for 2007” is adopted, subsidies for educational programs will be reduced. Either the 1st or 2nd draft of this law will be adopted. So, either the middle class will suffer or subsidies for educational programs will be reduced “are:

- A. Simple constructive dilemma
- B. Difficult constructive dilemma
- C. Simple destructive dilemma
- D. Difficult destructive dilemma

89. In the enthymeme “If a person is a young specialist, he cannot be fired during a period of 3 years. N. is a young specialist “missed:

- A. Bigger assertion
- B. Smaller assertion

- C. Conclusion
- D. Both assertions

90. Analyze the following thought of L. N. Tolstoy “Man is like a fraction: its numerator is what it is, and the denominator – what she thinks about herself. The larger the denominator, the smaller the fraction. This reasoning:

- A. It is not an inference at all
- B. It is an analogy
- C. Is an incomplete induction
- D. Is an example of inverse deduction

91. The conclusion “Monarchy can be absolute or constitutional. In modern Britain, the monarchy is not absolute. So there is a constitutional monarchy “is:

- A. Dividing-categorical syllogism according to the negative-affirmative modus
- B. Dividing-categorical syllogism according to the affirmative-negative modus
- C. Conditionally categorical syllogism according to the negative modus
- D. Conditionally categorical syllogism according to the affirmative modus

92. The conclusion “The crime was either planned in advance or was committed through negligence. There are facts that confirm the planning of this crime. Therefore, it will not be qualified as negligent “is:

- A. Categorical syllogism
- B. Separation-categorical syllogism
- C. Conditionally-categorical syllogism
- D. Abbreviated syllogism

93. The consideration “If power in the country is exercised through direct expression of the will of the people, then this form of democracy is direct, and if power in the country is exercised through the expression of the will of the people’s representatives in

elected bodies, then this form of democracy is representative. Power in the country is exercised either through the direct expression of the will of the people, or through the expression of the will of the people’s representatives in elected bodies. Democracy can be direct or representative”:

A. Is a divisive-categorical syllogism according to the modus of ponendo tollens

B. It is a conditionally categorical syllogism that does not give a reliable conclusion

C. It is a division-categorical syllogism according to the tollendo ponens modus

D. Is a lematic syllogism

94. Specify the type of inference

“Citizens A., B., C., D., E. are witnesses in Ivanov’s case.

Witnesses A. and E. were interviewed on Tuesday. The rest of the witnesses were questioned the next day. So, in the case of Ivanov, all witnesses were interviewed “:

A. Deductive

B. Complete induction

C. Incomplete induction

D. Traditional

95. Specify the type of inference

“Law students are taking an exam on the history of Ukraine. Students of technical universities take an exam on the history of Ukraine. Medical students take an exam in the history of Ukraine. Thus, all students take an exam on the history of Ukraine “:

A. Deductive

B. Complete induction

C. Incomplete induction

D. By analogy

96. Specify the type of inference

“Spanish is spoken in Argentina. In Ecuador, Spanish is spoken. Spanish is spoken in Venezuela. Argentina, Ecuador, and Venezuela

are South American countries. So, in all South American countries Spanish is spoken “:

- A. Deductive
- B. Complete induction
- C. Incomplete induction
- D. By analogy

97. In the following reasoning “I. Kepler wrote that the Earth, like a man, has an inner warmth, as volcanic activity convinces us. Rivers correspond to the vessels of the living body on Earth. There are a number of other correspondences. But a man has a soul. So, the Earth also has a soul “is used:

- A. Inaccurate analogy
- B. Incomplete scientific induction
- C. Exact analogy
- D. Complete induction

98. In the following reasoning “I. Kepler wrote that the Earth, like a man, has an inner warmth, we are convinced by volcanic activity. Rivers correspond to the vessels of a living body on Earth. There are a number of other correspondences. But a man is a living being who has a soul. Thus, according to I. Kepler, the Earth also has a soul “(F. Rosenberg” History of Physics “) as an example of analogy is used:

- A. Planet Earth
- B. Man
- C. Rivers on the planet
- D. Human vessels

99. In the following reasoning “I. Kepler wrote that the Earth, like a man, has an inner warmth, we are convinced by volcanic activity. Rivers correspond to the vessels of a living body on Earth. There are a number of other correspondences. But a man is a living being who has a soul. Thus, according to I. Kepler, the Earth also has a soul “(F. Rosenberg” History of Physics “) as a subject of analogy is used:

- A. Planet Earth
- B. Man

- C. Rivers on the planet
- D. The human soul

100. In the following reasoning “I. Kepler wrote that the Earth, like a man, has an inner warmth, we are convinced by volcanic activity. Rivers correspond to the vessels of a living body on Earth. There are a number of other correspondences. But a man is a living being who has a soul. Thus, according to I. Kepler, the Earth also has a soul” (F. Rosenberg “History of Physics”) a similar transferential feature is:

- A. The human soul
- B. Inner warmth, vessels and other structural elements
- C. Rivers on the planet
- D. Living organism

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для підготовки до заліку та іспиту**

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видавничої продукції – серія ДК № 5748 від 06.11.2017