

Test: Biology (Entrance examination) For Moscow Pirogov Medical Research University

**Question # 1. Endocrine glands**

The endocrine glands produce

Select correct answer

- antibodies  hormones  enzymes  vitamins

Save

**Question # 2. Predation**

Which is true and relevant to "predation"

Select correct answer

- both interacting species suffer  
 one of the interacting species benefits, the other neither benefits nor suffers  
 none of the interacting species benefits or suffers  
 one of the interacting species benefits, the other suffers loss of life of an organism

Save

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**Question # 3. Fertilization**

The process of fertilization includes

Select correct answer

- differentiation of ovum  fusion of male and female pronuclei  sperm production  
 meiosis of gametes

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**Question # 4. Rods and cones**

Light-sensitive receptors — rods and cones — are located in

Select correct answer

- retina  cornea  sclera  lens

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**Question # 5. Microevolution**

Limited resources of environment and intense multiplication of organisms are the reason of:

Select correct answer

- natural selection  genetic drift  formation of adaptations  struggle for existence

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**Question # 6. Genotype**

The genotype is

Select correct answer

- the set of somatic cells chromosomes of an individual organism  
 the set of all characteristics of an individual organism  
 the set of all genes of an individual organism  
 the set of observable characteristics of an individual organism

Save

**Question # 7. Trematoda**

Which is true and relevant to the class Trematoda?

Select correct answer

all are parasites  larvae have a notochord  digestive system has an anus  body a rounded shape

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**Question # 8. Source of energy**

The main source of energy in the cell is

Select correct answer

RNA  Proteins  Cellulose  ATP

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**Question # 9. Blood clotting**

What cells are involved in the process of blood clotting in humans?

Select correct answer

leukocytes  lymphocytes  platelets  erythrocytes

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**Question # 10. Parasitism**

Which is true and relevant to "parasitism"

Select correct answer

- both interacting species suffer  none of the interacting species benefits or suffers
- one of the interacting species benefits, the other neither benefits nor suffers
- one of the interacting species benefits, the other suffers

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**Question # 11. Differentiation**

At which stage of embryogenesis does the tissue differentiation begin?

Select correct answer

gastrula  blastula  morula  zygote

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**Question # 12. Flowering plants**

Name the main characteristic of the Flowering plants (Angiosperms or Magnoliophyta)

Select correct answer

- formation of the fruit  ability to photosynthesize  cross-pollination
- presence of conductive tissues

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**Question # 13. Expected ratio**

What is the probability of the birth of a blue-eyed blond child from the blue-eyed, dark-haired father and the brown-eyed blonde mother if the parents are heterozygous for a dominant trait?

Select correct answer

12.5%  0.5  0.75  0.25

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**Question # 14. Arachnida**

The class Arachnida refers to

Select correct answer

Crustacea  Cestod  Insecta  Acari

**Question # 15. M. Shleyden and T. Shvann**

What is the theory formulated by German scientists M. Shleyden and T. Shvann?

Select correct answer

- embryogenesis theory  evolution theory  chromosomal theory  cell theory

Save

**Question # 16. Bones strength**

Bones strength depends mainly on the content of:

Select correct answer

- lipids  calcium  iodine  proteins

Save

**Question # 17. Migration of atoms**

Biogenic migration of atoms provides

Select correct answer

- the ability of organisms to metabolism  the ability of organisms to adaptation  
 the ability of organisms to irritability  the ability of organisms to self-regulation

**Question # 18. Mesoderm**

What develops from the mesoderm?

Select correct answer

- the renal tubular epithelial cells  the neurons of the spinal cord  the epithelium of the intestine  
 the melanocytes of the skin

**Question # 19. Ferns**

Ferns unlike mosses there are

Select correct answer

- roots  flowers  stems  foliage

Save

**Question # 20. Linkage groups**

Specify how many linkage groups are in the human genome?

Select correct answer

- 92  46  12  23

**Question # 21. Big circle of blood**

In the veins of a big circle of blood circulation in humans:

Select correct answers

- oxygen-rich blood flows  the blood flows faster than in the capillaries  
 blood flows from the heart  blood flows more slowly than in capillaries  
 blood flows to the heart  flowing blood saturated with carbon dioxide

**Question # 22. Chloroplasts**

Specify the features of the structure and functions of chloroplasts:

Select correct answers

- they have outer and inner membranes  
 they synthesize organic substances using the energy released during the oxidation of inorganic compound  
 their enzymes break down biopolymers to monomers  
 they characterized by anaerobic method of energy production  
 they contains DNA and ribosomes  they contain connected thylakoid

**Question # 23. X-linked inheritance**

Select features of X-linked recessive inheritance:

Select correct answers

- sons receive a sign from the mother  a sign is observed mainly in men  
 in each generation there are carriers of the sign  father passes this sign to all his sons

not in every generation there are carriers of the sign  a sign of in men and women meets equally often

#### Question # 24. Vertebrates

What are the common features of the organization of Vertebrates you can specify:

Select correct answers

- differentiation of the mantle and mantle cavity  appearance of the excretory system consisting of individual cells  development of jaws, apparatus for capturing and grinding food
- appearance of the heart and differentiation of blood circulation  external skeleton formation
- progressive development of the forebrain and sensory organs

#### Question # 25. Ecosystems

In biogeocenosis:

Select correct answers

- Open biogeochemical cycles  a branched food chain  unbalanced biogeochemical cycles
- diverse species composition  closed biogeochemical cycles  among consumers is dominated by predators

#### Question # 26. Gametes

Sperm, in contrast to the egg, is characterized by:

Select correct answers

- haploid set of chromosomes  a small amount of cytoplasm  ability to to active movement
- larger sizes  the presence of acrosome  large supply of nutrients

#### Question # 27. Fungi

The similarity of fungi and animals is that:

Select correct answers

- they have unlimited growth  in their cells contained vacuoles with cell sap
- they have a heterotrophic way of feeding.  the cell wall of fungi and the integument of arthropods contain chitin  they have an autotrophic way of feeding.  their cells lack chloroplasts

#### Question # 28. Anthropogenesis

What factors of anthropogenesis can be attributed to social:

Select correct answers

- population waves  natural selection  social lifestyle  oral and written speech
- home improvement  genetic drift

#### Question # 29. Anabolism

In the process of anabolism occurs:

Select correct answers

- synthesis of inorganic substances  formation of fibrinogen  cholesterol synthesis
- synthesis of insulin  lipid oxidation  oxidation of glucose

#### Question # 30. Chromatin

The chemical basis of chromatin are molecules:

Select correct answers

- ribonucleic acids'  starch's  cholesterol  hormones'  deoxyribonucleic acids'
- polypeptides

#### Question # 31. Mendel's laws

Law of independent assortment formulated by Mendel is valid for :

Select correct answers

- diploid organisms whose homologous chromosomes are not separated in the anaphase of the first division of meiosis

- diploid organisms whose gametes are randomly combined in fertilization
- diploid organisms whose genes are in different pairs of homologous chromosomes
- haploid organisms whose genes are in different pairs of homologous chromosomes
- diploid organisms whose genes are in the same pair of homologous chromosomes
- diploid organisms whose chromosomes are randomly combined in meiosis

**Question # 32. Chordates**

What are the common features of the organization of Chordates you can specify:

Select correct answers

- heart is on the dorsal side  pharyngeal slits or clefts in early embryogenesis
- mouthpart is formed by modified legs  circulatory system is open
- neural tube with neurocoel  internal axial skeleton

**Question # 33. Agroecosystems**

What are the similarities of the ecosystems and agroecosystems:

Select correct answers

- the presence of producers, consumers, decomposers
- using solar energy  use of additional energy sources  small number of species
- biogeochemical cycles not closed  closed of biogeochemical cycles

**Question # 34. Axial complex**

What organs belong to the axial complex of Chordates:

Select correct answers

- gut  notochord  neural tube  spinal column  brain  heart

**Question # 35. Ferns**

Specify the general characteristics of ferns:

Select correct answers

- gametophyte has real roots, stems and leaves  alternation of generations in which the sporophyte is dominant  alternation of generations in which the haploid generation dominates
- sporophyte reduced to a small germ  these are the first plants with conductive xylem and phloem tissues  the sporophyte has true roots, stems, leaves, and conducting tissue

**Question # 36. Evolution**

In an ideal population:

Select correct answers

- allele frequencies change over generations  large number of individuals  there is a selection for this allele  equal phenotype survival  no change in allele frequencies in generations
- crosses are not random

**Question # 37. Heart muscle**

Human heart muscle is characterized by:

Select correct answers

- lack of nuclei in cells  presence of striated muscle tissue  contractions as a result of nerve impulses of spinal cord motor neurons  numerous connections between cells  spontaneous rhythmic contractions  presence of smooth muscle tissue

**Question # 38. Endoderm**

What are the derivatives of the endoderm:

Select correct answers

- dermis of the skin  epithelium of the liver  epithelium of the lungs  epithelium of the abdominal cavity  epithelium of the pancreas  musculature of the uterus

Question # 39. Interaction of allelic genes

Specify the types of interaction of allelic genes:

Select correct answers

- complementarity  domination  codominance  epistasis  polymeria  incomplete dominance

**Question # 40. Birds**

In birds, as in reptiles: Select correct answers

- four-chamber heart  keratinization of the skin  arterial blood does not mix with venous  
 missing teeth  skin dry, devoid of glands  intestines, ureters, sex glands open into the cloaca

**Question # 41. Primary succession**

Set the sequence of primary succession processes of ecosystems

For correct answer set order

- formation of climax woodland  1,2,3,4,5,6  
providing habitats for insects and other animals  1,2,3,4,5,6,  
appearance of shrubs and semi-shrubs or trees   
appearance of the lichen, algae, and fungi on the rocks  1,2,3,4,5,6  
colonization of the territory with mosses and bushy lichens  1,2,3,4,5,6  
forming an herbal community

**Question # 42. Aromorphoses**

Set the sequence for appearance of aromorphoses (general complications of the organization) in the evolution

For correct answer set order

- Two-chamber heart  1,2,3,4,5,6  
two circles of blood circulation  1,2,3,4,5,6  
development of the embryo in the uterus  1,2,3,4,5,6  
horny scales cover the body  1,2,3,4,5,6  
feeding the young with milk  1,2,3,,4,5,6  
lung respiration  1,2,3,4,5,6

**Question # 43. Gene expression**

Set the sequence of gene expression process:

For correct answer set order

- Proteins determine the characteristics of cells, forming protein structures or controlling metabolic processes  1,2,3,4,5,6  
Removal of introns and splicing of exons  1,2,3,4,5,6  
Transcription of DNA  1,2,3,4,5,6  
Formation of a polypeptide with a specific amino acid sequence  1,2,3,4,5,5,6  
Polypeptides form three-dimensional structures of functionally active protein molecules  1,2,3,4,5,6  
Translation of mRNA in ribosome

**Question # 44. Blood circulation**

Specify the sequence of blood flow in a large circle of human blood circulation  
For correct answer set order

right atrium [dropdown] 1,2,3,4.. venae cavae [dropdown] 1,2,3,4...veins of organs [dropdown]  
1,2,3,4.....aorta. [dropdown] 1,2,3.....  
arteries of organs [dropdown] 1,2,3,4.... left ventricle [dropdown] 1,2,3.....capillaries of organs: 1,2,3....

**Question # 45. Moss plants**

Set the sequence of development of haploid moss plants  
For correct answer set order

from the zygote sporophyte is formed [dropdown] 1,2,3,4.....  
haploid spore produces a protonema (mass of thread-like filaments) [dropdown] 1,2,3,4.....  
spore-producing cells undergo meiosis to form haploid spores [dropdown] 1,2,3,4.....  
adult plant structurally differentiated into stems and leaves [dropdown] 1,2,3,4.....  
in the gametophyte develop the anteridia and archegonia [dropdown] 1,2,3,4....  
in the presence of water the fertilization occurs

**Question # 46. Class Arachnida**

Specify the characteristics of the class Arachnida and class Insecta:  
development is direct or with metamorphosis

- class Arachnida  class Insecta three pairs of legs  class Arachnida
- class Insecta body consists of the the head, thorax, and abdomen
- class Arachnida  class Insecta body consists of the cephalothorax and abdomen
- class Arachnida  class Insecta mouthparts is formed by the upper and lower jaws
- class Arachnida  class Insecta presence of chelicerae and pedipalps
- class Arachnida  class Insecta four pairs of legs  class Arachnida  class Insecta development
- with complete and incomplete metamorphosis  class Arachnida  class Insecta

**Question # 47. Alleles**

Establish the correspondence between the location of alleles in chromosomes and the type of organism:  
in homologous autosomes are different alleles of the gene

- gemizygote  homozygote  heterozygote in both X-chromosomes of the female are the same alleles of the gene  gemizygote  homozygote  heterozygote allele of the gene is in the non-homologous area of the X chromosome of the male  gemizygote  homozygote  heterozygote homologous autosomes contain the same alleles of a given gene
  - gemizygote  homozygote  heterozygote in both X-chromosomes of the female different alleles of the gene
  - gemizygote  homozygote  heterozygote
- Question # 48. Sperm and eggs: Correlate the characteristics of sperm and eggs:small mobile cells, the volume of cytoplasm is insignificant
- eggs  sperms haploid nucleus  eggs  sperms large immobile cell with a stock of substances necessary for development  eggs  sperms presence of the flagellum  eggs  sperms presence of special protective shells

eggs  sperms presence of acrosome  eggs  sperms

**Question # 49. Higher and lower plants**

Specify the characteristics of higher and lower plants:

body of plants is not differentiated into tissues and organs  lower plants  higher  
plant reproductive organs have a multicellular structure  lower plants  higher plant  
sdominant phase of the life cycle is the sporophyte  lower plants  higher plant  
body of plants is differentiated into organs and tissues  lower plants  higher plant  
reproductive organs single-celled  lower plants  higher plant  
multicellular embryo  lower plants  higher plant  
dominant phase of the life cycle is the gametophyte  lower plants  higher plant

**Question # 50. Natural selection**

Establish the correspondence between the main forms of natural selection and the results of their action on individuals in the population:

acts to hold a trait at a constant optimum, and in the simplest case all deviations from this optimum are selectively disadvantageous

stabilizing form of selection  disruptive natural selection  directional natural selection  
describes changes in population in which extreme values for a trait are favored over intermediate values. In this case, the variance of the trait increases and the population is divided into two distinct groups  
 stabilizing form of selection  disruptive natural selection  directional natural selection  
under this tape of selection an extreme phenotype is favored over other phenotypes; the advantageous allele increases as a consequence of differences in survival and reproduction among different phenotypes  
 stabilizing form of selection  disruptive natural selection  directional natural selection