

BIOLOGY SAMPLE QUESTIONS

Ecological pyramid is a graphical representation that illustrates:

51. A. a range of changes in environmental factors
B. the collection of all adaptive characteristics of an organism
C. the spatial distribution of individuals in the population
D. feeding relationships in a biocenosis
E. stratification of a biocenosis

A man of normal phenotype (whose mother had achondroplasia) and a healthy woman had a son. What is the probability that their son inherited this disorder?

52. A. 75%
B. 50%
C. 33%
D. 25%
E. 0%

Genes B and D are attached, and the genotype of a person is BbDd. Both dominant alleles are on the same chromosome. Recombination occurred between the gene loci B and D. Mark only the gametes which result from the recombination.

53. A. BD and bd
B. BD and Bd
C. bd and Bd
D. Bd and bD
E. bd and Bd

The mother is blood type A, Rh negative, and her child is AB, Rh negative. The father of this child **CANNOT** be:

54. A. B, Rh positive
B. AB, Rh positive
C. B, Rh negative
D. O, Rh negative
E. AB, Rh negative

In the case of complementary activities of the dominant alleles of two genes, after the crossing of two heterozygous organisms (of the AaBb genotypes) the following outcome is expected:

55. A. only one phenotype
B. three phenotypes in the ratio 1 : 2 : 1
C. two phenotypes in the ratio 9 : 7
D. two phenotypes in the ratio 15 : 1
E. four phenotypes in the ratio 9 : 3 : 3 : 1
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Choose the correct statement that refers to the modern theory of the origin of life:

56. A. DNA is the first molecule that had an enzyme activity.
B. The emergence of the DNA has enabled the formation of the RNA.
C. The original RNA molecule had the role of a carrier of information, but not the enzymatic role.
D. RNA was the first molecule that had the replicating ability.
E. The correct answers are 2 and 3.
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Which of the following reactions is controlled by the activated the anterior part of the hypothalamus?

57. A. slowed-down heart rate
B. narrowing of blood vessels
C. increase in blood pressure
D. pupil widening
E. reactions typical in response to stress
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If the percentage of cytosines in a single DNA molecule is 29%, calculate the percentage of adenine in that DNA molecule.

58. A. 21%
B. 42%
C. 29%
D. 12%
E. 22%
-

In a balanced population of 1,000 people, the number of recessive homozygotes is 160, while the number of heterozygous genotypes is 480. Calculate the frequency of the dominant allele.

59. A. 0.3
B. 0.4
C. 0.6
D. 0.48
E. 0.36

Which of the following stimulates the secretion of gastric juice?

- 60.
- A. gastrin
 - B. trypsinogen
 - C. chymotrypsinogen
 - D. lipase
 - E. secretin
-

Which of the following refers to inversions:

- 61.
- A. They arise after the break-up into two homologous or non-homologous chromosomes and the exchange of broken parts.
 - B. The occurrence of inversion must lead to the loss of genetic material.
 - C. The meiosis of the inversion carrier can result in gametes with duplications and deletions.
 - D. Inversion carriers can not have a normal phenotype.
 - E. All the statements are correct.
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Chose the correct statement:

- 62.
- A. Spliceosomes participate in the process of intron transcription removal.
 - B. Exons are never removed during the processing of primary transcription.
 - C. The primary transcription needs to be transported from the nucleus to the cytoplasm before the process of intron transcription removal.
 - D. The process of intron transcription removal is carried out according to the same principle both in prokaryotic and eukaryotic organisms.
 - E. All the statements are correct.
-

Receptors placed along the muscle fibers, which register muscle stretching are:

- 63.
- A. baroreceptors
 - B. nociceptors
 - C. proprioceptors
 - D. electroreceptors
 - E. chemoreceptors
-

Which of the following is **NOT** a hormone secreted by the adenohipophysis?

- 64.
- A. prolactin
 - B. vasopressin
 - C. follicle stimulating hormone
 - D. thyrotrophic hormone
 - E. growth hormone

Golgi apparatus in the cell of animals participates in the processes of:

65. A. synthesis of ATP
B. decomposition of the substrate inside and outside cells
C. modification of proteins and lipids
D. replication
E. synthesis of polysaccharide component of the cell wall
-

The affiliation to the AB0 blood group system is determined by:

66. A. the presence of antigens on the surface of all blood elements
B. the presence of antibodies on the surface of leukocytes
C. the presence of antigens on the surface of red blood cells
D. the presence of antigens in the serum
E. the presence of antibodies on the surface of erythrocytes
-

The control of body temperature is provided by specific thermoregulatory centers that are located in:

67. A. the hippocampus
B. the hypothalamus
C. the epiphysis
D. the adenohipophysis
E. the neurohypophysis
-

The hydrophobic regions of phospholipids in the bilayer of the cell membrane:

68. A. are directed towards one another
B. are in contact with aqueous environment of the cell
C. are immersed into protein bilayer
D. are directed towards the cytoplasm
E. do not exist in bacterial cells
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Notochord:

69. A. is only present in mammals
B. originates from the endoderm
C. affects the elongation of the embryo
D. remains present until the end of the life of vertebrates
E. originates below the intestinal tube
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Mark the statement which is **NOT CORRECT**.

70. A. The higher amount of calcium released in the cytoplasm causes weaker muscle tension.
B. Muscle tetanus causes muscle fatigue.
C. The process of muscle relaxation is an active process.
D. The level of lactic acid increases in the fatigued muscle.
E. Muscle spasm occurs due to the temporary cessation of ATP inflow.
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During the G1 phase of the cell cycle the number of chromatids is:

71. A. twice the number of chromosomes in the cell
B. twice lower than the number of chromatids at the beginning of the G2 phase in the same cell
C. twice the number of chromatids at the end of the G2 phase in the same cell
D. twice lower than the haploid number of chromosomes
E. None of the answers is correct.

The notion of secondary structure of the DNA molecule refers to:

- 72.
- A. two polynucleotide chains wrapped around one another to the right
 - B. linking of nucleotides by phosphodiester bonds
 - C. the formation of hydrogen bonds between purine bases
 - D. the formation of hydrogen bonds between the pyrimidine bases
 - E. the presence of chromatin in the cells

The process of cytokinesis temporally coincides with:

- 73.
- A. prophase
 - B. the ending of metaphase
 - C. early anaphase
 - D. telophase
 - E. synthetic period of interphase

Spermatozoa are characterized by:

- 74.
- A. a large amount of cytoplasm
 - B. the presence of acrosome
 - C. the absence of mitochondria
 - D. the absence of centrioles
 - E. all of the above

Which of the following refers to the replication in the bacterial cell:

- 75.
- A. A single replication fork is formed
 - B. It does not occur according to the semi-conservative principle
 - C. New nucleotides are added to the 5' ending of the growing polynucleotide chain
 - D. The replication is carried out more slowly than in eukaryotic cells
 - E. The replication starts at one place in the DNA molecule

Most mammals belong to the group of:

- 76.
- A. oviparous organisms
 - B. organisms with external fertilization
 - C. ovoviviparous organisms
 - D. viviparous organisms
 - E. None of the answers is correct.

In mammals blastomeres lose totipotency:

- 77.
- A. at the gastrula level
 - B. immediately after the first division of the fertilized egg
 - C. after the eight-cell stage
 - D. at the beginning of the process of organogenesis
 - E. None of the answers is correct.

A chromosome consists of a single DNA molecule in:

- 78.
- A. anaphase I of the meiotic division
 - B. prophase II of the meiotic division
 - C. anaphase II of the meiotic division
 - D. metaphase II of the meiotic division
 - E. telophase I of the meiotic division

The nucleotide sequence of a part of the DNA molecule chain is 5' AGC TGA CGT CCA 3'. Choose the complementary chain of this DNA molecule.

- 79.
- A. 5' TCG ACT GCA GGT 3'
 - B. 5' TGG ACG TCA GCT 3'
 - C. 5' TGG UCG TCU GCT 3'
 - D. 5' TCG UCA GCU GGT 3'
 - E. 5' TGG ACG TGA GCT 3'

The first embryonic sheath that surrounds the embryo is called:

- 80.
- A. chorion
 - B. allantois
 - C. amnion
 - D. yolk sac
 - E. placenta