

1. Hemostasis is:

- a) the formation of blood cellular components
- b) the tendency of a system to maintain its internal stability
- c) the method of treating disease by drugs, given in minute doses, that would produce in a healthy person symptoms similar to those of the disease
- d) a process which causes bleeding to stop
- e) none of the answers is correct

2. A membrane that covers the outer surface of all bones is:

- a) periosteum
- b) periostraca
- c) endosteum
- d) endostosis
- e) none of the answers is correct

3. A rickets is a disease:

- a) marked by swollen and bleeding gums with loosened teeth
- b) resulting from a deficiency of vitamin C
- c) treated by exposure to ultraviolet B light in sunlight or by fish oil
- d) at one time common among sailors at sea longer than perishable fruits and vegetables could be stored
- e) none of the answers is correct

4. Mark the correct combination of true statements about the blood plasma:

- 1) the volume percentage of plasma in whole blood is normally about 40%; 2) contains dissolved proteins; 3) is the liquid portion of the blood; 4) serves as the protein reserve of the human body.
- a) 1 and 2
 - b) 1 and 2 and 3
 - c) 2 and 3 and 4
 - d) 1 and 2 and 3 and 4
 - e) none of the answers is correct

5. In the following three columns, hormone, endocrine organ and its functions are listed. Which of the triads has a meaning?

- | | | |
|-------------------------------------|-------------------|-----------------------|
| a) thyroxine | parathyroid gland | brain maturation |
| b) testosterone | testes | growth of muscle mass |
| c) insulin | pancreas | bone mineralization |
| d) growth hormone | hypothalamus | protein synthesis |
| e) none of the triads is meaningful | | |

6. Which of the following is true?

- a) During inspiration, the rib cage compresses
- b) gas exchange in the lungs occurs in the bronchi
- c) The air that moves in and out of the lungs with each breath is called the residual volume
- d) Inhalation is an active process
- e) none of the answers is correct

7. Most oxygen in the blood is transported

- a) inside the red blood cells bound to hemoglobin molecules
- b) transported in the plasma bound to hemoglobin molecules
- c) inside the red blood cells bound to cytoskeletal proteins
- d) transported in the plasma as bicarbonate ions
- e) none of the answers is correct

8. What cannot be detected in the final urine in healthy man?

- a) water
- b) sodium
- c) glucose
- d) urea
- e) none of the answers is correct

9. Which of the following is true?

- a) the duct that transports the sperm into the urethra is urether
- b) sperm are produced in the germinal epithelium of the seminiferous tubules of the epididymis

- c) the formation of sperm is known as spermatogenesis
- d) the inability to achieve an erection is known as ejaculation
- e) none of the answers is correct

10. What is NOT a typical secondary sex characteristic in female

- a) growth of facial hair
- b) growth of pubic hair
- c) enlargement of breasts
- d) subcutaneous fat deposits, mainly around the buttocks, thighs, and hips
- e) none of the answers is correct

11. The visual perception is mediated by

- a) chemoreceptors
- b) photoreceptors
- c) thermoreceptors
- d) mechanoreceptors
- e) none of the answers is correct

12. Which of the following structures are parts of the central nervous system?

- 1) motor nerves; 2) medulla oblongata; 3) cerebellum; 4) cerebral hemispheres,
- a) 1 and 4 are correct
- b) 1 and 2 and 4 are correct
- c) 2 and 3 and 4 are correct
- d) 1 and 2 and 3 and 4 are correct
- e) none of the answers is correct

13. The sympathetic nervous system

- a) increase heart rate
- b) is voluntary
- c) is activated mainly in sleep
- d) activate digestion
- e) none of the answers is correct

14. Which scientists work contributed to our understanding of the causes of infectious diseases?

- a) Alexander Fleming
- b) James Watson
- c) Louis Pasteur
- d) Robert Koch
- e) none of the answers is correct

15. Thirty eight percent (38%) of the nucleotide bases in *E. coli* DNA are cytosine (C). What is the percentage of adenine (A) bases in human DNA?

- a) 12%
- b) 24%
- c) 38%
- d) 76%
- e) none of the answers is correct

16. In the following three columns, cell constituents, biochemical components and biochemical functions are listed. Which of the triads has a meaning?

- | | | |
|-------------------------------------|-------------|-----------------------|
| a) cytoplasm | uracil | synthesis of proteins |
| b) nucleus | deoxyribose | synthesis of mRNA |
| c) mitochondria | phosphate | ATP synthesis |
| d) vacuole | glycogen | glucose oxidation |
| e) none of the triads is meaningful | | |

17. Radioactive thymine was added to an actively growing culture of *E. coli* bacteria. Which of the following would be the result if a cell replicated once in the presence of this radioactive base?

- a) One of the daughter cells, but not the other, would have radioactive DNA
- b) Both daughter cells would have radioactive RNA.
- c) Both daughter cells would have radioactive DNA.
- d) DNA replication would not occur, because two radioactive bases are required for proper pairing
- e) none of the answers is correct

18. A differentiated cell of an organism and the zygote this organism developed from are characterized by:

- a) different number of genes
- b) the same number of genes
- c) identical mRNA molecules
- d) identical phenotypes
- e) none of the answers is correct

19. All of the following cellular events involve microtubules EXCEPT:

- a) ciliary beating
- b) cytokinesis
- c) flagellar motion
- d) movement of chromosomes during mitosis
- e) all of the above is correct

20. The conformation of a polypeptide chain (folding) is called:

- a) primary structure
- b) secondary structure
- c) tertiary structure
- d) quaternary structure
- e) none of the answers is correct

21. What will enable you to distinguish between a prokaryotic and a eukaryotic cell?

- a) presence or absence of the cytoplasmic organelles (endoplasmic reticulum, Golgi apparatus, etc)
- b) presence or absence of a rigid cell wall
- c) presence or absence of ribosomes
- d) presence or absence of the plasma membrane
- e) none of the answers is correct

22. The movement of molecules and ions through the plasma membrane from areas of high concentration to low concentration is known as:

- a) osmosis
- b) diffusion
- c) passive transport
- d) pinocytosis
- e) none of the answers is correct

23. Plant cells act as osmometers:

- a) in a hypotonic medium the vacuole shrinks
- b) in a hypertonic medium the cell shrinks
- c) in a hypotonic medium the cell expands
- d) in a hypertonic medium the vacuole shrinks
- e) none of the answers is correct

24. Main function of the endoplasmic reticulum is:

- a) sugar fermentation
- b) synthesis of secretory proteins
- c) glycogen synthesis
- d) detoxification of metabolites
- e) none of the answers is correct

25. The following is found in mammals during female gamete formation EXCEPT:

- a) temporary arrest of meiosis at the metaphase I stage
- b) accumulation of yolk during gamete formation
- c) formation of four functional gametes from a primary germ cell
- d) generation of a polar body during meiosis I
- e) none of the answers is correct

26. To produce two genetically identical daughter cells, the DNA in each chromosome must be replicated, and the replicated chromosomes must be accurately distributed into the two daughter cells. The DNA is replicated in ----- and the replicated chromosomes segregate in -----.

- a) S and anaphase of M phase
- b) S phase and metaphase of M phase
- c) G1 and S phase
- d) G1 and G2 phase
- e) none of the answers is correct

27. Human embryonic stem cells are isolated from:

- a) inner cell mass of a blastocyst
- b) umbilical cord blood of newborns
- c) bone marrow
- d) placenta
- e) none of the answers is correct

28. The alleles of a given gene

- a) always occur in two copies
- b) occupy the same loci on homologous chromosomes
- c) carry information for different proteins with the same function
- d) are localized on different loci of the same chromosome
- e) none of the answers is correct

29. In a monohybrid cross between individuals with a genotype AA and Aa:

- a) all offspring are heterozygous
- b) all individuals are homozygous dominant
- c) the ratio of phenotypes is 3 : 1
- d) the ratio of genotypes is 1:1
- e) none of the answers is correct

30. In a variety of garden peas the allele for tall plants (T) is dominant over the allele for short plants (t). A cross between a tall plant and a short plant resulted in 50% of the offspring being short. What were the genotypes of the parents?

- a) TT and Tt
- b) Tt and Tt
- c) Tt and tt
- d) TT and tt
- e) none of the answers is correct

31. Crossing over is:

- a) exchange of chromosome segments between maternal and paternal chromatids
- b) a synonym for chromosome segregation
- c) assortment of new sets of chromosomes
- d) chromosomal arrangement in the metaphase resembling X letter
- e) none of the answers is correct

32. The nucleotide sequence of a DNA triplet is GTA. During transcription this triplet is transcribed to mRNA codon. In the process of protein synthesis, tRNA anticodons pair with the mRNA codons. Which is the nucleotide sequence of the tRNA anticodon which matches to the DNA triplet?

- a) CAT
- b) CUT
- c) CAU
- d) GUA
- e) none of the answers is correct

33. When crossing individuals with genotypes AaBb x AaBb, the ratio of phenotypes (A,B dominant alleles, a,b, recessive alleles) will be as follows:

- a) 9:3:3:1
- b) 3:1
- c) 1:2:2:1
- d) 1:1:1:1
- e) none of the answers is correct

34. Which of the following processes occurs in the telophase of mitotic division?

- a) condensation of chromosomes
- b) restoration of the nuclear envelope
- c) formation of the spindle
- d) movement of chromosomes to the cell poles
- e) none of the answers is correct

35. Human genome project (1990-2003) revealed that the human genome comprises probably following number of genes:

- a) 13.700
- b) 20,500
- c) 33.500
- d) 50.000 -100.000
- e) none of the answers is correct

36. One of Mendel's key discoveries was that

- a) organisms have two hereditary factors for all traits
- b) blending was a common occurrence in sexually reproducing organisms
- c) gametes contained two heredity factors for each trait
- d) DNA is a repository of genetic information
- e) none of the answers is correct

37. The cell theory was postulated by:

- a) Robert Koch
- b) Mathias J. Schleiden and Theodor Schwann
- c) Johan Gregor Mendel
- d) Antonie van Leeuwenhoek
- e) none of the answers is correct

38. Plants are part of a group known as a

- a) genus
- b) species
- c) family
- d) kingdom
- e) none of the answers is correct

39. All animal organisms inhabiting a particular region constitute:

- a) biocoenosis
- b) phytocoenosis
- c) zoocoenosis
- d) ecosystem
- e) none of the answers is correct

40. Which of the following was regarded by Ch. Darwin as the major factor of evolution?

- a) natural selection
- b) mutations
- c) struggle for life
- d) migration
- e) none of the answers is correct

