

TEST 2018

1. A body cell is infected with a pathogen. Which sentence correctly describes the immune response?

- A. Killer T cells punch holes in infected cells, thus initiating the release of antibodies.
- B. Killer T cells release cytokines; infected body cells release antibodies.
- C. Memory cells release antibodies; killer T cells secrete cytokines.
- D. T helper cells release cytokines; plasma cells release antibodies.

2. Cancer is often the result of activation of (1) _____ to (2) _____ and the inactivation of (3) _____. (please fill in the blanks)

- A. (1) oncogenes; (2) tumor-suppressor genes; (3) proto-oncogenes
- B. (1) proto-oncogenes; (2) oncogenes; (3) tumor-suppressor genes
- C. (1) oncogenes; (2) proto-oncogenes; (3) tumor-suppressor genes
- D. (1) proto-suppressor genes; (2) suppressors; (3) oncogenes

3. The role of enzymes in metabolism is to:

- A. catalyze the hydrolysis of large molecules only.
- B. increase the number of collisions between molecules.
- C. lower the activation energy required to start a reaction.
- D. supply the activation energy required to start a reaction.

4. Adults usually have _____ permanent teeth while children have _____ baby (milk) teeth. (please fill in the blanks)

- A. 32; 20
- B. 32; 32
- C. 20; 32
- D. 28; 26

5. Bleeding gums is one of the symptoms of scurvy, which is caused by the deficit of vitamin C required for proper:

- A. collagen synthesis
- B. mucosa lubrication
- C. blood coagulation
- D. calcium absorption

6. The main cause of tooth decay is/are:

- A. acids
- B. age
- C. caffeine
- D. cavities

7. What is used in dental products to make teeth more resistant to decay?

- A. calcium carbonate
- B. sodium fluoride
- C. zinc oxide
- D. mint oil

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8. Which organ(s) receive(s) blood from both an artery and a vein?

- A. the kidney and the liver
- B. the kidney and the lung
- C. the liver
- D. the lung

9. Halitosis is the medical term for:

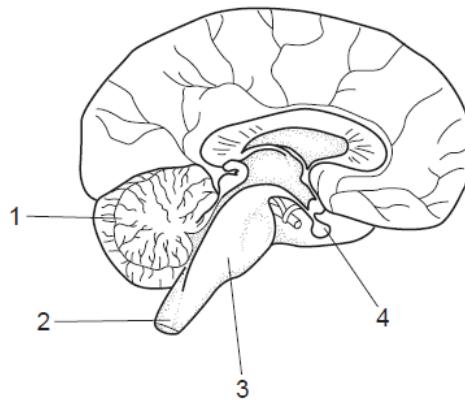
- A. black hairy tongue
- B. plaque buildup
- C. bad breath
- D. all of the above

10. The diagram represents a section through the brain. It was done in the:

- A. transverse plane
- B. sagittal plane
- C. coronal plane
- D. midsagittal plane

11. Fever blister or a cold sore:

- A. is highly contagious bacterial disease.
- B. is caused by *Herpes simplex* virus infection.
- C. appears in infected subjects when their immune system is activated.
- D. can be efficiently eradicated by home remedies.



12. Although the basic structure of the plasma membrane is determined mainly by its (1)_____, the functions of the plasma membrane are determined mainly by its (2) _____. (please fill in the blanks)

- A. (1) lipids, (2) proteins
- B. (1) carbohydrates, (2) proteins
- C. (1) proteins, (2) lipids
- D. (1) carbohydrates, (2) lipids

13. The _____ on a tRNA molecule pairs with three nucleotides on an mRNA molecule. (please fill in the blank)

- A. codon
- B. anticodon
- C. exon
- D. intron

TEST 2018**14. Blood is moved through the circulatory system by:**

- A. valves in the walls of the blood vessel.
- B. pressure gradients created by the heart.
- C. peristalsis caused by the smooth muscles in the blood vessel walls.
- D. osmotic pressure.

15. The process where a part of a proprotein is cleaved off to make it functional is called:

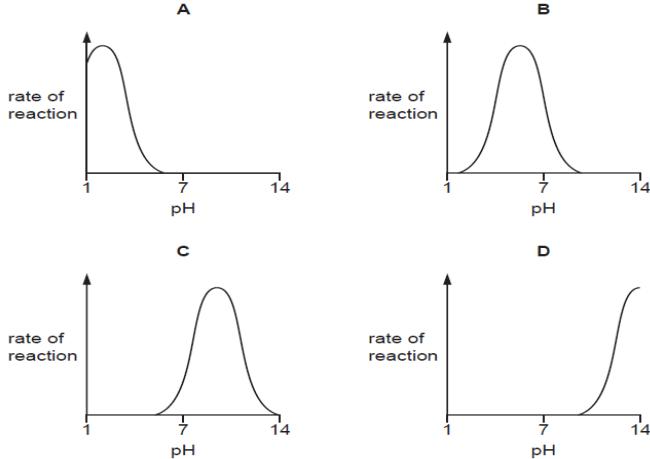
- A. transcription
- B. posttranscriptional processing
- C. translation
- D. posttranslational processing

16. Which of the following muscles of the head is involved in chewing?

- A. masseter
- B. orbicularis oculi
- C. temporalis
- D. nasalis

17. The most superficial of the meninges is the:

- A. dura mater
- B. pia mater
- C. arachnoid mater
- D. filum terminale

18. Which graph best represents the effect of pH on pepsin enzymatic activity?**19. A ridge or fold on the surface of the cerebrum is called a:**

- A. fissure
- B. ganglion
- C. sulcus
- D. gyrus

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20. The following events are parts of a negative feedback mechanism:

1. Blood pressure increases.
2. The cardiovascular center receives and analyses information from baroreceptors.
3. Heart rate increases.
4. Baroreceptors detect a decrease in blood pressure.

Arrange these events in the order in which they occur.

- A. 4, 2, 3, 1
- B. 1, 2, 3, 4
- C. 4, 3, 2, 1
- D. 3, 1, 4, 2

21. The anesthetic administered by a dentist before drilling to clean and repair a cavity blocks sensory impulses from a branch of which cranial nerve?

- A. trigeminal
- B. hypoglossal
- C. facial
- D. abducens

22. Autonomic fibers of which cranial nerve carry impulses to the heart and many smooth muscles and glands in the viscera of the thorax and abdomen?

- A. cochlear
- B. trigeminal
- C. abducens
- D. vagus

23. Which of the organs listed below are correctly paired with the cavities surrounding each of them?

1. the heart and pericardial cavity
2. the lungs and pleural cavity
3. the stomach and peritoneal cavity
4. the kidneys and peritoneal cavity

- A. 1, 4
- B. 1, 2, 3
- C. 2, 3, 4
- D. 1, 2, 4

24. Sensations can occur only:

- A. within the afferent neuron.
- B. at the receptor site.
- C. in an effector, such as skeletal muscle.
- D. in the cerebral cortex.

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25. The largest area of the somatic sensory cortex contains sensory neurons representing the:

- A. back
- B. leg
- C. face
- D. arm

26. The four major tissues that make up the tooth are enamel, dentin, cementum, and dental pulp. It is true that enamel:

- A. covers both the crown and the root(s) of a tooth.
- B. has different embryonic origin than the other three tissues.
- C. is densely innervated, and thus responsible for toothache.
- D. is completely resistant to demineralization by dental biofilm.

27. Saliva is produced by:

- A. three pairs of large salivary glands.
- B. the tongue and buccal glands in the largest volume.
- C. two pairs of salivary glands.
- D. two pairs of salivary glands and an unpaired sublingual gland.

28. Which of the proteins present in saliva DO NOT act defensively?

- A. lactoferrin
- B. salivary immunoglobulins
- C. ptyalin
- D. lysozyme

29. Which of the following describes the display of chromosomes in somatic cells?

- A. genotype
- B. phenotype
- C. karyotype
- D. centrosome

30. How many times higher is the energy yield per molecule of glucose in aerobic respiration than that in anaerobic respiration?

- A. 19
- B. 18
- C. 16
- D. 2

31. Once glycogen stores are filled, glucose and amino acids are used to synthesize:

- A. lactic acid
- B. proteins
- C. lipids
- D. glycoproteins

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32. There are _____ amino acids in proteins, of which _____ are considered to be essential amino acids. (please fill in the blanks)

- A. 30; 12
- B. 12; 9
- C. 20; 12
- D. 20; 9

33. Which other vitamin is necessary for nucleic acid synthesis alongside folate?

- A. vitamin C (ascorbic acid)
- B. vitamin A (retinol)
- C. vitamin B₁₂ (cobalamin)
- D. vitamin B₁ (thiamine)

34. In an asthma attack the (1)_____ muscles in the (2)_____ contract.

- A. (1) smooth, (2) trachea
- B. (1) smooth, (2) bronchioli
- C. (1) skeletal, (2) bronchi
- D. (1) skeletal, (2) bronchioli

35. One's breathing rate increases during exercising because:

- A. the PO₂ levels in the blood drop.
- B. the PCO₂ levels increase, and pH levels in the blood and cerebrospinal fluid drop.
- C. oxygen demand of the body increases due to higher engagement of the skeletal muscles.
- D. the reserves of ATP in the skeletal muscle are used up.

36. Cells that replicate themselves and generate differentiated cells during division are called:

- A. prokaryotes
- B. eukaryotes
- C. protoplasts
- D. stem cells

37. During oogenesis:

- A. a female will always produce four polar bodies.
- B. the first polar body is diploid, while the others are haploid.
- C. several primary oocytes will complete meiosis I in each cycle.
- D. meiosis will be completed only if fertilization occurs.

38. Achondroplasia is a dominant form of dwarfism. The chance of having an unaffected child by two affected individuals is:

- A. 0%
- B. 25%
- C. 50%
- D. 100%

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39. Albinism is an autosomal recessive trait. Two carriers of albinism have four children. One of their children is an albino and the remaining three are normally pigmented. What is the probability that their next child will be an albino?

- A. 0%
- B. 25%
- C. 75%
- D. 100%

40. In humans, the dominance relationship between the A and B alleles of the ABO blood group gene is an example of:

- A. codominance
- B. complete dominance
- C. incomplete dominance
- D. pleiotropy

41. Which of the following statements is FALSE for a pedigree showing the transmission pattern of a mitochondrial gene mutation?

- A. Mothers pass the gene to all offspring.
- B. Only females will express the trait.
- C. Fathers do not transmit the gene.
- D. All of the above statements are true.

42. Can a male be a carrier of a sex-linked disease?

- A. There is no way to predict it.
- B. No, males have only a single copy of sex-linked genes.
- C. Yes, if the male's father and mother were carriers.
- D. Yes, if the trait is recessive.

43. Which of the statements below is FALSE?

- A. The genetic code is overlapping.
- B. The genetic code is triplet in nature.
- C. The genetic code is universal.
- D. Degenerate codons specify the same amino acids.

44. Which of the following is an effect of a mutation?

- A. Prevention of protein formation.
- B. Decrease in the amount of a protein.
- C. Gain of function by a protein
- D. All of the above can occur.

45. Which of the following cell types is not used to examine chromosomes?

- A. white blood cells
- B. bone marrow cells
- C. erythrocytes
- D. all of the above can be used

Biology Test 2018

THE KEY

1D, 2B, 3C, 4A, 5A, 6A, 7B, 8C, 9C, 10D, 11B, 12A, 13B, 14B, 15D, 16A, 27A, 18A, 19D, 20A, 21A, 22D, 23B, 24D, 25C, 26B, 27A, 28C, 29C, 30B, 31C, 32D, 33C, 34B, 35B, 36D, 37D, 38B, 39B, 40A, 41B, 42B, 43A, 44D, 45C

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1. Human chorionic gonadotropin is secreted by the:

- A. developing embryo
- B. uterus of a pregnant woman
- C. choroid plexus cells in the brain of both sexes
- D. fetal part of placenta

2. Arrange the following events as they occur in a cell:

1. **Polypeptide chains move through rough endoplasmic reticulum and then are carried in vesicles to the Golgi apparatus.**
 2. **Vesicles are pinched off from the Golgi apparatus carrying newly formed proteins to plasma membrane.**
 3. **The Golgi apparatus separates and modifies different proteins, and then packages them into vesicles.**
 4. **Initiated by RNA, polypeptide chains are made by ribosomes on the rough endoplasmic reticulum.**
- A. 1, 2, 3, 4
 - B. 4, 1, 3, 2
 - C. 2, 3, 1, 4
 - D. 4, 1, 2, 3

3. Microtubules are:

- A. composed of actin filaments
- B. responsible for changes in cell shape
- C. smaller in diameter than other cytoskeleton components
- D. essential components of cilia, flagella, centrioles, and mitotic spindle fibers

4. Phenotypic sex is directly regulated by:

- A. XX or XY sex chromosomes
- B. reproductive tract differentiation
- C. sex steroids
- D. gonadal differentiation

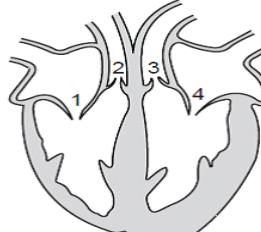
5. DNA samples were extracted from the salivary glands of a fruit fly and a human cheek cell. In which way did these DNA molecules differ?

- A. in the ratio of adenine to thymine
- B. in the contamination by histones in human preparation, but not in that of a fly
- C. in the shape of the molecules
- D. in the sequence of nucleotides

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6. The picture below shows a vertical section of a heart. Indicated with numbers are all four valves. In the cardiac cycle, ventricular systole begins with a phase called isovolumetric contraction. Which valves are open and/or which ones are closed during this phase?

	Valves opened	Valves closed	
A.	2 and 3	1 and 4	
B.	2 and 4	1 and 3	
C.	none	1,2,3, and 4	
D.	1,2,3 and 4	none	



7. Red-green color blindness is caused by a sex-linked recessive allele. What is the probability that a color-blind man and a woman with normal vision, whose father was color-blind, will have a color-blind daughter?

- A. 100%
- B. 75%
- C. 50%
- D. 25 %

8. What pattern of inheritance would lead a geneticist to suspect that an inherited disorder of cell metabolism is caused by a defective mitochondrial gene?

- A. affected males pass the altered gene to all of their daughters
- B. affected males do not pass the altered gene to their children
- C. affected females pass the altered gene to all of their sons, but not daughters
- D. affected females pass the altered gene to all of their daughters, but not sons

9. Carbonic anhydrase is an enzyme present, inter alia, in erythrocytes. It is responsible for the transfer of most carbon dioxide in blood. The product of the reaction that it catalyses is:

- A. carbaminohemoglobin
- B. hemoglobin acid
- C. carbonic acid
- D. carboxyhemoglobin

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10. *Heart block is a disease which usually results in a lower than normal heart rate. In this condition, electrical impulses are initiated as normal, but are not correctly conducted to the ventricles. Which part(s) of the conduction system may be functioning incorrectly in people suffering from this condition?*

1. atrioventricular node (AVN)
2. Purkinje fibres
3. sinoatrial node (SAN)
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 3 only

11. *The human vertebral column originally develops as 33 vertebrae, but is eventually reduced to 24 vertebrae, plus the sacrum and coccyx. The vertebrae are divided into the cervical, thoracic, and lumbar regions. It is TRUE that:*

- A. the first cervical vertebra is called the axis
- B. the correct number of vertebrae in each region is 7, 10, and 7, respectively
- C. sacrum and coccyx together contain 12 fused vertebrae
- D. only thoracic vertebrae carry a pair of ribs

12. *Exposure to which of the following factors is known to increase the risk of developing cancer?*

	ultraviolet light	viruses	carbon monoxide	X-rays
A.	yes	yes	no	yes
B.	yes	no	yes	yes
C.	no	yes	yes	no
D.	yes	no	no	no

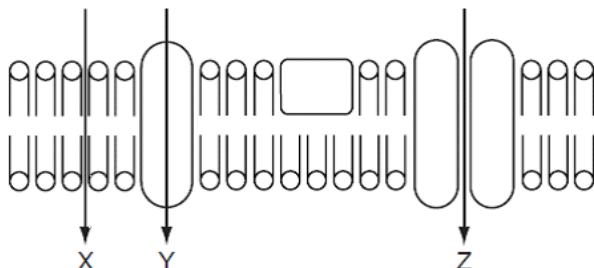
13. *People with what blood type can safely receive blood from a person who has blood type A?*

- A. A and AB
- B. A and O
- C. B and O
- D. AB only

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14. The scheme below illustrates three possible routes through which various substances can get inside a cell. Which row correctly indicates the routes for vitamins C and D respectively?

	Vitamin C	Vitamin D
A.	X	Y
B.	Y	X
C.	Z	X
D.	Y	Z



15. A 19 base pairs long piece of DNA was analyzed to find the number of nucleotide bases in each of the polynucleotide strands. Some of the results are shown below. How many nucleotides containing C were present in strand 1?

- A. 2
- B. 3
- C. 5
- D. 7

	Number of nucleotide bases			
	A	C	G	T
strand 1				4
strand 2		7		5

16. Which of the following statements is/are TRUE for the function(s) of T-lymphocytes during an immune response?

1. they destroy infected body cells
 2. they differentiate into memory cells
 3. they secrete antibodies
- A. 1 only
 - B. 3 only
 - C. 1 and 2
 - D. 2 and 3

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17. RNA was extracted from isolated beta pancreatic cells. It was then used to make DNA coding for human insulin. Which enzyme was used to make the DNA?

- A. DNA ligase
- B. restriction enzyme
- C. reverse transcriptase
- D. RNA polymerase

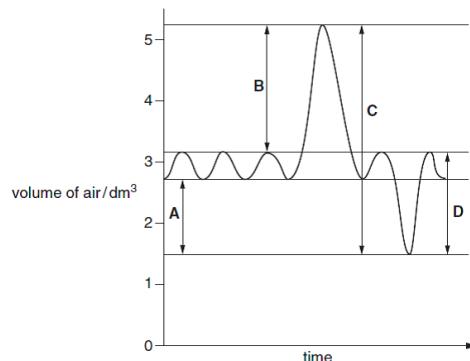
18. The magnitude of a stimulus is conferred to the brain by a single receptor through:

- A. the level to which the receptor is depolarized
- B. the amplitude of the action potentials generated
- C. the frequency of the action potential generated
- D. the number of neurons depolarized within the central nervous system

19. Cholera is an infectious disease of the small intestine. While it is currently classified as a pandemic, it is rare in the developed world. What are the causative agents and transmission methods of this disease?

	Causative agent	Method of transmission
A.	bacterium	airborne droplets
B.	bacterium	water-borne
C.	virus	airborne droplets
D.	protist	vector

20. The diagram below shows human lung volumes, as measured with a spirometer. Which part of the trace represents expiratory reserve volume?



21. Which of the following statements are TRUE for human erythrocytes?

1. Oxygen diffuses through the phospholipid bilayer.
 2. Sodium ions diffuse through the phospholipid bilayer.
 3. Water passes in and out of these cells by osmosis.
- A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2 and 3

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22. Which method of gaining immunity can be described as artificial passive immunity?

- A. injection with vaccine
- B. inhaling the chicken pox virus
- C. injection with antibodies
- D. through the placenta

23. Which row correctly indicates hormones produced in the hypothalamus-pituitary-target organ axis?

- A. ACTH, CRH, tyroxine
- B. TRH, TSH, calcitonin
- C. TSH, TRH, tyroxine
- D. CRH, ACTH, cortisol

24. Which phenomenon is associated with activation of the parasympathetic division of the autonomic nervous system?

- A. decreased heart rate
- B. decreased saliva production
- C. dilation of bronchioles
- D. B and C

25. A nerve can be best described as:

- A. the axon segment of a neuron
- B. neurons bundled together within the connective tissue
- C. axons surrounded by connective tissue supplied by blood vessels
- D. a collection of cell bodies outside the central nervous system

26. Of the 180 L of filtrate produced by the kidneys each day, approximately ____% is returned to blood and not lost in urine. (Please fill in the blank.)

- A. 99
- B. 85
- C. 75
- D. 66

27. The liver is a major storehouse for all of the following except one. Indicate the substance(s) which is/are NOT stored in the liver?

- A. copper and iron
- B. vitamin B₁₂, E and A
- C. calcium
- D. glycogen

28. One of the reported benefits of taking vitamins C and E is that they:

- A. increase collagen formation
- B. promote the absorption of phosphorus and calcium from the small intestine
- C. facilitate rhodopsin synthesis in the retina
- D. block the effects of free radicals

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29. All of these are functions of the liver EXCEPT for:

- A. biotransformation of organic molecules
- B. storage of glycogen, some vitamins, and iron
- C. synthesis of bile
- D. synthesis of digestive enzymes

30. Adults usually have ____ permanent teeth, while children have ____ baby teeth.
(Please fill in the blanks.)

- A. 32, 20
- B. 32, 32
- C. 20, 32
- D. 28, 26

31. The part of the efferent division of the nervous system that transmits impulses from the central nervous system to the smooth muscle, cardiac muscle, and the glands is the:

- A. somatic motor nervous system
- B. somatic sensory division
- C. visceral sensory division
- D. autonomic nervous system

32. Due to injuries sustained in an automobile accident, a young man fell into a coma and was hospitalized. It is likely that the injuries affected his:

- A. brainstem
- B. limbic system
- C. spinal cord
- D. cerebellum

33. Which of the statements is TRUE for hormones?

- A. Each endocrine gland secretes only one hormone.
- B. Each target cell may be capable of responding to several hormones.
- C. Each hormone affects only one type of target cell.
- D. The release of all hormones is controlled by other hormones.

34. The gag reflex is triggered when foreign material enters the larynx. When eating and talking simultaneously, some of the boluses being swallowed may enter the larynx because:

- A. the epiglottis is not closed over the glottis
- B. the esophageal sphincters relax
- C. food must contain irritants
- D. it is impossible to swallow when talking

35. The nervous system regulates secretion of each of these hormones EXCEPT:

- A. oxytocin
- B. parathyroid hormone
- C. thyroxine
- D. epinephrine (adrenaline)

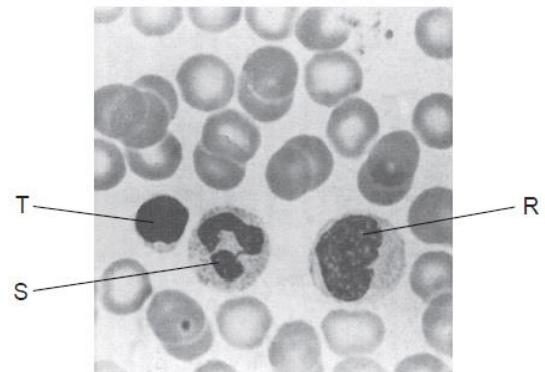
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36. Damage to the hypothalamo-hypophyseal portal system may result in:

- A. decreased secretion of ADH (vasopressin)
- B. decreased secretion of insulin
- C. decreased secretion of thyroid stimulating hormone
- D. increased secretion of parathyroid hormone

37. The microphotograph of stained human blood smear taken from under the microscope shows three types of white blood cells among erythrocytes. Which row in the table correctly identifies these cells?

	Cell T	Cell S	Cell R
A.	monocyte	neutrophilic granulocyte	lymphocyte
B.	neutrophilic granulocyte	monocyte	lymphocyte
C.	monocyte	neutrophilic granulocyte	neutrophilic granulocyte
D.	lymphocyte	neutrophilic granulocyte	monocyte



38. Antidiuretic hormone (ADH) is also called vasopressin because at high concentrations it causes:

- A. increased urine output
- B. constriction of blood vessels
- C. sudden drop in blood pressure
- D. widening (dilation) of blood vessels

39. Egg cells (ova) are transported in the female reproductive tract by the _____, whereas sperm cells are transported by the _____. (Please fill in the blanks.)

- A. action of ciliated epithelium in the uterine tubes; movements of their tails
- B. movement of their tails; lashing movements of their tails
- C. peristaltic contractions of the uterus; peristaltic contractions of the vaginal wall
- D. forces of gravity; activity of prostate gland secretions

40. In oogenesis, the first meiotic division is completed:

- A. in the fetal life
- B. only if the egg is fertilized
- C. just before ovulation
- D. after ovulation

41. A woman with a typical 28-day menstrual cycle is most likely to become pregnant from sexual intercourse occurring:

- A. no matter when, as long as the partner is fertile
- B. on days 1-5 of the cycle
- C. on days 12-16 of the cycle
- D. two days after ovulation

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42. The menstrual cycle:

- A. is never shorter than 28 days
- B. begins with the first day of bleeding
- C. begins on the first day when bleeding stopped
- D. can be divided into the follicular and proliferative phases

43. If the gene "A" is normal, and "a" is a gene for albinism, what is the likelihood that a couple, both of genotypes "Aa", will have an albino child?

- A. 1/2
- B. 1/4
- C. 3/4
- D. 4/4 (all will be albino)

Biology Test 2017

THE KEY

1D , 2B , 3D, 4C, 5D, 6C, 7C, 8B, 9C, 10A, 11D, 12A, 13A, 14C, 15B, 16C, 17C, 18C, 19B, 20A, 21B, 22C, 23D, 24 A, 25C, 26A, 27C, 28D, 29D, 30A, 31D, 32A, 33B, 34A, 35B, 36C, 37D, 38B, 39A, 40C, 41C, 42B, 43B,

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1. The term *cortical blindness* refers to the loss of vision caused by:

- A. damage to the brain's occipital cortex;
- B. damage to the cornea of the eye;
- C. damage to the brain's parietal cortex;
- D. damage to the optic nerve.

2. What do the causative agents of AIDS, malaria and tuberculosis have in common?

	They have a cell surface membrane	They have genes	They have ribosomes	They respire
A.	✓	✓	✓	✓
B.	✓	✗	✗	✓
C.	✗	✓	✗	✓
D.	✗	✓	✗	✗

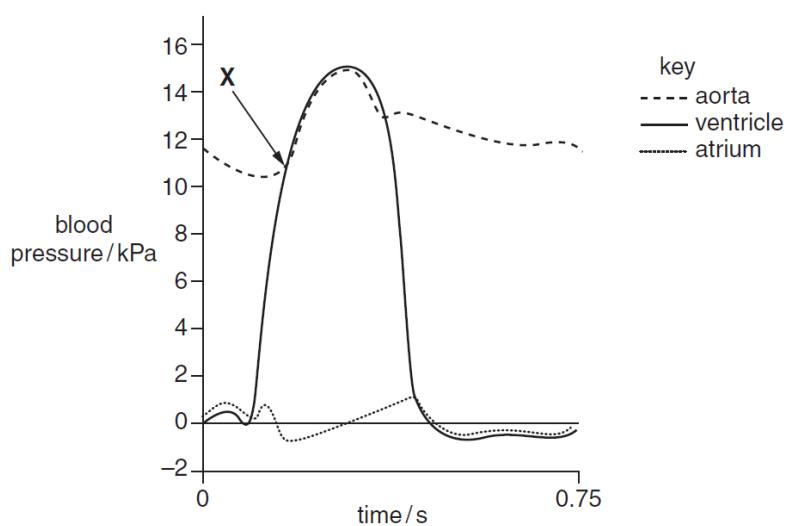
3. Ovulation and pregnancy detection home tests are based on detection of what in urine sample respectively?

- A. Estrogen and progesterone;
- B. luteinizing hormone and human chorionic gonadotropin;
- C. estrogen and human chorionic gonadotropin;
- D. luteinizing hormone and progesterone.

4. Due to the distribution of cardiac impulse by the conduction system, ventricular contraction begins:

- A. in the semilunar valves, and then pushes blood toward the interventricular septum;
- B. in the papillary muscles, and causes the atrioventricular valves to open;
- C. in the superior part of the ventricles, and pushes blood toward the apex;
- D. at the apex of the heart, and pushes blood toward the semilunar valves.

5. The graph shows changes in blood pressure during one cardiac cycle. What is happening to the ventricle and the aortic semilunar valve at the point marked X?



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	ventricle	aortic semilunar valve
A.	contracting	closing
B.	contracting	opening
C.	relaxing	closing
D.	relaxing	opening

6. The antidiuretic hormone is secreted in response to:

- A. overhydration;
- B. increased volume of the body fluids;
- C. increased osmotic pressure of the body fluids;
- D. high blood pressure.

7. The genetic code is said to be ‘degenerate’ because:

- A. there are more codons than amino acids;
- B. there are more amino acids than codons;
- C. different organisms use different codons to encode the same amino acid;
- D. some codons specify more than one amino acid.

8. The most correct sequence of early development following fertilization is:

- A. zygote, blastomeres, morula, blastocyst;
- B. oocyte, zygote, morula, blastocyst;
- C. zygote, conceptus, blastocyst;
- D. polar bodies, zygote, conceptus, blastocyst.

9. Which of the following processes would be affected if cyanide stopped the production of ATP?

- A. simple diffusion;
- B. osmosis;
- C. active transport;
- D. facilitated diffusion.

10. Which of these processes is associated with meiosis, but not mitosis?

- A. DNA replication prior to division;
- B. cytokinesis;
- C. crossing over;
- D. prophase-metaphase-anaphase-telophase sequence.

11. If the gene "A" is normal, and "a" is a gene for albinism, predict the likelihood that a couple, both with genotypes "Aa", will have an albino child.

- A. 0 (not possible)
- B. 1/4
- C. 1/2
- D. 4/4 (all will be albino)

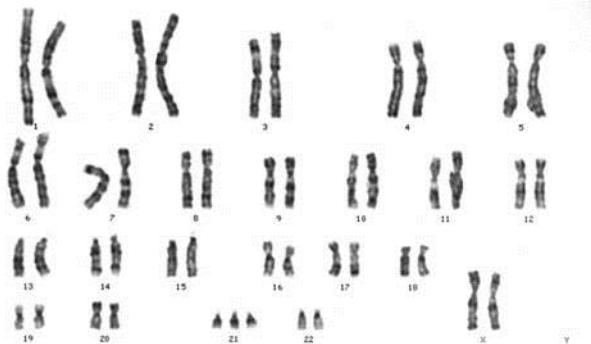
TEST 2016

- 12. If a hemophilic man and a healthy woman (with no genes for hemophilia) have a son, what is the probability that the son will have hemophilia?**
- A. 4/4 (all their sons must have hemophilia)
 - B. 3/4
 - C. 1/2
 - D. 0 (their sons cannot have hemophilia)
- 13. Which of the following groups correctly lists the auditory ossicles?**
- A. Anvil, stapes, and hyoid;
 - B. stapes, malleus, and incus;
 - C. hyoid, hammer, and stirrup;
 - D. lacrimal, auditory, and vestibular.
- 14. Which of the following is a tick-borne bacterial disease that can affect joints?**
- A. Rheumatoid arthritis;
 - B. Lyme disease;
 - C. syphilis;
 - D. gout.
- 15. Laboratory mice whose p53 genes had been switched off developed tumours. When their p53 genes were switched on again, the tumour cells stopped dividing and died within a few days. Healthy cells in the mice were unaffected. What do these observations suggest?**
- A. p53 protein speeds up the mitotic cell cycle;
 - B. p53 protein causes all cells to die;
 - C. the p53 gene acts as a tumour suppressor gene;
 - D. the p53 gene encourages the growth of tumours.
- 16. Which diseases can be cured (at least in theory) by the use of antibiotics?**
- A. Cholera and tuberculosis;
 - B. measles and smallpox;
 - C. measles and tuberculosis;
 - D. smallpox and cholera.
- 17. Haemoglobin consists of two α chains and two β chains. Approximately 5 % of all humans have one amino acid in the β chain different from normal. Which level(s) of protein structure could be changed in these humans?**
- A. Primary only;
 - B. primary and quaternary only;
 - C. primary, secondary and tertiary only;
 - D. quaternary only.

TEST 2016

18. Which of the following statements best describes the figure below?

- A. It shows a normal female karyotype.
- B. It shows the karyotype of a male with Down syndrome.
- C. It shows a metaphase spread of human chromosomes.
- D. It shows an abnormality of mitosis.



19. Which part of brain plays a central role in the control of body temperature, hunger and thirst, and connects to the pituitary gland?

- A. Pineal body;
- B. hypothalamus;
- C. substantia nigra;
- D. pons.

20. The sympathetic division of the autonomic nervous system:

- A. has cell bodies in the cranial and sacral regions of the spinal cord;
- B. stimulates vegetative activities;
- C. secretes norepinephrine at most target tissues;
- D. has many fibers in cranial nerve X (vagus).

21. The (1)_____ secretes peptidases and disaccharidases, whereas the (2)_____ secretes trypsin, chymotrypsin, amylase, lipase and nuclease.

Please fill in the blanks in the appropriate order.

- A. (1) stomach, (2) liver;
- B. (1) small intestine, (2) liver;
- C. (1) liver, (2) pancreas;
- D. (1) small intestine, (2) pancreas.

22. Which of these statements about airflow into the lungs is FALSE?

- A. At the end of expiration, alveolar pressure is equal to atmospheric pressure; no air flows.
- B. During inspiration, alveolar pressure is lower than atmospheric pressure, and air flows into the alveoli.
- C. During inspiration, the volume of the thoracic cavity increases.
- D. For expiration, thoracic volume decreases, alveolar pressure decreases, and air flows out.

TEST 2016

23. Which of these statements concerning respiration is FALSE?

- A. Higher brain centers can modify activity of the respiratory center.
- B. A decrease in pH of blood increases respiration rate.
- C. Carbon dioxide level in blood has no effect on respiration rate.
- D. Low oxygen levels in blood increase respiration rate.

24. Glucose is converted to (1)_____ for long-term storage, and to (2)_____ for short-term storage.

Please fill in the blanks in the appropriate order.

- A. (1) fat, (2) glycogen;
- B. (1) glycogen, (2) protein;
- C. (1) pyruvic acid, (2) fat;
- D. (1) fat, (2) pyruvic acid.

25. From each primary spermatocyte, (1)_____ sperm cell(s) is/are produced; from each primary oocyte, (2)_____ secondary oocyte(s) is/are produced.

Please fill in the blanks in the appropriate order.

- A. (1) one, (2) two;
- B. (1) two, (2) two;
- C. (1) four, (2) one;
- D. (1) four, (2) two.

26. After ovulation, the granulosa cells of the ruptured follicle become the:

- A. mature follicle;
- B. polar body;
- C. zona pellucida;
- D. corpus luteum.

27. An oxygen molecule diffuses directly from air in an alveolus to haemoglobin in a red blood cell. What is the minimum number of times this molecule must pass cell surface membranes?

- A. 2
- B. 3
- C. 4
- D. 5

28. Hemoglobin molecules:

- A. each contain 2 heme groups and 2 globins;
- B. bind to and transport most of the carbon dioxide in the blood;
- C. contain iron atoms at (II) oxidation state;
- D. can each carry one oxygen molecule.

29. What is an effect of inhaling tobacco smoke?

- A. Decreased mucus production by goblet cells;
- B. increased movement of cilia in bronchial epithelium;
- C. reduced oxygen transport by blood;
- D. thinning of bronchial epithelium.

TEST 2016

30. A cell can be identified as a prokaryote when its DNA is:

- A. associated with protein;
- B. circular in form;
- C. in the form of a double spiral;
- D. surrounded by a membrane system.

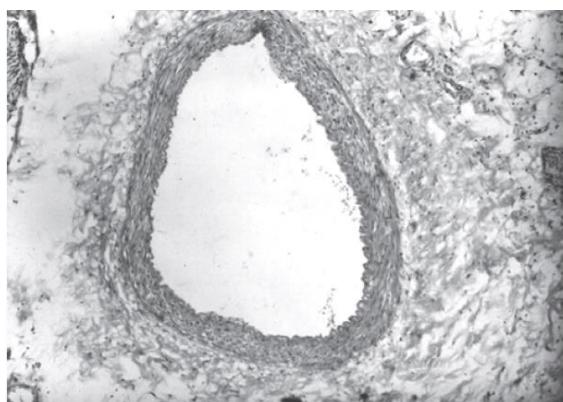
31. In human blood:

- A. both erythrocytes and thrombocytes are anucleate;
- B. monocytes are precursors of tissue mast cells;
- C. lymphocytes are involved in phagocytosis;
- D. polymorphonuclear granulocytes secrete antibodies.

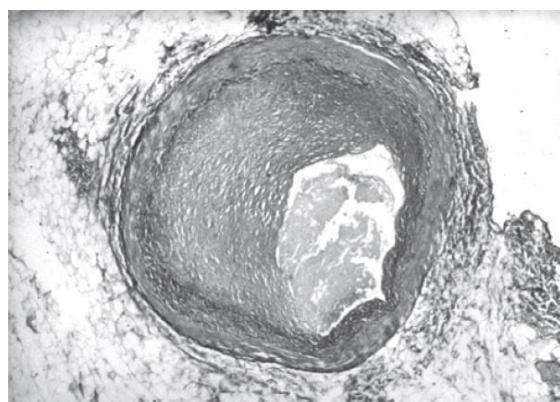
32. A good example of an organ with parts of different embryonic origin is:

- A. skin (dermis and epidermis);
- B. adrenals (cortex and medulla);
- C. pituitary (anterior and posterior part);
- D. all of the above.

33. The photomicrographs show an artery in a non-smoker and a smoker respectively.



non-smoker



smoker

What is the reason that the smoker's artery looks like this?

- A. A cancerous tumour has formed and is blocking the lumen.
- B. Nicotine has damaged the artery endothelium causing a plaque.
- C. Tar has stuck to the artery wall forming a blockage.
- D. The artery has become constricted due to carbon monoxide.

34. The antibodies involved in allergic reactions:

- A. are called allergens;
- B. are secreted by mast cells;
- C. belong to the IgE group;
- D. are produced by T-lymphocytes.

Biology Test 2016

THE KEY

1A , 2D , 3B, 4D, 5B, 6C, 7A, 8A, 9C, 10C, 11B, 12D, 13B, 14B, 15C, 16A, 17C, 18C, 19B,
20C, 21D, 22D, 23C, 24A, 25C, 26D, 27D, 28C, 29C, 30B, 31A, 32D, 33B, 34C,

TEST 2015

1. Bone tissue contains large multinucleated cells that can dissolve and remove the bony substance. They are called:

- a) chondrocytes
- b) macrophages
- c) leucocytes
- d) osteoclasts

2. The enzymes that catalyze the linking of nucleotide subunits are called:

- a) DNA polymerases
- b) DNA ligases
- c) DNA endonucleases
- d) DNA helicases

3. Which hormone deficiency in early youth is responsible for Addison's disease?

- a) glucagon
- b) aldosterone
- c) thyroxine
- d) calcitonin

4. Urea is produced from ammonia in the:

- a) liver
- b) kidney
- c) pancreas
- d) urinary bladder

5. Which cells directly precede spermatozoa in the maturation process are called:

- a) primary spermatocytes
- b) spermatids
- c) spermatogonia
- d) secondary spermatocytes

6. Which hormone is produced by the mucosa of the stomach?

- a) secretin
- b) cholecystokinin
- c) gastric inhibitory peptide
- d) gastrin

7. The bacterial cell wall is composed of:

- a) peptidoglycan
- b) cellulose
- c) chitin
- d) lignin

8. The 3rd ventricle is situated in the:

- a) metencephalon
- b) telencephalon
- c) mesencephalon
- d) diencephalon

TEST 2015

9. Major histocompatibility complex (MHC) class II antigens are found on:

- a) only cells of the immune system, particularly B cells and macrophages
- b) most nucleated cells instead of neurons
- c) only erythrocytes
- d) every cell of nervous system

10. Control centers of body temperature and appetite are situated in the:

- a) midbrain
- b) cerebellum
- c) hypothalamus
- d) medulla

11. Beri beri (weakened heart muscle, enlarged right side of the heart, etc.) is caused by the deficiency of vitamin

- a) D
- b) B₁
- c) C
- d) E

12. If a single gene produces multiple phenotypic effects, it is said to exhibit:

- a) epistasis
- b) polygenic inheritance
- c) penetrance
- d) pleiotropy

13. A thin layer of connective tissue, which adheres closely to the tissue of the brain is called

- a) dura mater
- b) arachnoid
- c) pia mater
- d) none of the above

14. Individuals with Patau syndrome (multiple defects, with death by age 1 to 3) have three copies of which chromosome:

- a) 13
- b) 18
- c) 21
- d) 22

15. Which sentence dealing with the lactose operon is true?

- a) When lactose is present, the lactose repressor binds to the operator region
- b) The lactose repressor protein is encoded by the operator gene.
- c) The sequence of bases called the promoter region is next to the operator.
- d) When lactose is absent, the lactose repressor binds to the operator region.

TEST 2015**16. Frameshift mutations are caused by the:**

- a) substitution in one pair of nucleotides in a DNA sequence
- b) insertion of a base pair in a DNA sequence
- c) Robertsonian translocation
- d) paracentric inversion of the chromosome

17. Which pathway of synthesis and transport in the cell is correct?

- a) Golgi lumen -> transport vesicle -> endoplasmic reticulum lumen -> secretory vesicle -> cell surface
- b) Endoplasmic reticulum lumen -> transport vesicle -> Golgi lumen -> secretory vesicle -> cell surface
- c) Endoplasmic reticulum lumen -> secretory vesicle -> Golgi lumen -> transport vesicle -> cell surface
- d) Cell surface -> transport vesicle -> Endoplasmic reticulum lumen -> secretory vesicle -> Golgi lumen

18. Pyruvate, the end product of glycolysis, is converted to acetyl CoA in the:

- a) cytoplasm
- b) lysosome
- c) peroxisome
- d) mitochondrion

19. Lyases catalyze:

- a) reactions in which two double bonds are formed or broken
- b) the transfer of a functional group from a donor molecule to an acceptor molecule
- c) the hydrolysis reactions
- d) conversion of a molecule from one isomeric form to another

20. If both parents are *Bb*, what is the probability that their child will be *bb*?

- a) 0
- b) 25%
- c) 50%
- d) 75 %

21. Choose the correct set:

	<u>Sympathetic action</u>	<u>Parasympathetic action</u>
a) iris of the eye	constricts pupil	dilates pupil
b) heart	decreases rate	increases rate
c) intestine	stimulates motility	inhibits motility
d) bronchial tubes	dilates	constricts

22. The valve between the right atrium and the right ventricle in the heart is called the:

- a) mitral valve
- b) semilunar valve
- c) tricuspid valve
- d) bicuspid valve

TEST 2015

23. Lungs of which group of animals have air sacs (usually nine) reaching into all parts of the body and even penetrating some of the bones?

- a) amphibians
- b) reptiles
- c) birds
- d) mammals

24. Maltase, an enzyme splitting maltose into two glucose molecules, is produced by the:

- a) liver
- b) small intestine
- c) pancreas
- d) stomach

25. Which viruses use reverse transcriptase?

- a) adenoviruses
- b) retroviruses
- c) parvoviruses
- d) herpesviruses

26. In the fetal circulation oxygenated blood returns via:

- a) 1 umbilical artery
- b) 2 umbilical arteries
- c) 2 umbilical veins
- d) 1 umbilical vein

27. Cones with their photopigment rhodopsin serve as motion detectors. How many errors can be found in this sentence?

- a) 0
- b) 1
- c) 2
- d) 3

28. How many pairs of cranial nerves emerge from the brain respectively in reptiles, birds, and mammals?

- a) 12, 12, 12
- b) 10, 11, 12
- c) 10, 10, 12
- d) 10, 12, 12

29. Which structure originates from the ectoderm?

- a) heart
- b) dermis
- c) vertebra
- d) adrenal medulla

TEST 2015

30. Three tiny bones - the malleus, incus, and stapes (or hammer, anvil, and stirrup) are present in:

- a) all vertebrates excluding fishes
- b) only mammals
- c) birds and mammals
- d) reptiles, birds, and mammals

31. Which term is otherwise called “cell-drinking”?

- a) exocytosis
- b) pinocytosis
- c) phagocytosis
- d) plasmolysis

32. The process when a phage carries bacterial genes from one bacterial cell to another is called:

- a) transformation
- b) conjugation
- c) transduction
- d) translation

33. Choose the correct name of a purine base:

- a) cytosine
- b) guanine
- c) thymine
- d) uracil

34. The main location of reticular connective tissue is the:

- a) liver and spleen
- b) lung
- c) dermis of skin
- d) bone

35. The auditory receptors are located in the:

- a) cochlea of the middle ear
- b) cochlea of the inner ear and tympanic membrane
- c) only cochlea of the inner ear
- d) only tympanic membrane

36. These cells contain large amounts of histamine, which they release as a response to injury and during allergic reactions. This description refers to:

- a) neutrophils
- b) mast cells
- c) nongranular leukocytes
- d) monocytes

TEST 2015

37. The proper localization of the thymus is in the vicinity of the:

- a) pineal gland
- b) adrenal glands
- c) pancreas
- d) trachea

38. The lumbar region of the mammalian vertebral column consists of:

- a) 7 vertebrae
- b) 12 vertebrae
- c) 5 vertebrae
- d) 10 vertebrae

39. Chief cells in the gastric glands secrete pepsinogen. This sentence is:

- a) false because these cells secrete pepsin
- b) false because pepsinogen is produced by parietal cells of the gastric glands
- c) false because chief cells secrete hydrochloric acid
- d) true

40. The Cri-du-chat syndrome is caused by the:

- a) deletion of the short arm of chromosome 5
- b) deletion of the short arm of chromosome 4
- c) translocation between chromosomes 4 and 5
- d) pericentric inversion in chromosome 5

41. Which sentence about the mitochondrion is false?

- a) It has a double membrane.
- b) It stores calcium.
- c) It has a single-stranded DNA.
- d) All these features are typical for both plant and animal mitochondria.

42. Which vitamin protects unsaturated fatty acids and membranes (acts as an antioxidant)?

- a) D
- b) E
- c) C
- d) B₁

43. Deficiency of certain element results in goiter (abnormal enlargement of the thyroid gland). Please choose the correct name of this element:

- a) sodium
- b) chloride
- c) sulfur
- d) iodine

TEST 2015

44. Neural crest cells migrate downward from their original position and form the:

- a) dorsal root ganglia of the spinal nerves
- b) eyes
- c) pituitary gland
- d) nails and hair

45. Lampbrush chromosomes are found only in:

- a) spermatocytes
- b) spermatogonia
- c) oocytes
- d) spermatids

46. Which hormone is produced in the hypothalamus?

- a) prolactin
- b) oxytocin
- c) calcitonin
- d) melatonin

47. Rocky Mountain spotted fever (transmitted by ticks) is caused by:

- a) Myxobacteria
- b) Cyanobacteria
- c) Spirochetes
- d) Rickettsias

48. Where in eukaryotes the subunits of ribosomes are assembled?

- a) In the cytoplasm.
- b) In the rough endoplasmic reticulum.
- c) In the nucleolus.
- d) In the lysosomes.

49. Which antibodies, known also as immunoglobulins (Ig), are present in the mucus, tears, saliva, and milk?

- a) IgA
- b) IgD
- c) IgM
- d) IgG

50. The mitotic spindle is formed in the:

- a) prophase
- b) metaphase
- c) anaphase
- d) telophase

TEST 2015 KEY

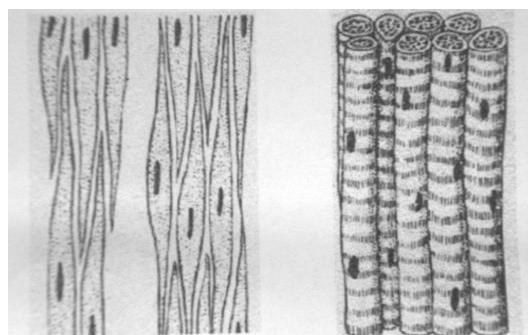
**1d, 2a, 3b, 4a, 5b, 6d, 7a, 8d, 9a, 10c, 11b, 12d, 13c, 14a, 15d, 16b, 17b, 18d, 19a, 20b,
21d, 22c, 23c, 24b, 25b, 26d, 27c, 28a, 29d, 30b, 31b, 32c, 33b, 34a, 35c, 36b, 37d, 38c,
39d, 40a, 41c, 42b, 43d, 44a, 45c, 46b, 47d, 48c, 49a, 50a**

TEST 2014

- 1. These are non-nucleated blood cells, biconcave in shape. Human blood contains 4.4 to 5 million of the cells per cubic millimeter. This description concerns:**
 - A. Thrombocytes
 - B. Lymphocytes
 - C. Monocytes
 - D. Erythrocytes
- 2. Which of the following statements concerning the functioning of the digestive system is correct?**
 - A. Digestive enzymes are produced only in the pancreas
 - B. Bile salts are enzymes which cause the emulsification of dietary lipids
 - C. The digestive system produces hormones that stimulate the synthesis of digestive enzymes
 - D. The human digestive system produces enzymes that are able to cleave cellulose
- 3. Which one of the following statements concerning vitamin A is correct?**
 - A. Vitamin A plays an essential role as an antioxidant necessary to decrease the incidence of some chronic diseases
 - B. Night blindness is one of the earliest signs of vitamin A deficiency
 - C. Vitamin A is responsible for mineralization of bones and teeth
 - D. Vitamin A is essential for blood clotting
- 4. Which part of the amniotic egg supplies the embryo with nutrients?**
 - A. Allantois
 - B. Yolk sac
 - C. Chorion
 - D. Amnion
- 5. The process which cell uses to take large molecules in, is called:**
 - A. Exocytosis
 - B. Endocytosis
 - C. Pinocytosis
 - D. Facilitated diffusion
- 6. A dominant gene codes for dark hair DD. If a parent with a DD genotype is crossed with a parent with a Dd genotype, what percent of their offspring will have dark hair?**
 - A. 25%
 - B. 50%
 - C. 75%
 - D. 100%
- 7. Colorblindness is a recessive sex-linked trait while normal vision is dominant. If a female who is heterozygous for colorblindness has children with a man who has normal vision, what percent of their male children would be expected to be color blind?**
 - A. 0%
 - B. 25%
 - C. 50%
 - D. 100%

TEST 2014

- 8. Which of the following takes place during the anaphase of mitosis in animal cells?**
- A. Kinetochore microtubules elongate to push chromosomes toward the metaphase plate
 - B. Sister chromatids remain attached to each other at the centromere and move toward the pole as a unit
 - C. Polar microtubules elongate and slide to push the spindle poles apart
 - D. The chromosomes align on the metaphase plate
- 9. DNA extracted from human skin cells was analyzed for base composition. It was found that 38% of the bases are adenine. What percentage of the bases is cytosine?**
- A. 24%
 - B. 12%
 - C. 76%
 - D. 38%
- 10. In vascular plants DNA is contained in which of the following?
I-nucleus, II-chloroplasts, III-mitochondria**
- A. only I
 - B. I and II only
 - C. I and III only
 - D. I, II and III
- 11. In *Escherichia coli* induction of the lactose operon (*lac operon*) occurs when allolactose binds to:**
- A. Repressor
 - B. Promoter
 - C. Operator
 - D. *lac* mRNA
- 12. The figure presents a schematic view of smooth and striated muscles. Which of the elements is not found in smooth muscles?**



- A. Thin filaments
- B. Thick filaments
- C. Sarcomeres
- D. Tropomyosin

TEST 2014

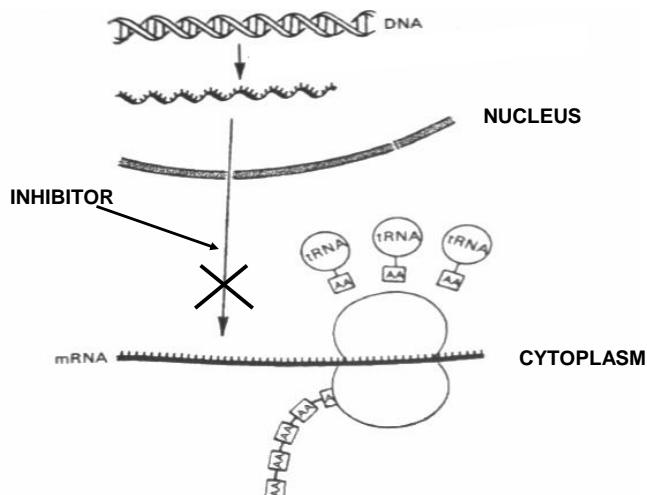
- 13. The greatest exchange of glucose and oxygen between vertebrate blood and tissues occurs through the:**
- A. Arteries
 - B. Veins
 - C. Glomerulus
 - D. Capillaries
- 14. The normal site of implantation of an early embryo (blastocyst) in a human is the:**
- A. Cervix
 - B. Ovary
 - C. Uterus
 - D. Vagina
- 15. The cell membrane of a red blood cell will allow water, oxygen, carbon monoxide and glucose to pass through but other substances are blocked. This membrane is called:**
- A. Perforated
 - B. Semi-permeable
 - C. Non-conductive
 - D. Permeable
- 16. Which cellular organelle is responsible for energy production?**
- A. Mitochondrion
 - B. Chloroplast
 - C. Nucleus
 - D. Golgi apparatus
- 17. The respiratory system depends on the nervous system for signals to:**
- A. Enhance the amount of oxygen in lungs
 - B. Coordinate muscles controlling breathing
 - C. Exchange gases with the circulatory system
 - D. Release hormones to increase the exchange of gases
- 18. Which of the following, not being able to synthesize proteins on their own, require a host cell?**
- A. Viruses
 - B. Blue-green algae
 - C. Bacteria
 - D. Yeast
- 19. Genetic engineering has produced goats whose milk contains proteins that can be used as medicine. This was a result of:**
- A. Mixing foreign genes into the milk
 - B. Injecting foreign genes into goats' udders
 - C. Feeding genetically modified food to the goats
 - D. Inserting foreign genes into the fertilized eggs of the goats

TEST 2014

20. Which structure originates from the ectoderm?

- A. Lung
- B. Heart
- C. Brain
- D. Adrenal cortex

21. Indicate a process that is inhibited on the schema presented below?



- A. Translation
- B. Transcription
- C. Replication
- D. Reverse transcription

22. Reptiles and birds have four extraembryonic membranes. Which of them are rudimentary for the majority of mammals?

- A. Allantois and amnion
- B. Amnion and yolk sac
- C. Allantois and yolk sac
- D. Chorion and amnion

23. Which of the following element(s) listed below hold(s) bones together in the skeletal system?

- A. Tendons
- B. Ligament
- C. Cartilage
- D. Synovial fluid

24. What is the name of the clear layer at the front of an eye that helps to focus light?

- A. Iris
- B. Retina
- C. Lens
- D. Cornea

TEST 2014

25. You observe a cell under a microscope and notice that it contains a plasma membrane, cell wall and ribosome, but no organelles. You will conclude that:

- A. It is an animal cell
- B. It is a plant cell
- C. It is an eukaryotic cell
- D. It is a prokaryotic cell

26. The place of processing proteins, where they are sorted for targeting to specific cellular destination, is:

- A. Golgi apparatus
- B. Mitochondria
- C. Endoplasmic reticulum
- D. Vacuoles

27. Which part of the human brain controls breathing?

- A. Cerebellum
- B. Hypothalamus
- C. Cerebrum
- D. Medulla oblongata

28. The return of the blood from the head and body to the heart takes place through:

- A. Vena cava
- B. Ventricles
- C. Arteries
- D. Capillaries

29. Which of these is part of the inner ear?

- A. Hammer
- B. Stirrup
- C. Cochlea
- D. Tympanic membrane

30. These are bacterial proteins that have the ability to cut both strands of a DNA molecule at a specific nucleotide sequence:

- A. Vectors
- B. Restriction enzymes
- C. Plasmid
- D. Clones

31. Calcitonin is secreted by:

- A. Thyroid gland
- B. Adrenal gland
- C. Testes
- D. Pituitary gland

TEST 2014

32. Which of these is a fat-soluble vitamin?

- A. Vitamin D
- B. Biotin
- C. Vitamin B₆
- D. Niacin

33. Which of the following secretes a hormone that helps the human body to manage stress?

- A. Parathyroid glands
- B. Hypothalamus
- C. Adrenal glands
- D. Spleen

34. Which of these enzymes begins the digestion of proteins?

- A. Trypsin
- B. Pepsin
- C. Aminopeptidases
- D. Elastase

35. Hinge joints can be found in:

- A. Hips
- B. Fingers
- C. Shoulders
- D. Wrists

36. The longest part of the digestive system is:

- A. Large intestine
- B. Oesophagus
- C. Small intestine
- D. Bile duct

37. Which part of the human brain connects the endocrine and nervous system?

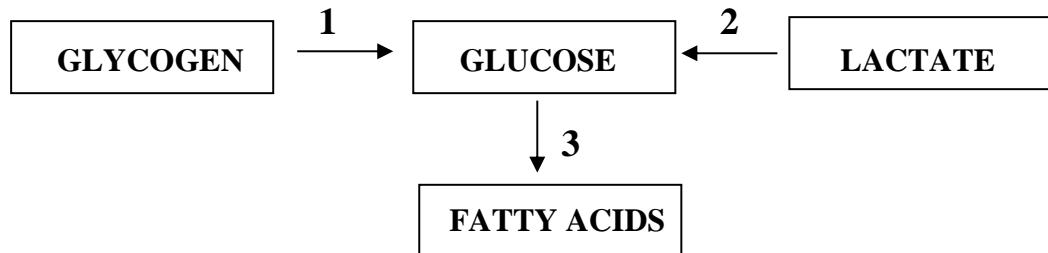
- A. Hypothalamus
- B. Cerebellum
- C. Thalamus
- D. Cerebrum

38. What is an intron?

- A. Short coding nucleotide sequence in genes
- B. RNA sequences, which code for protein
- C. Codon
- D. Long, noncoding nucleotide sequence in pre-mRNA

TEST 2014

39. Which of the following reactions take place when a person's diet is rich in carbohydrates and the consumption of calories is in excess of daily energy requirements for a long time.



- A. Reaction 1
- B. Reaction 1 and 2
- C. Reaction 3
- D. Reaction 2 and 3

40. Urea is produced in the:

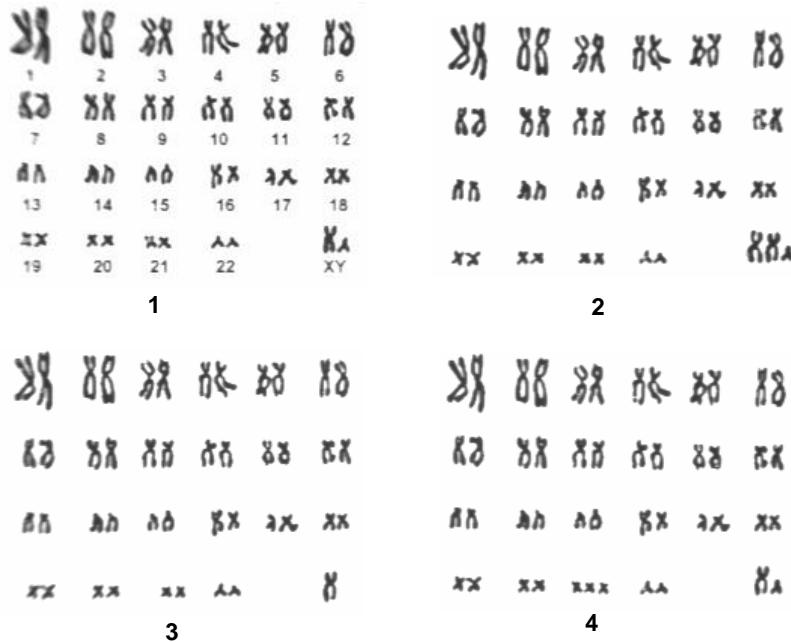
- A. Kidney
- B. Urinary bladder
- C. Spleen
- D. Liver

41. Which protein is composed of two identical heavy chains and two identical light chains?

- A. Immunoglobulin
- B. Antigen
- C. Insulin
- D. Thyrotrophic hormone

TEST 2014

42. Which of the following statements is TRUE about the presented karyotypes?



- A. Karyotype 1 – healthy female
- B. Karyotype 3 – Turner syndrome
- C. Karyotype 4 – female with Down syndrome
- D. Karyotype 2 – male with Turner syndrome

43. Which of the following shows the correct order of the phases of mitosis?

- A. Telophase-Anaphase-Metaphase-Prophase
- B. Anaphase-Metaphase-Prophase-Telophase
- C. Telophase-Anaphase-Metaphase-Prophase
- D. Prophase-Metaphase-Anaphase-Telophase

44. Human Immunodeficiency Virus (HIV) destroys:

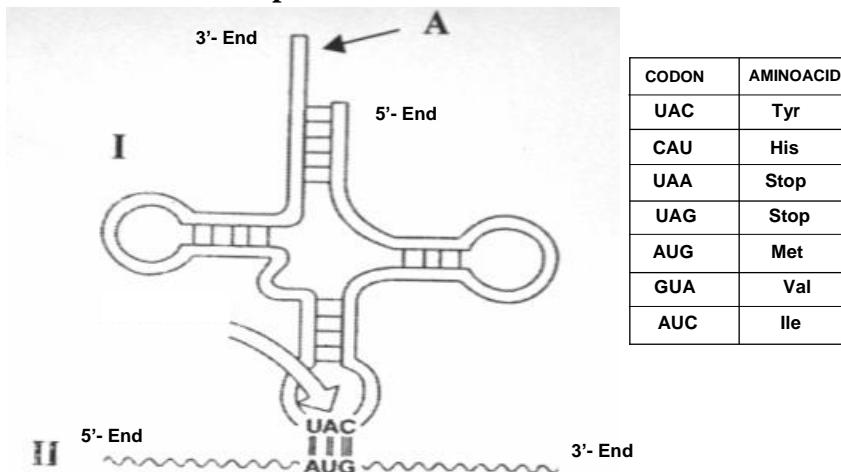
- A. T helper cells
- B. Memory B cells
- C. Natural killer cells
- D. Immunoglobulins

45. In which form do humans store excess energy?

- A. Carbohydrates
- B. Proteins
- C. Lactate
- D. Fat

TEST 2014

46. Each tRNA molecule has an attachment site for a specific amino acid. Which amino acid is attached to the place A?



- A. Tyrosine
- B. Valine
- C. Methionine
- D. No amino acid is attached because the termination codon is presented on mRNA

47. In which part of a cell does the citric acid cycle take place?

- A. In the cytoplasm
- B. In the mitochondria
- C. In the inner membrane of the mitochondrial
- D. In the intermembrane space

48. Which of the DNA sequences is complementary to a fragment of DNA sequence 5'-ATGCCGTT-3'?

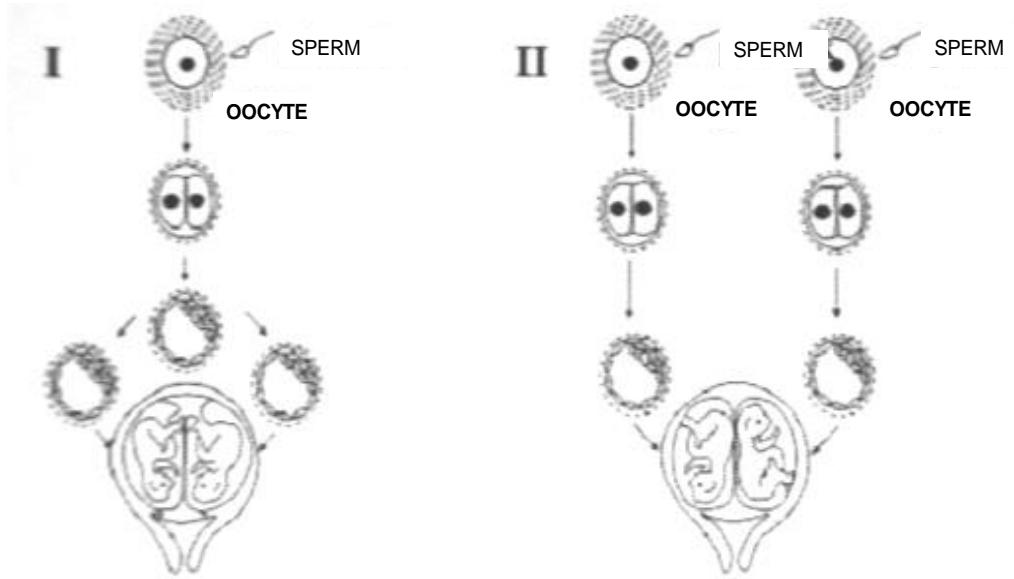
- A. 5'-TACGGCAA-3'
- B. 5'-AACGGCAT-3'
- C. 5'-TTGCCGTA-3'
- D. 5'-ATGCCGTT-3'

49. Which of the following is secreted principally by the corpus luteum of the human ovary?

- A. Luteinizing hormone
- B. Follicle stimulating hormone
- C. Progesterone
- D. Gonadotropin releasing hormone

TEST 2014

50. Which of the statements is true about the presented schema?



- A. On graph I the twins are nearly identical and are of the same sex
- B. On graph II the twins are nearly identical but are of different sex
- C. On graph I the twins are similar to each other, but are of different sex
- D. On graph II the twins are nearly identical and are of the same sex

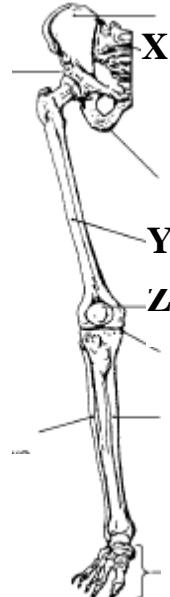
TEST 2014 KEY

**1D, 2C, 3B, 4B, 5B, 6D, 7C, 8C, 9B, 10D, 11A, 12C, 13D, 14C, 15B, 16A, 17B, 18A, 19D,
20C, 21A, 22C, 23B, 24D, 25D, 26A, 27D, 28A, 29C, 30B, 31A, 32A, 33C, 34B, 35B, 36C,
37A, 38D, 39C, 40D, 41A, 42B, 43D, 44A, 45D, 46C, 47B, 48B, 49C, 50A**

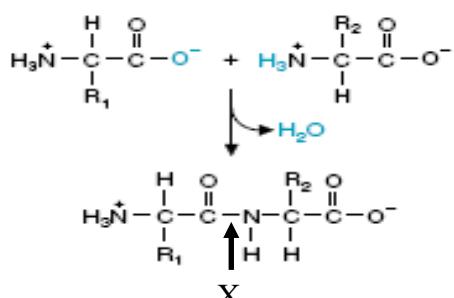
TEST 2013

1. Choose the correct description of bones in the lower limb:

- A. X - sacrum; Y- femur; Z - patella
 - B. X - sacrum; Y- fibula; Z - coccyx
 - C. X - patella; Y- femur; Z - patella
 - D. X - coccyx; Y- fibula; Z - patella



2. The bond marked X on the scheme below is:



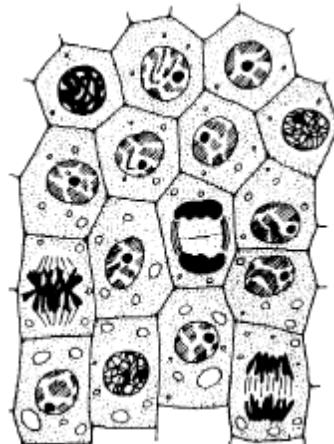
- A. Ionic
 - B. Peptide
 - C. Hydrogen
 - D. Electrostatic

3. What is the name of the innermost eyeball layer that contains light-sensitive cells?

- A. Iris
 - B. Retina
 - C. Choroid
 - D. Cornea

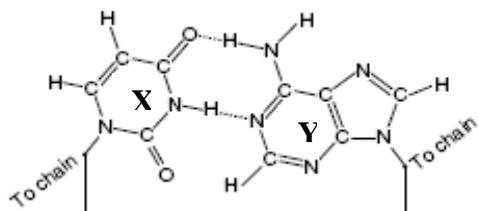
4. Which of the following statements is correct about the scheme?

- A. Every cell is in a different phase of cell division
 - B. Some cells are in different phases of cell division
 - C. All dividing cells are in metaphase
 - D. All dividing cells are in anaphase



TEST 2013

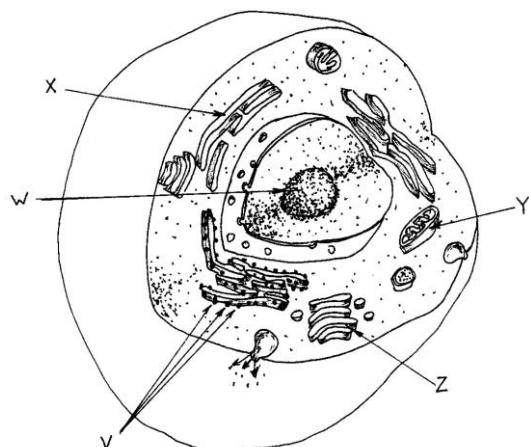
5. Which of the following is true?



- A. X = uracil; Y = adenine
- B. X = adenine; Y = thymine
- C. X = guanine; Y = cytosine
- D. X = cytosine; Y = guanine

6. Which of the following is synthesized by organelle indicated as V in the figure below?

- A. ATP
- B. Proteins
- C. Lipids
- D. RNA



7. Inhibitors of ATP production in cells MAINLY affect the:

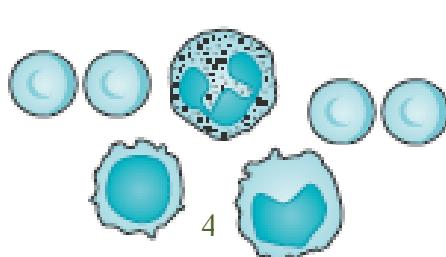
- A. Ribosomes
- B. Mitochondria
- C. Golgi apparatus
- D. Rough endoplasmic reticulum

8. The main function of the smooth endoplasmic reticulum in liver cells is:

- A. Protein storage
- B. Signaling
- C. Energy generation
- D. Conversion of toxic molecules to nontoxic derivatives

9. The main function of cells illustrated below DOES NOT include:

- A. Phagocytosis
- B. Blood clotting
- C. Oxygen transport
- D. Immune reactions



TEST 2013

10. Choose the pair including cells and proteins that are necessary for defense against an infection:

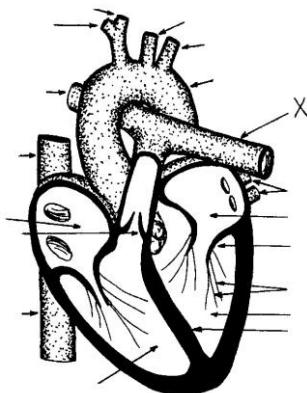
- A. Leukocytes and immunoglobulins
- B. Thrombocytes and immunoglobulins
- C. Leukocytes and erythrocytes
- D. Erythrocytes and thrombocytes

11. The specialized connective tissue in which cells are suspended in a liquid called plasma is:

- A. Blood
- B. Serum
- C. Lymph
- D. Extracellular fluid

12. Which of the following correctly identifies structure X and the composition of blood it contains?

- A. Vein; high O₂ content
- B. Vein; low O₂ content
- C. Artery; high O₂ content
- D. Artery; low O₂ content



13. Indicate enzymes that are mostly synthesized and secreted in an inactive form:

- A. Lipases
- B. Proteases
- C. Amylases
- D. Nucleases

14. Which of the following can be found within the wall of the stomach, but NOT in the lumen of the stomach (gastric juice)?

- A. HCl
- B. Pepsin
- C. Gastrin
- D. Trypsin

15. Surgical resection of a large fragment of the colon is likely to affect the:

- A. Release of bile
- B. Digestion of fats
- C. Absorption of glucose
- D. Water balance in the body

TEST 2013

16. One of the functions of the liver is synthesis of:

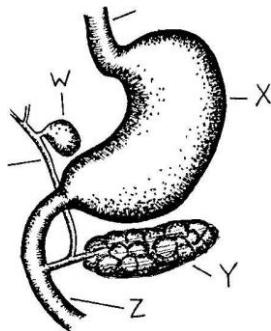
- A. Lipids
- B. Hemoglobin
- C. Mucus
- D. Hydrochloric acid

17. The digestion of carbohydrates mostly occurs in:

- A. Mouth and large intestine
- B. Mouth and small intestine
- C. Mouth, stomach and pancreas
- D. Mouth, stomach and small intestine

18. Indicate the organ marked on the scheme which stores food, kills bacteria, and digests proteins?

- A. W
- B. X
- C. Y
- D. Z



19. What type of gene mutation occurs if the nucleotide sequence TACGGCATG, becomes a TAGGCATG?

- A. Deletion
- B. Insertion
- C. Transition
- D. Transversion

20. During the process of transcription, the information carried out by:

- A. RNA is converted to DNA
- B. DNA is converted to RNA
- C. Protein is converted to RNA
- D. RNA is converted to protein

21. Which of the following is true for double-stranded DNA?

- A. $[A] = [C]$, $[T] = [G]$
- B. $[A] = [G]$, $[T] = [C]$
- C. $[A] + [T] = [G] + [C]$
- D. $[A] + [G] = [T] + [C]$

TEST 2013

22. Diet components that supply an organism with precursors of coenzymes are:

- A. Lipids
- B. Proteins
- C. Vitamins
- D. Carbohydrates

23. Which of the following is TRUE about a metabolic pathway?

- A. ATP is required at each step of metabolism
- B. The product of a reaction often becomes the substrate of the subsequent reaction
- C. The same enzyme is used at each step in the pathway
- D. All of the above are correct

24. Which of the following processes would be the FIRST to be affected by the lack of oxygen in a cell?

- A. Osmosis
- B. Diffusion
- C. Active transport
- D. Facilitated transport

25. The process of expelling particles from a cell is called:

- A. Exocytosis
- B. Endocytosis
- C. Phagocytosis
- D. Reverse osmosis

26. Epinephrine is produced and released by:

- A. Pancreas
- B. Adrenal cortex
- C. Adrenal medulla
- D. Posterior pituitary

27. Which of the following is increased by stimulation of the parasympathetic nervous system?

- A. Heart beat rate
- B. Breathing rate
- C. Smooth muscle activity
- D. Blood flow in skeletal muscles

28. One of the roles of mitochondria in the synaptic knob (terminal) of an axon is to provide energy for the:

- A. Pumping sodium across the synapse
- B. Pumping potassium across the synapse
- C. Synthesis and exocytosis of neurotransmitters
- D. Synthesis of a receptor on the post-synaptic membrane

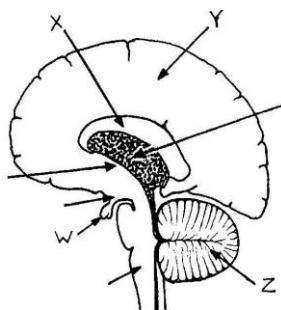
TEST 2013

29. Which of the following is NOT TRUE regarding myelin?

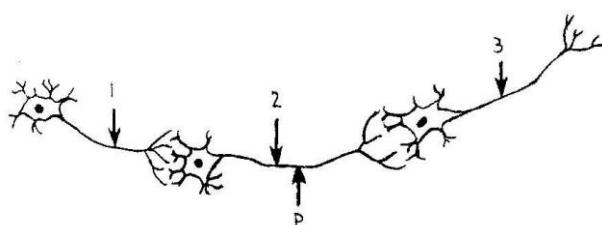
- A. It is produced by Schwann cells
- B. It allows impulses to travel faster
- C. It prevents cross-communication between neurons
- D. It prevents the loss of neurotransmitters during synaptic transmission

30. The structure marked with Z on the scheme below is responsible for:

- A. Sorting and relaying sensory stimuli
- B. Seeing and hearing
- C. Integrating muscle position and balance
- D. Controlling heartbeat and breathing



31. When the axon of neuron 2 is stimulated at point P, an impulse can only be transmitted from neuron 2 to:



- A. Neuron 1 by the movement of ions
- B. Neuron 3 by the movement of ions
- C. Neuron 1 by the release of neurotransmitters
- D. Neuron 3 by the release of neurotransmitters

32. Progesterone is produced in the:

- A. Ovary and acts on the testes
- B. Ovary and acts on the uterus
- C. Ovary and acts on the pineal gland
- D. Pituitary and acts on the ovary

TEST 2013

33. Which of the following has the GREATEST Effect on the expression of female secondary sex characteristics?

- A. Estrogen
- B. Progesterone
- C. Luteinizing hormone
- D. Follicle stimulating hormone

34. Reduction of the release of GnRF (GnRH) from the hypothalamus will:

- A. Stimulate LH and induce FSH secretion
- B. Decrease the release of gonatotropic hormones
- C. Stimulate an increase of progesterone and estrogen levels
- D. Initiate ovulation in females and reduce spermatogenesis in males

35. Most of carbon dioxide is transported in the blood as:

- A. Dissolved gas
- B. Bicarbonate ions
- C. Reduced hemoglobin
- D. Carbaminohemoglobin

36. The breathing center is located in the:

- A. Thalamus
- B. Cerebrum
- C. Hypothalamus
- D. Medulla oblongata

37. The part of the respiratory and digestive tracts where both food and air pass in normal conditions is the:

- A. Larynx
- B. Trachea
- C. Pharynx
- D. Nasal sinus

38. Deamination of amino acids MAY DIRECTLY lead to the production and excretion of nitrogen in the form of:

- A. Bile
- B. Urea
- C. Uric acid
- D. Ammonia

39. Which of the following MOST correctly describes the site of urea entry into blood and site of urea removal from blood?

- A. Produced in liver, removed by liver
- B. Produced in kidneys, removed by intestine
- C. Produced in liver, removed by kidneys
- D. Produced in muscles, removed by kidneys

TEST 2013**40. High solute concentration in blood (hypertonic blood) is detected by:**

- A. Glomerulus of kidney
- B. Distal tubule of the kidney
- C. Hypothalamus
- D. Posterior pituitary gland

41. In which kidney region is the majority of Bowman's capsules located?

- A. Renal vein
- B. Renal pelvis
- C. Renal cortex
- D. Renal medulla

42. Which part of uriniferous tubule in the kidney is MOST affected by ADH?

- A. Loop of Henle
- B. Collecting tubule
- C. Distal convoluted tubule
- D. Proximal convoluted tubule

43. Which of the processes accounts for returning of useful nutrients to the blood?

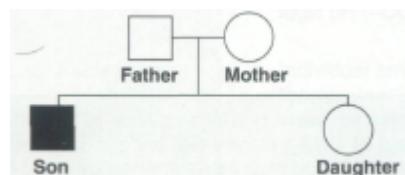
- A. Filtration
- B. Secretion
- C. Excretion
- D. Reabsorption

44. Which of the following sentences is correct?

- A. Mitosis is the process in which the chromosome number in a cell is halved
- B. DNA synthesis takes place in G₁ phase of eukaryotic cell cycle
- C. In the somatic cells of female mammals only one of the X chromosomes is active, whereas the second one is inactive as Barr body
- D. Turner syndrome is an example of trisomy

45. The blood type (group) of mother is A, but father is B. What will be the children's blood type?

- A. A or B
- B. AB
- C. A, B or AB
- D. A, B, AB or 0

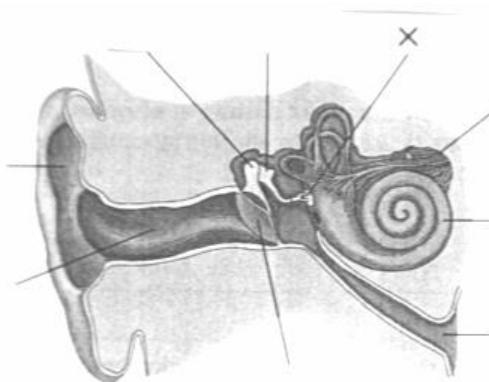
46. The diagram below shows a family pedigree and appearance of a disease that is marked with the black square. What can you say about this disease?

TEST 2013

- A. The disease is inherited as autosomal recessive illness
- B. The disease is inherited as autosomal dominant illness
- C. The disease is inherited as Y-linked recessive illness
- D. The disease is inherited as X-linked dominant illness

47. Which of the following statements is correct about the element of the ear marked with an X on the scheme?

- A. It is one of tiny bones
- B. It is placed in the inner ear
- C. It is responsible for maintaining balance
- D. All answers are correct



48. If both parents are Rh-positive:

- A. Their children will never be Rh-negative
- B. Only their sons can be Rh-negative
- C. 50% of their children will be Rh-negative
- D. 25% of their children will be Rh-negative

49. Colorblindness is a recessive sex linked trait while normal vision is dominant. Which of the statements is true for a woman who is colorblind $X^c X^c$ and a man with normal vision?

- A. 100% of their female offspring will be colorblind
- B. 100% of their male offspring will be colorblind
- C. 50% of their female offspring will be colorblind
- D. 50% of their male offspring will be colorblind

50. Development of a recombinant DNA technology was possible after the discovery of:

- A. Plasmids
- B. PCR
- C. Restriction enzymes
- D. cDNA

TEST 2013 KEY

**1A; 2B; 3B; 4B; 5A; 6B; 7B; 8D; 9B; 10A; 11A; 12D; 13B; 14C; 15D; 16A; 17B; 18B;
19A; 20B; 21D; 22C; 23B; 24C; 25A; 26C; 27C; 28C; 29D; 30C; 31D; 32B; 33A; 34B;
35B; 36D; 37C; 38D; 39C; 40C; 41C; 42B; 43D; 44C; 45D; 46A; 47A; 48D; 49B; 50C**

TEST 2012

1. The main site of peptide neurohormone biosynthesis is:

- A. nucleus
- B. rough endoplasmic reticulum
- C. dendrite
- D. postsynaptic density

2. In humans, the Barr body is an:

- A. active X chromosome in females
- B. active X chromosome in males
- C. inactive Y chromosome in males
- D. inactive X chromosome in females

3. A major advantage of monoclonal antibodies over polyclonal antibodies is that monoclonal antibodies:

- A. have identical binding sites that recognize a specific epitope
- B. cross-link molecules that share antigenic sites
- C. have higher-affinity binding to antigens
- D. can be produced against proteins that are immunogenic in rabbits

4. If a cell has one chromosome in excess of the normal number of chromosomes present in the nucleus, it is referred to as:

- A. aneuploid
- B. polyploid
- C. tetraploid
- D. haploid

5. Eukaryotic cells with DNA damage often cease progression through the cell cycle until the damage is repaired. This type of control over the cell cycle is referred to as:

- A. proteasome control
- B. damage control
- C. checkpoint control
- D. transcriptional control

6. All of the following histones occur within the core of a nucleosome EXCEPT:

- A. H1
- B. H2A
- C. H3
- D. H4

TEST 2012

7. DNA from the bacteriophage X174 has a base composition of 25% A, 33% T, 24% G, and 18% C. Which of the following best explains this observation?

- A. In viral genomes, the base pairing does not follow the standard Watson-Crick rules
- B. Viral genomes are linear and tolerate base pair mismatches
- C. Nucleic acids from viruses are tightly complexed with nucleic acid-binding proteins and so cannot base-pair with one another
- D. The genome of bacteriophage X174 is single-stranded

8. Which of the following is NOT an anabolic product of nitrogen assimilation?

- A. Glutamine
- B. Asparagine
- C. Aspartate
- D. Urea

9. A silent mutation in a gene results in:

- A. no change in the nucleotide sequence of mRNA encoded by the gene
- B. no change in the amino acid sequence of the protein encoded by the gene
- C. no expression of the protein encoded by the gene
- D. a shift of the translational reading frame

10. Which of the following most accurately explains the cause for the abnormal number of chromosomes during human reproduction that can result in Down syndrome, or Turner's syndrome?

- A. occurrence of nondisjunction of homologous chromosomes during meiosis
- B. duplicative production of extra chromosomes during DNA replication
- C. abnormal pairing of nonhomologous chromosomes during prophase of meiosis I
- D. fusion of two sperm with one egg to provide an extra set of paternal chromosomes

11. The zymogen - chymotrypsinogen is converted into active chymotrypsin by:

- A. binding of a metal ion
- B. reduction of a disulfide bond
- C. proteolytic cleavage
- D. action of signal peptidase

12. The first metabolic intermediate that is common to the aerobic metabolism of glucose and fatty acids is:

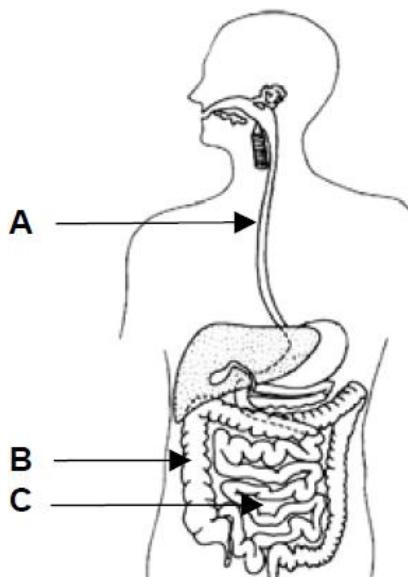
- A. acetyl CoA
- B. pyruvate
- C. citrate
- D. glyceraldehyde 3-phosphate

TEST 2012**13. A neurotransmitter is released by:**

- A. Phagocytosis
- B. Exocytosis
- C. Endocytosis
- D. Apoptosis

14. What possesses genes that may be integrated into the genome of an infected eukaryotic cell:

- A. *E. coli*
- B. Yeast
- C. Bacteriophage
- D. Retrovirus

15. Which part(s) of gastrointestinal tract contain(s) symbiotic bacteria?

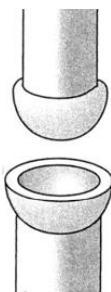
- A. Only A
- B. B and C
- C. A, B and C
- D. Only B

16. In humans the middle ear comprises the tympanic cavity with three auditory bones. Sound vibrations are transmitted from the tympanic membrane across the cavity via these bones. Choose the correct order:

- A. Hammer, anvil and stirrup
- B. Anvil, hammer and stirrup
- C. Stirrup, hammer and anvil
- D. Hammer, stirrup and anvil

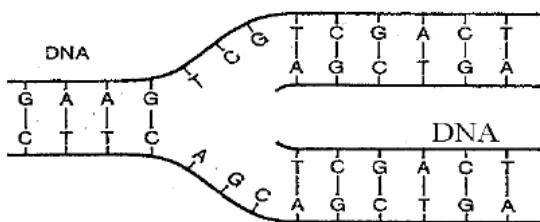
TEST 2012

17. This kind of joint is present in the human body in:



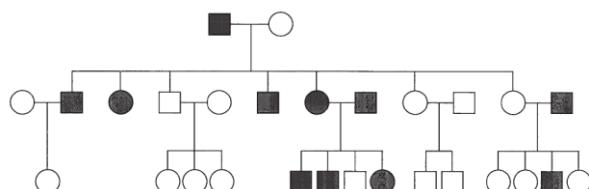
- A. Hip joint only
- B. Knee joint
- C. Hip joint and shoulder joint
- D. Isn't present in human body

18. Which process is presented on the scheme below?



- A. Replication
- B. Transcription
- C. Translation
- D. Reverse transcription

19. In the pedigree below, circles denote females, squares denote males, and shaded figures denote individuals expressing a specific trait. Which of the following is the most probable mode of inheritance of this trait?



- A. Simple Mendelian dominant
- B. Simple Mendelian recessive
- C. X-linked dominant
- D. Polygenic inheritance

20. During which of the following stages of the cell cycle will a diploid cell contain twice the amount of DNA found in a gamete?

- A. Prophase
- B. Entire S phase
- C. G₁
- D. G₂

21. If the mother's blood type is AB, and the father's is O, their child's blood type will be:

- A. either A or B
- B. only AB
- C. one of the following three : A, B, AB
- D. one of the following four : A, B, AB, O

22. Lactate may be formed as the product of glycolysis in:

- A. liver
- B. erythrocytes
- C. skeletal muscle
- D. all of the above

TEST 2012

23. AIDS virus (HIV) can infect T helper cells. Which aspect(s) of the body's defenses will be affected by the virus?

- A. Primary immune response
- B. Secondary immune response
- C. Both A and B
- D. Neither A nor B

24. Duchenne muscular dystrophy is a sex-linked recessive disorder. Choose the correct answer to complete the sentence: The gene of the disease.....

- A. is inherited by males from their mothers
- B. should be more common in females than in males
- C. Both A and B
- D. Neither A nor B

25. The base that is found in RNA but not in DNA is:

- A. Cytosine
- B. Uracil
- C. Adenine
- D. Guanine

26. The part of the vertebrate eye that regulates the amount of light that can enter the eye is the:

- A. Lens
- B. Ciliary body
- C. Iris
- D. Cornea

27. The blood vessel that carries blood away from a heart ventricle is a/an:

- A. Vein
- B. Artery
- C. Capillary
- D. Both vein and artery

28. Which of the following organs is/are considered to be a part of the lymphatic system?

- A. Kidneys
- B. Heart
- C. Spleen
- D. Stomach

TEST 2012

29. The hormone secreted by the anterior pituitary lobe that stimulates milk production is called:

- A. FSH
- B. Oxytocin
- C. Prolactin
- D. Estrogen

30. If one strand of DNA has the base sequence 5'-AGCTACGGA -3', the other strand has the complementary sequence:

- A. 5'-TCGATGCCT-3'
- B. 5'-TCCGTAGCT-3'
- C. 5'-AGGCATCGA-3'
- D. 5'-AGCTACGGA-3'

31. Rough endoplasmic reticulum:

- A. Synthesizes cholesterol
- B. Breaks down toxic chemicals
- C. Is a calcium ions storage place
- D. Has ribosomes attached

32. In a eukaryotic cell, the citric acid cycle takes place:

- A. In the matrix of mitochondria
- B. On the cell membrane
- C. In the cytoplasm
- D. In the inner mitochondrial membrane

33. An inducible operon:

- A. Is normally turned on
- B. Is normally turned off
- C. Is always under positive control
- D. Is active at all times

34. The most posterior and inferior part of the brain is the:

- A. Pons
- B. Cerebrum
- C. Cerebellum
- D. Medulla

TEST 2012

35. The optic disk:

- A. Has both rods and cones
- B. Is the central anterior part of the sclera
- C. Is also known as the “blind spot”
- D. Is the region of sharpest vision

36. All of the following are functions of the liver EXCEPT:

- A. Detoxification of alcohol and other drugs and poisons
- B. Storage of iron and certain vitamins
- C. Conversion of excess amino acid to fatty acids and urea
- D. Storage of bile

37. Ectoderm gives rise to the:

- A. Circulatory system
- B. Nervous system and sense organs
- C. Reproductive system
- D. Muscle

38. The blood elements that are involved in blood clotting are called:

- A. Gamma globulins
- B. Erythrocytes
- C. Leukocytes
- D. Thrombocytes

39. The portion of the renal tubule that conducts filtrate from Bowman's capsule is the:

- A. Distal convoluted tubule
- B. Glomerulus
- C. Proximal convoluted tubule
- D. Loop of Henle

40. The outermost extraembryonic membrane is the:

- A. Chorion
- B. Amnion
- C. Allantois
- D. Yolk sac

41. Astrocytes:

- A. Form myelin sheaths around some axons
- B. Are phagocytic cells that remove cell debris
- C. Provide neurons with glucose
- D. Envelop neurons in the central nervous system

TEST 2012

42. In humans approximately 75% of the circulating antibodies belong to the class:

- A. Ig G
- B. Ig D
- C. Ig A
- D. Ig E

43. The muscle that contracts to produce a particular action is known as the:

- A. Agonist
- B. Protagonist
- C. Extensor
- D. Antagonist

44. The presence of acidic chyme acting on the mucosa of the duodenum stimulates release of the hormone:

- A. Secretin
- B. Gastric inhibitory peptide
- C. Cholecystokinin
- D. Gastrin

45. Antidiuretic hormone (ADH):

- A. Increases sodium reabsorption
- B. Targets blood vessels
- C. Increases the permeability of collecting tubules to water
- D. Is produced by the adrenal glands

46. An enzyme:

- A. Change usually ends in “use”
- B. Increases the activation energy needed to initiate a chemical reaction
- C. Is permanently altered and cannot be reused
- D. Can promote only a chemical reaction that could also proceed without it

47. Lipid soluble hormones:

- A. Are hydrophilic
- B. Bind to receptors on the surface of the target cell
- C. Pass through the cell membrane of the target cell
- D. Do not enter the target cell

TEST 2012

48. Injury or removal of the cerebellum results in:

- A. Irregular sleep cycles
- B. Inability to regulate respiration
- C. Impaired muscle coordination
- D. Inability to swallow

49. The system that maintains water and ionic balance of tissues and transport of oxygen, nutrients, hormones and wastes is the.....system:

- A. Lymphatic
- B. Respiratory
- C. Urinary
- D. Circulatory

50. Peroxisomes are found in large numbers in cells that synthesize, store or degrade:

- A. Proteins
- B. Lipids
- C. Nucleic acids
- D. Carbohydrates

KEY 2012 TEST

**1B; 2D; 3A; 4A; 5C; 6A; 7D; 8D; 9B; 10A; 11C; 12A; 13B; 14D; 15D; 16A; 17C; 18A;
19A; 20C; 21A; 22D; 23B; 24A; 25B; 26C; 27B; 28C; 29C; 30B; 31D; 32A; 33B; 34D;
35C; 36D; 37B; 38D; 39C; 40A; 41C; 42A; 43A; 44A; 45C; 46D; 47C; 48C; 49D; 50B**

TEST 2011

1. In a eukaryotic cell, glycolysis takes place:

- A. In the mitochondrial matrix
- B. On the cell membrane
- C. In the cytoplasm
- D. In the inner mitochondrial membrane

2. The blood components that take part in coagulation (clotting) of blood are called:

- A. Gamma globulins
- B. Erythrocytes
- C. Leukocytes
- D. Thrombocytes

3. Heterochromatin:

- A. Is usually transcribed
- B. Is associated with active genes
- C. Can be observed as a Barr body when one of two X chromosomes in female mammals is inactive
- D. Is a loosely packed chromatin structure

4. Bovine spongiform encephalopathy is caused by a:

- A. Bacteriophage
- B. Virus
- C. Viroid
- D. Prion

5. Epithelium equipped with cilia is located:

- A. In the alimentary canal, where cilia transport food
- B. In the respiratory tract, where cilia transport dust particles
- C. In the urinary tract, where cilia transport urine
- D. In all the above tracts

6. Removal of the occipital lobes of the cerebral cortex results in:

- A. Blindness
- B. Inability to perceive sensations such as hot and cold
- C. Loss of the sense of smell
- D. Decrease in the auditory acuity in both ears

TEST 2011**7. Indicate a true statement:**

- A. Antibody labels antigen for degradation
- B. Antibody destroys antigen
- C. Antigen binds only to an antibody attached to a cell membrane
- D. Antigen binds to Fc portion of the antibody

8. Growth hormone is referred to as an anabolic hormone because:

- A. Secretion of this hormone inhibits release of other hormones
- B. It stimulates decomposition of bone tissue
- C. It promotes protein synthesis
- D. It causes the growth plates in long bones to ossify

9. In the renal tubules, two hormones play a role in determining the final volume and sodium concentration of urine. The hormone(1).... regulates sodium reabsorption, while ... (2)... regulates water reabsorption.

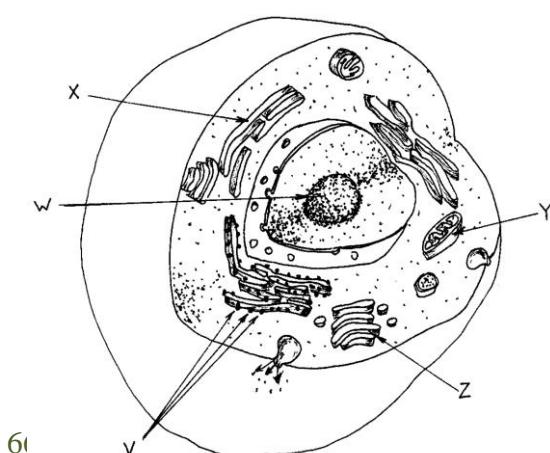
- A. 1- aldosterone; 2- antidiuretic hormone (ADH)
- B. 1- cortisol; 2- adrenocorticotrophic hormone (ACTH)
- C. 1- renin; 2- antidiuretic hormone (ADH)
- D. 1- aldosterone; 2- epinephrine

10. Urobilinogen, which is converted to yellow urobilin, giving urine its characteristic color, is generated in the course of degradation of:

- A. Hemoglobin
- B. Nucleic acids
- C. Urea
- D. Creatine

11. This cell structure is responsible for formation of secretory vesicles containing proteins such as hormones, blood plasma proteins, and digestive enzymes. It is marked as:

- A. X
- B. Y
- C. Z
- D. V



TEST 2011**12. Mitochondria are the site of all of the following processes EXCEPT:**

- A. ATP synthesis
- B. DNA synthesis
- C. Calcium storage
- D. Detoxification of exogenous compounds

13. The primary mechanism by which the plasma membrane is replaced is:

- A. Exocytosis
- B. Pinocytosis
- C. Phagocytosis
- D. Endocytosis

14. A recombinant DNA can be introduced into cells of eukaryotic organisms by using:

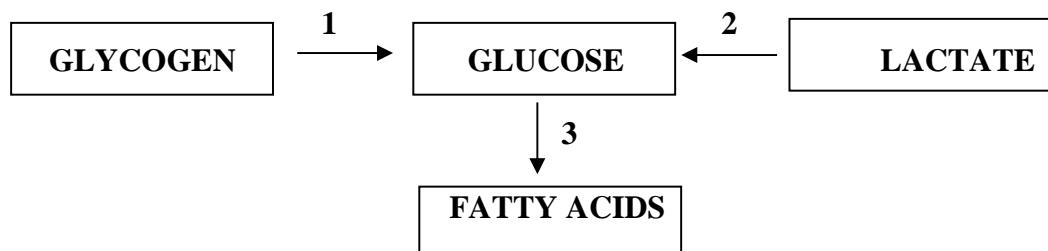
- A. Bacterial cell
- B. Virus
- C. Fungal cell
- D. Protozoan

15. The function of the parietal cells in the stomach is the secretion of:

- A. Mucus
- B. Pepsinogen
- C. Amylase
- D. Hydrochloric acid

16. Hormone secreted by this organ initiates an alarm reaction that enables a person to think quicker, fight harder or run faster than usual:

- A. Pancreas
- B. Adrenal medulla
- C. Thyroid
- D. Hypothalamus

17. Which of the following reactions is not possible during fasting?

- A. Reaction 1
- B. Reaction 1 and 2
- C. Reaction 3
- D. Reaction 2 and 3

TEST 2011

18. Metabolism consists of two opposite processes, ie. catabolism and anabolism. The catabolic pathway is:

- A. Synthesis of glycogen
- B. Aerobic respiration
- C. Photosynthesis
- D. Urea cycle

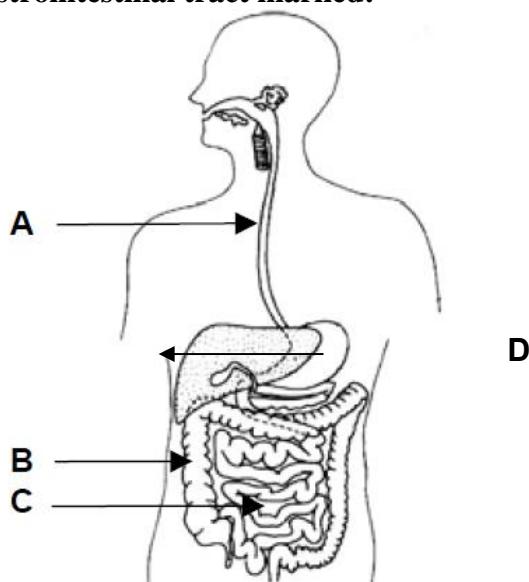
19. Oxidative phosphorylation:

- A. Does not require oxygen
- B. Undergoes most efficiently in cytoplasm due to glycolysis
- C. Is responsible for a small percentage of synthesized ATP in respect of the needs of a cell
- D. Requires the electron transport chain

20. A coenzyme is a:

- A. Protein part of enzyme
- B. Nonprotein part tightly bound to enzyme
- C. Immature form of enzyme
- D. Small organic molecule that functions with an enzyme in the catalytic process.

21. Absorption of most of the digestion products takes place in the part of gastrointestinal tract marked:



TEST 2011

- A. A
- B. B
- C. C
- D. D

22. Which cell is involved in bone resorption?

- A. Osteocyte
- B. Osteoclast
- C. Osteoblast
- D. Osteoid

23. All the following statements describe an operon EXCEPT:

- A. It is involved in the regulation of eukaryotic gene expression
- B. It contains control sequences such as an operator
- C. It is expected to code for polycistronic mRNA
- D. It includes structural genes

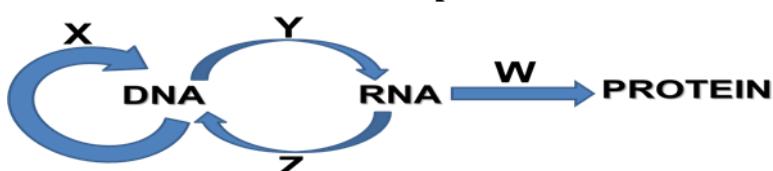
24. All the following statements about restriction enzymes are true EXCEPT:

- A. Development of recombinant DNA methodologies is based on discovery of the enzymes
- B. These enzymes are endonucleases that cleave double-stranded DNA into smaller fragments
- C. They recognize specific short nucleotide sequences which exhibit two-fold rotational symmetry (palindromes)
- D. These enzymes are produced by bacteriophages

25. A codon is:

- A. A three-base nucleotide sequence in tRNA
- B. A three-base nucleotide sequence in mRNA
- C. A three-base nucleotide sequence in DNA
- D. The whole information, required for the synthesis of a single protein

26. Choose the correct names of the processes shown in the scheme below:

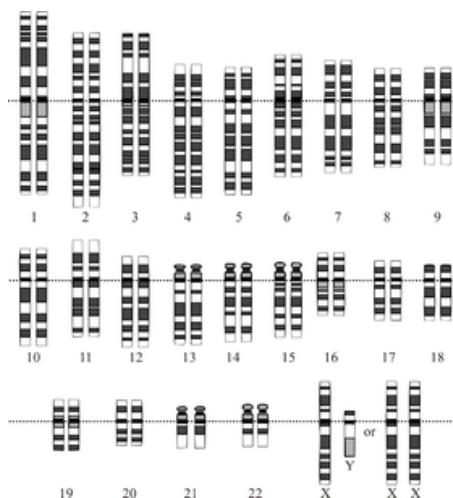


TEST 2011

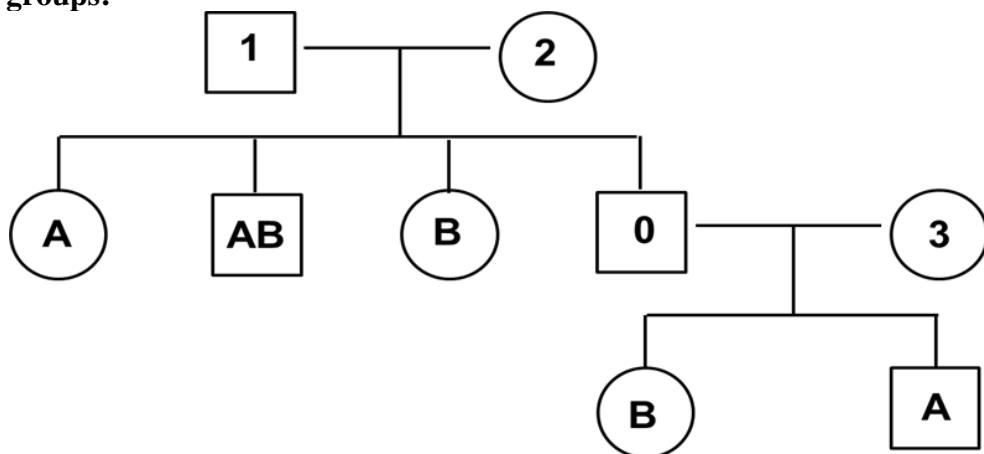
- A. X - replication; Z - reverse transcription; W - translation
- B. Z - replication; Y - transcription; W - translation
- C. X - replication; Z - transcription; W - translation
- D. X - reverse transcription; Z - replication; W - translation

27. Human chromosomes can be classified into three types. Find the correct classification for chromosomes: 12; 15; Y. See the scheme below.

- A. 12 - metacentric; 15 - acrocentric; Y - submetacentric
- B. 12 - acrocentric; 15 - metacentric; Y - submetacentric
- C. 12 - submetacentric; 15 - acrocentric; Y - acrocentric
- D. 12 - acrocentric; 15 - submetacentric; Y - metacentric



28. The diagram below shows the inheritance of blood groups in a family. Circles denote females, squares denote males. The persons marked 1; 2; 3 have the following blood groups:



TEST 2011

- A. 1-A; 2-B; 3-AB
- B. 1-B; 2-AB; 3-AB
- C. 1-AB; 2-0; 3-AB
- D. 1-A; 2-B; 3-0

29. The base sequence of DNA strand used as a template for transcription is 5'AGTCATC3'. What is the base sequence of the RNA product? (Note: remember that RNA polymerase synthesize RNA in 5' – 3' direction).

- A. 5'UCAGUAG3'
- B. 5'GAUGACU3'
- C. 5'TCAGTAC3'
- D. 5'GATGACT3'

30. This molecule helps the muscle cell regenerate ATP from ADP, so that energy is always available for muscle contraction:

- A. Creatine phosphate
- B. Phosphokinase
- C. Botulin
- D. Acetylcholinesterase

31. Which type of tissue protects, absorbs, secretes and excretes?

- A. Connective
- B. Muscle
- C. Epithelial
- D. Nervous

32. Neuroglial cells help neurons in each of the following ways EXCEPT:

- A. By supporting and binding nervous tissue
- B. By phagocytosis
- C. By playing a role in cell to cell communication
- D. By transmitting nerve impulses

TEST 2011

33. How does the physiology of muscle contraction differ between smooth and skeletal muscle?

- A. Smooth muscle contracts faster than skeletal muscle
- B. Skeletal muscle can change length without changing tension
- C. Smooth muscle responds to one neurotransmitter, while skeletal muscle responds to two
- D. A number of hormones cause smooth muscle but not skeletal muscle to contract

34. The bicuspid (mitral) valve:

- A. Separates the left atrium from ventricle
- B. Guards the entrance to the aorta
- C. Guards the entrance to the pulmonary trunk
- D. Separates the right atrium from ventricle

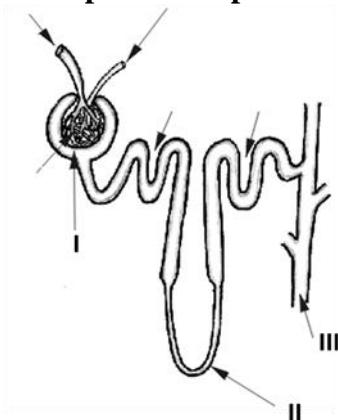
35. Freshly oxygenated blood enters the heart through(1)..... and is pumped out to(2).....

- A. 1 - right atrium, 2 - aorta
- B. 1 - left atrium, 2 - aorta
- C. 1 - right ventricle, 2 - pulmonary arteries
- D. 1 - left ventricle, 2 - pulmonary arteries

36. In blood, oxygen is primarily transported ... (1)....while the bulk of carbon dioxide is transported(2)....

- A. 1 - as deoxyhemoglobin; 2 - as carbon dioxide dissolved in the plasma
- B. 1 - in association with hemoglobin; 2 - as carbaminohemoglobin
- C. 1 - as oxyhemoglobin; 2 - as bicarbonate ions
- D. 1 - dissolved in the plasma; 2 - as carbaminohemoglobin

37. Choose the correct description of nephron components:



TEST 2011

- A. I - Bowman's capsule; II - proximal tubule; III – distal tubule
- B. I - loop of Henle; II - proximal tubule; III - collecting tubule
- C. I - Bowman's capsule; II - proximal tubule; III - collecting tubule
- D. I - Bowman's capsule; II - loop of Henle; III - collecting tubule

38. In the kidney, tubular reabsorption is responsible for retaining compounds the body requires. Most tubular reabsorption occurs in the where microvilli increase the surface area available for reabsorption.

- A. Distal convoluted tubule
- B. Proximal convoluted tubule
- C. Collecting tubule
- D. Loop of Henle

39. What function(s) is/are attributed to the endocrine system and its hormones?

- A. They play vital roles in development, growth and reproduction
- B. They control the rates of certain metabolic reactions
- C. They carry signals to generate some sort of alterations at the cellular level
- D. All answers are correct

40. Which part of the alimentary system serves as a passageway for food but produces no digestive enzymes?

- A. Oral cavity
- B. Esophagus
- C. Stomach
- D. Small intestine

41. In metabolic processes enzymes:

- A. Lower the energy of activation
- B. Act as substrate molecules
- C. Catalyse otherwise impossible reactions
- D. All of these are correct

TEST 2011

42. What is the overall purpose of anaerobic and aerobic respiration?

- A. To store nutrients in cells
- B. To release energy from food and convert it to a form cells can use
- C. To prevent formation of keton bodies
- D. To digest food

43. A new miracle skin cream which is supposed to stimulate collagen production recently hit the beauty counters. Which cells does it supposedly stimulate?

- A. Keratinocytes
- B. Melanocytes
- C. Merkel cells
- D. Fibroblasts

44. What is true about vitamins B as a group?

- A. They are fat-soluble
- B. They are synthesized by human tissues
- C. They generally function as precursors of coenzymes in metabolic pathways
- D. They are stored for long periods in the body

45. In what way does the liver aid digestion?

- A. It produces digestive enzymes
- B. It produces acidic solution to facilitate digestion
- C. It produces bile to emulsify fats in the duodenum
- D. All of these are correct

46. In the pancreas,(1)..... cells produce insulin, which(2)..... blood level of glucose.

- A. 1 - delta; 2 - raises
- B. 1 - alpha; 2 - lowers
- C. 1 - beta; 2 - lowers
- D. 1 - alpha; 2 - raises

47. Which hormone helps to regulate circadian rhythms in humans?

- A. Thymosin
- B. Melatonin
- C. Progesterone
- D. FSH

TEST 2011

48. All the features listed below are characteristic for a cell membrane EXCEPT:

- A. It is selectively permeable
- B. It contains one type of lipids (phospholipids)
- C. Carbohydrates on the surface help cells to recognize each other
- D. Many kinds of proteins are embedded in the membrane

49. What is the role of the thymus in protecting the body against disease?

- A. It is a site of maturation of T lymphocytes
- B. It is a site of production and maturation of B lymphocytes
- C. Macrophages and monocytes are produced here and migrate to other tissues of the body
- D. All statements are correct

50. Choose the correct statement:

- A. Antigens are proteins, polysaccharides, glycoproteins or glycolipds that stimulate the immune response
- B. Antigens occur only in bacteria and other pathogens
- C. Antigens are produced in response to introduction of a foreign protein into an animal
- D. All statements are correct

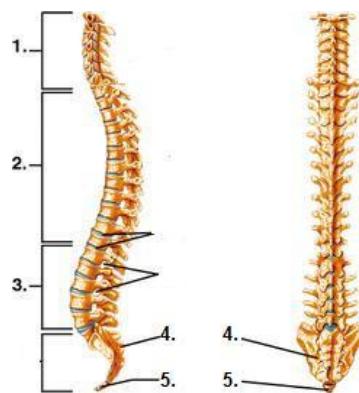
51. The HIV virus destroys these cells leading to the development of AIDS:

- A. B lymphocytes
- B. Macrophages
- C. Plasma cells
- D. T helper lymphocytes

52. Choose the correct description of the illustrated spine structures:

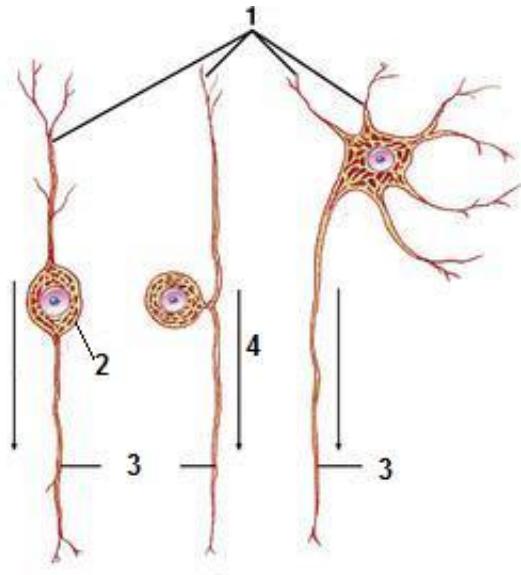
- A. 1 - cervical vertebrae; 2 - thoracic vertebrae; 3 - sacral vertebrae
- B. 3 - lumbar vertebrae; 4 - coccyx; 5 - sacrum
- C. 2 - thoracic vertebrae; 4 - sacrum; 5 - coccyx
- D. 1 - cervical vertebrae; 2 - thoracic vertebrae; 3 - pelvic vertebrae

TEST 2011



53. In the illustrated nerve cell types, arrows show direction of impulse. Choose the correct statement:

- A. 1 - are dendrites; 3 - are axons
- B. 1 - are axons; 3 - are dendrites
- C. It is impossible to tell because impulse can run in both directions
- D. The middle cell does not exist because impulse must always pass through the cell body



54. The cones in the eye are responsible for:

- A. Focusing the light on the retina
- B. Synthesis of rodopsin
- C. Night and peripheral vision
- D. Color vision

55. Conversion of sound waves into impulses transmitted to the brain via acoustic nerve takes place in:

- A. Auditory canal
- B. Semicircular canals
- C. Middle ear
- D. Cochlea

KEY TEST 2011

**1C; 2D; 3C; 4D; 5B; 6A; 7A; 8C; 9A; 10A; 11C; 12D; 13A; 14B; 15D; 16B; 17C; 18B;
19D; 20D; 21C; 22B; 23A; 24D; 25B; 26A; 27C; 28A; 29B; 30A; 31C; 32D; 33D; 34A;
35B; 36C; 37D; 38B; 39D; 40B; 41A; 42B; 43D; 44C; 45C; 46C; 47B; 48B; 49A; 50A;
51D; 52C; 53A; 54D; 55D**

TEST 2010

- 1. In a state of stress or fear, the human adrenal gland produces epinephrine which can cause:**
 - A. increased blood pressure,
 - B. decreased breathing rate,
 - C. increased production of red blood cells,
 - D. decreased heart rate.

- 2. The following organelles best show that plant cells can perform functions different from those of most of animal cells:**
 - A. Cytoplasm and mitochondria,
 - B. Chloroplast and cell walls,
 - C. Nuclei and centriole,
 - D. Ribosomes and cell membranes.

- 3. Two plants are crossed, and the traits of height and color are assessed in the offspring. The following crossing was conducted: $TPP \times tpp$.**
T = dominant allele for height (tall plant)
t = recessive allele for height (short plant)
P = dominant allele for color (purple)
p = recessive allele for color (white)
Which of the following statements correctly describes the offspring?
 - A. Three-quarters of the plants are tall and purple.
 - B. Three-quarters of the plants are short and white.
 - C. All are short and white.
 - D. All are tall and purple.

- 4. In humans, meiosis occurs in:**
 - A. testis,
 - B. liver,
 - C. skin,
 - D. pancreas.

- 5. When an animal eats, food remains in the stomach for a certain period of time. When a unicellular organism, such as Paramecium, takes in food, it is contained in which organelle?**
 - A. Chloroplast,
 - B. Mitochondrion,
 - C. Nucleus,
 - D. Vacuole

- 6. Which of the sentences below is true:**
 - A. Enzymes function only in higher animals, and not in bacteria.
 - B. Only fibrous proteins can act as enzymes.
 - C. Enzymes act as catalysts to accelerate chemical reaction of a body.
 - D. Enzymes are irreversibly lost during a reaction.

TEST 2010

- 7. The following cell type is most abundant in neuroglia:**
 - A. Astrocytes,
 - B. Oligodendrocytes,
 - C. Microglia,
 - D. Schwann cells
- 8. In the human body, muscle cells have an increased need for energy during exercise. To supply this energy, the body will immediately increase:**
 - A. food intake,
 - B. retention of waste products,
 - C. activity of the nervous system to stimulate intake of carbon dioxide,
 - D. the breathing rate to supply more oxygen to cells.
- 9. Toxic molecules are converted to nontoxic derivatives in the:**
 - A. Smooth endoplasmic reticulum,
 - B. Vacuoles,
 - C. Nucleus,
 - D. Mitochondria.
- 10. The medulla oblongata contains the nerve centers controlling:**
 - A. breathing,
 - B. locomotion,
 - C. digestion,
 - D. balance of the body.
- 11. All hormones react to negative feedback EXCEPT:**
 - A. progesterone,
 - B. estrogen,
 - C. prolactin,
 - D. oxytocin.
- 12. Cells lacking membrane-bound internal organelles, as observed under a microscope, most likely are:**
 - A. Plant cells,
 - B. Animal cells,
 - C. Eucaryotic cells,
 - D. Prokaryotic cells.
- 13. The following is an example of a genetically engineered organism:**
 - A. A plant that received external DNA to produce natural insecticides.
 - B. A new plant created by various cross-pollinations.
 - C. A plant with natural medicinal properties.
 - D. Seedless fruits resulting from grafting of one plant onto another.

TEST 2010

14. A chart of human chromosome pairs is called a karyotype. What information is revealed in the karyotype shown in the figure below?

- A. Sex,
- B. Trisomy,
- C. Age,
- D. Gene dominance.

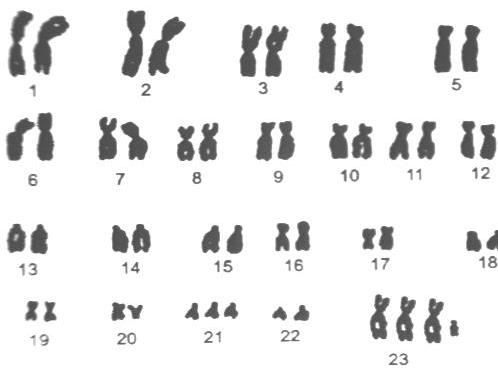


15. The major function of the valves in the human veins is:

- A. slowing red blood cells down,
- B. reducing the back flow of blood,
- C. adding oxygen to blood plasma,
- D. preventing movement of blood clots.

16. How many Barr bodies are expected in a patient with the karyotype presented below?

- A. 1,
- B. 2,
- C. 3,
- D. 0



17. Lipids and carbohydrates are important in animal cells because they both:

- A. are a storage form of energy,
- B. provide insulation,
- C. form cell walls,
- D. contain nitrogen.

18. Bones do all of the following EXCEPT:

- A. protect organs,
- B. produce blood cells,
- C. store calcium,
- D. produce cholesterol.

19. Cells present in blood most abundantly are:

- A. erythrocytes,
- B. neutrophils,
- C. lymphocytes,
- D. platelets.

TEST 2010

20. Amino acids are linked together by peptide bonds to form proteins. In which cellular organelle would this process occur?

- A. Nucleus,
- B. Golgi body,
- C. Ribosome,
- D. Lysosome.

21. Environmental factors such as high energy radiation or chemicals can cause mutation. For a mutation to pass on to an offspring, it must occur in a:

- A. germinal cell,
- B. muscle cell,
- C. bone cell,
- D. any cell in the body.

22. Secretory proteins are released from cells by a process called:

- A. Exocytosis,
- B. Phagocytosis,
- C. Endocytosis,
- D. Pinocytosis.

23. Mother's blood group is B, and father's group is A. Their child's blood group will be:

- A. only A or B,
- B. only AB,
- C. one of three : A, B, AB,
- D. one of four : A, B, AB, 0

24. Epidermis originates from this same embryonic layer as:

- A. brain,
- B. dermis,
- C. lung,
- D. kidney.

25. After an initial infection B-cells recognize the measles virus. How is this helpful in the human immune response?

- A. B-cells use this recognition to defend the body against other pathogens such as bacteria,
- B. B-cells recognize and respond quicker to any other virus that would invade the body,
- C. B-cells produce antibodies quicker if the measles virus is encountered again,
- D. B-cells activate macrophages which will destroy the viruses.

26. Humans are important to the life cycle of malaria parasites because malaria parasites:

- A. kill humans,
- B. only live in human cells,
- C. can live in mutual symbiosis with humans,
- D. use humans for reproductive purposes.

TEST 2010

27. One of the parents of a child has phenylketonuria (PKU), which is caused by recessive alleles. The other parent does not have the PKU alleles. What is the chance that the couple will have a child with phenylketonuria?

- A. 0%
- B. 50%
- C. 75%
- D. 100%

28. The table shows the list of messenger RNA codes. A strand of coding DNA with the sequence AGA AAC CCC undergoes a mutation, and the first A is replaced by a C. How will this mutation affect the amino acid sequence?

- A. One amino acid will change,
- B. Two amino acids will change,
- C. All of the amino acids will change,
- D. The amino acids will remain the same.

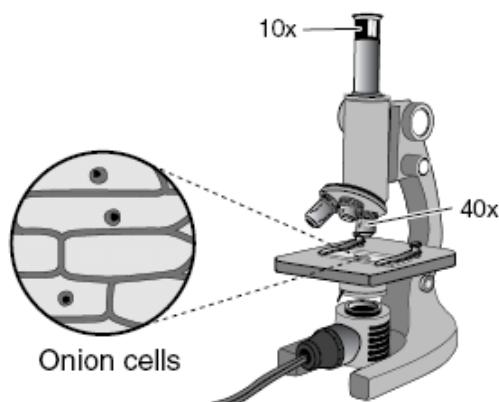
29. Iodine is added to table salt to prevent:

- A. Diabetes,
- B. Simple goiters,
- C. Addison's disease,
- D. Cushing syndrome.

	U	C	A	G
U	UUU Phe UUC Phe UUA Leu UUG Leu	UCU Ser UCC Ser UCA Ser UCG Ser	UAU Tyr UAC Tyr UAA Stop UAG Stop	UGU Cys UGC Cys UGA Stop UGG Trp
C	CUU Leu CUC Leu CUA Leu CUG Leu	CCU Pro CCC Pro CCA Pro CCG Pro	CAU His CAC His CAA Gln CAG Gln	CGU Arg CGC Arg CGA Arg CGG Arg
A	AUU Ile AUC Ile AUA Ile AUG Met	ACU Thr ACC Thr ACA Thr ACG Thr	AAU Asn AAC Asn AAA Lys AAG Lys	AGU Ser AGC Ser AGA Arg AGG Arg
G	GUU Val GUC Val GUA Val GUG Val	GCU Ala GCC Ala GCA Ala GCG Ala	GAU Asp GAC Asp GAA Glu GAG Glu	GGU Gly GGC Gly GGA Gly GGG Gly

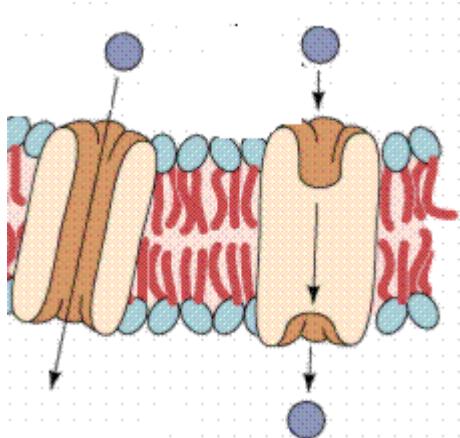
30. What is the total magnification used to view onion cells through this microscope setup?

- A. 40x
- B. 10x
- C. 400x
- D. 50x



TEST 2010

31. The diagram shows a section of a cell membrane that includes a channel protein. The function of this protein is to:



- A. Transport proteins across the cell membrane,
- B. Transport ions across the cell membrane,
- C. Transport organelles across the cells membrane,
- D. All answers correct.

32. In eukaryotic cells, the structure(s) that contain(s) its (their) own DNA is (are) the:

- A. Mitochondrion,
- B. Chloroplast,
- C. Nucleus,
- D. All of the above.

33. Which cell structure contains a hydrolytic enzyme associated with intracellular digestion of macromolecules?

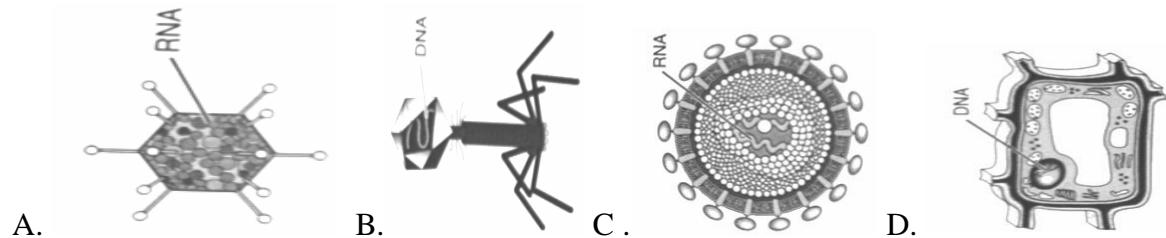
- A. Lysosome,
- B. Nucleolus,
- C. Peroxisome,
- D. Ribosome.

34. In humans, glucose is kept in balance in the bloodstream by insulin. Which concept best illustrates that phenomenon?

- A. Adaptation,
- B. Homeostasis,
- C. Metabolism,
- D. Organization.

35. What system has little to contribute to the homeostasis of the human organism?

- A. urinary system,
- B. reproductive system,
- C. respiratory system,
- D. nervous system.

TEST 2010**36. Which of these could not be a virus?****37. The common intermediate of carbohydrate, protein and lipid metabolism is:**

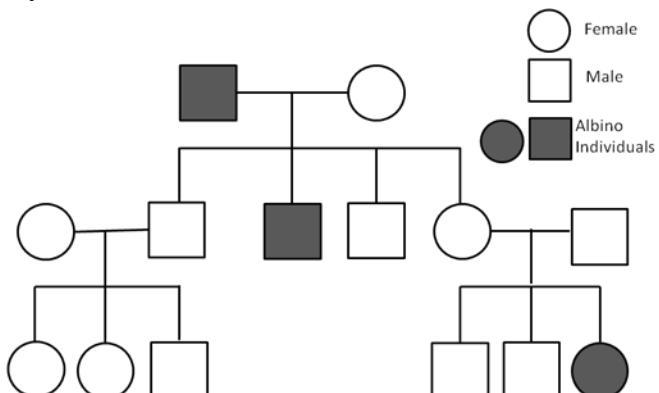
- A. Ammonia,
- B. Pyruvic acid,
- C. Acetyl CoA,
- D. ATP.

38. Glycogen stored in which of the following tissues can be used to elevate glucose concentration in the blood?

- A. liver,
- B. heart,
- C. skeletal muscles,
- D. all of the above.

39. Albino individuals lack all pigmentation, thus their hair and skin are white or pale. This family tree shows that albinism is:

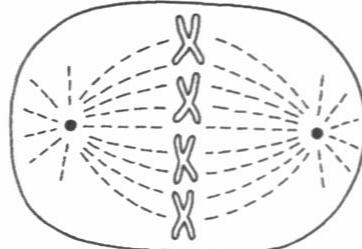
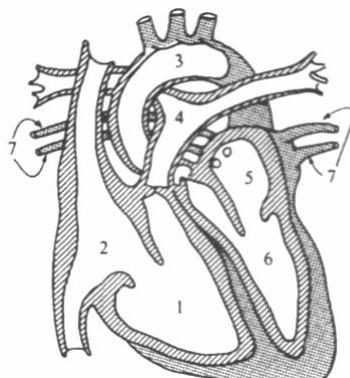
- A. carried only by females in this family,
- B. a recessive genetic trait,
- C. a sex-linked gene,
- D. a dominant genetic trait.



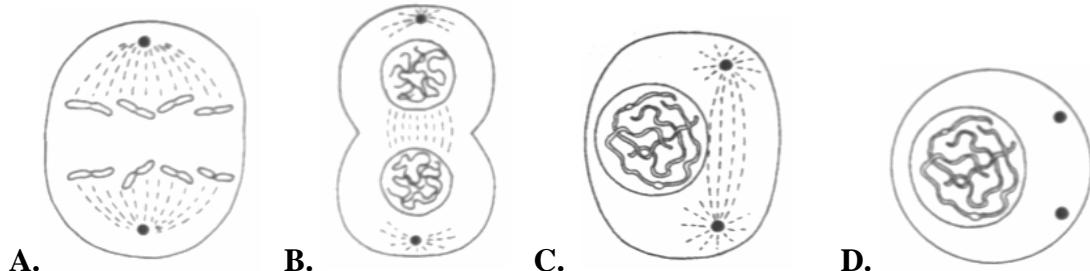
TEST 2010

40. Chambers and vessels that carry oxygenated blood include the following:

- A. 3, 5 and 6,
- B. 1 and 2,
- C. 5 and 6,
- D. 1,2 and 3



41. The next phase of mitosis will be:



42. Lactic acid:

- A. is produced as a result of aerobic metabolism of glucose,
- B. is the normal end product of glycolysis in red blood cells,
- C. is always produced in muscle cells,
- D. none of the above.

43. Any macromolecule that induces an immune response is called:

- A. an antigen,
- B. an antibody,
- C. an immunoglobulin,
- D. a serum.

TEST 2010

44. Pituitary gland produces:

- A. Tyroxine,
- B. Parathormone,
- C. Adrenocorticotrophic hormone (ACTH),
- D. Melatonin.

45. Which eye structure determines a person's eye color?

- A. lens,
- B. iris,
- C. retina,
- D. cornea.

46. It is true that vitamin D:

- A. is water-soluble,
- B. is essential for blood clotting,
- C. is a dietary requirement only in individuals with limited exposure to sunlight,
- D. deficiency results in scurvy.

47. Which of these is part of the middle ear?

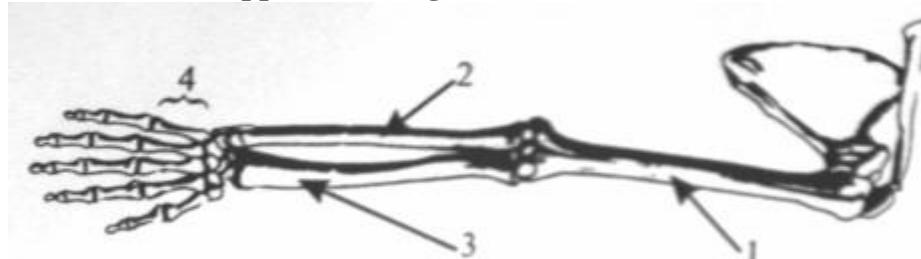
- A. Anvil,
- B. Cochlea,
- C. Vestibule,
- D. Auditory canal.

48. Urea is produced in the:

- A. Nephron,
- B. Bowman's capsule,
- C. Urinary bladder,
- D. Liver.

49. Bone marked as number 3 in the upper limb diagram is:

- A. Humerus,
- B. Radius,
- C. Ulna,
- D. Fibula.



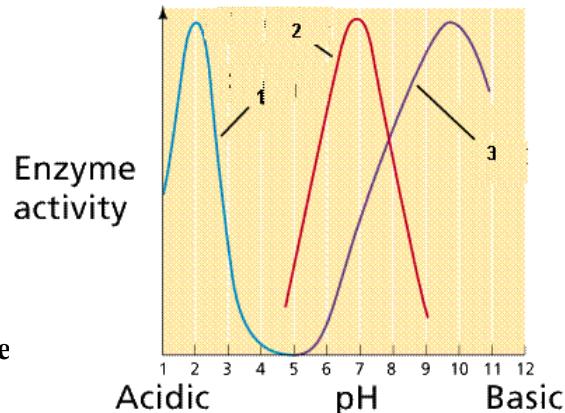
50. Programmed cell death is called:

- A. Symbiosis,
- B. Apoptosis,
- C. Necrosis,
- D. Cytotoxicity.

TEST 2010

51. Different enzymes vary in their optimal pH – pH at which they show the highest activity. Choose the set that concerns pH optima of enzymes 1, 2, and 3 shown in the figure:

- A. 1-salivary amylase; 2-trypsin; 3-pepsin,
- B. 1- pepsin; 2-salivary amylase; 3- arginase,
- C. 1-trypsin; 2-pepsin; 3-salivary amylase,
- D. 1-arginase; 2-pepsin; 3 - trypsin.



52. Which of the following bones can be found in the

- A. Sternalum,
- B. Fibula,
- C. Clavicle,
- D. Coccyx.

53. Which one of the following tissues has more cells than matrix (per volume)?

- A. Cartilage,
- B. Adipose tissue,
- C. Blood,
- D. Bone tissue.

54. The following part of the human brain connects the endocrine and nervous systems:

- A. Hypothalamus,
- B. Cerebellum,
- C. Medulla oblongata,
- D. Cerebrum.

55. The substances in question are very effective antioxidants, and help prevent cancer. Yellow, orange and dark green vegetables are generally good sources of them.

- A. Vitamin E,
- B. Fats,
- C. Proteins,
- D. Carotenoids.

TEST 2010 KEY

**1A; 2B; 3D; 4A; 5D; 6C; 7A; 8D; 9A; 10A; 11D; 12D; 13A; 14A; 15B; 16B; 17A; 18D;
19A; 20C; 21A; 22A; 23D; 24A; 25C; 26D; 27A; 28D; 29B; 30C; 31B; 32D; 33A; 34B;
35B; 36D; 37C; 38A; 39B; 40A; 41A; 42B; 43A; 44C; 45B; 46C; 47A; 48D; 49B; 50B;
51B; 52D; 53B; 54A; 55D**