

ACE – “Academic Challenge”

Biology Test (State) – 2020

1. Integrins are ____.
 - a. composed of polysaccharides
 - b. proteins that organize the cell's matrix
 - c. carbohydrates that allow for cells to adhere to each other
 - d. receptor proteins
 - e. All of the above are correct.

2. The point at which the esophagus passes through the diaphragm is called the ____.
 - a. esophageal hiatus
 - b. pyloric sphincter
 - c. cardiac sphincter
 - d. vermiform appendix
 - e. ileocecal valve

3. Which animal is **incorrectly** matched to their respiratory structure?
 - a. centipede – tracheae
 - b. grasshopper – book lungs
 - c. earthworms – skin
 - d. sea star – dermal gills
 - e. lamprey – gills

4. Telomerase is usually **not** present in ____.
 - a. blood cells
 - b. skin cells
 - c. cells lining the intestines
 - d. cells that produce eggs
 - e. muscle cells

5. Which is **not** a correct association?
 - a. double fertilization – angiosperms
 - b. cones – gymnosperms
 - c. prothallus – ferns
 - d. protonema – moss
 - e. liverworts – roots

6. Which of the following is an active transport mechanism involving a protein?
 - a. facilitated diffusion
 - b. sodium potassium pump
 - c. peristalsis
 - d. osmosis
 - e. None of the above are correct.

7. Researchers wanted to determine the effects of various quantities of artificial sweeteners on mice populations and measure the incidence of tumor growth in relationship to consumption. During scientific investigation, place the following in the correct sequence:
- Record tumor growth or size.
 - Feed mice different concentrations of sweeteners.
 - Determine the relationship between sweeteners and tumor growth.
 - Develop a hypothesis.
 - Ask a question.

Select the correct sequence:

- 1 – ii; 2 – iv; 3 – iii; 4 – i; 5 – v
 - 1 – iii; 2 – iv; 3 – ii; 4 – i; 5 – v
 - 1 – v; 2 – iii; 3 – ii; 4 – i; 5 – iv
 - 1 – v; 2 – iv; 3 – iii; 4 – ii; 5 – i
 - 1 – v; 2 – iv; 3 – ii; 4 – i; 5 – iii
8. The ____ gene is the major male-determining gene on the Y human chromosome.
- SRY
 - BRACA1
 - OCA2
 - CFTR
 - APOE
9. For long distance or marathon runners, which of the following would be correct?
- They would utilize fast twitch fibers mostly for endurance.
 - Following oxygen debt they would develop lactic acid build up in their muscles.
 - Stores of ATP and myoglobin would be useful.
 - Both b and c are correct.
 - All of the above are correct.
10. Which of the following would **not** be a component of a nucleotide?
- ribose
 - uracil
 - phosphate group
 - amino group
 - Both c and d are not correct.
11. Which is **not** a correct association of plant and seed dispersal?
- maple trees – wind
 - burdock burs – attaching to animal fur
 - dandelions – explosive dehiscence
 - acorns – are buried by squirrels
 - coconut – water dispersal

12. Which of the following would be the most diverse group of organic compounds?
- nutrients
 - carbohydrates
 - lipids
 - proteins
 - nucleic acids
13. Which of the following is true of the mitochondria?
- It is passed to offspring only by the female parent.
 - Protein synthesis occurs along its stroma.
 - Cristae project into the matrix.
 - Both a and c are correct.
 - All of the above, are correct.
14. Which is **not** correctly matched?
- silverfish marching with army ants – commensalism
 - nitrogen-fixing bacteria and nodules of roots in legume – mutualism
 - animals eating plants – predation
 - lamprey and fish – ectoparasite
 - All of the above are correctly matched.
15. ____ is found in the cell wall fungi and exoskeleton of insects.
- Chitin
 - Glycogen
 - Trans fats
 - Starch
 - Insulin
16. Retrotransposons ____.
- encode the enzyme reverse transcriptase
 - are found in humans
 - replicate by first forming an RNA intermediate
 - increase the chance of mutation
 - All of the above are correct.
17. Cladograms are constructed by determining ____.
- what homoplastic structures are present between the organisms
 - shared derived characters
 - the rate of evolution
 - if the organism contains both DNA and RNA
 - All of the above are correct.
18. Which of the following is **not** true?
- Eukaryotic cells may have both a cell wall and nucleus.
 - E. coli* is both bacteria and prokaryotic.
 - Apoptosis is rare in human cells.
 - Both a and b.
 - All of the above are true.

19. An amino acid is to proteins, as _____.

- a. glucose is to starch
- b. nucleotide is to polypeptide
- c. nucleic acid is to polypeptide
- d. polypeptide is to glycogen
- e. amino acid is to cellulose

20. Match the tissue type in **Column A**, with its location from **Column B**.

Column A

- 1. Simple cuboidal epithelium
- 2. Transitional epithelium
- 3. Fibrocartilage
- 4. Elastic cartilage
- 5. Simple squamous epithelium

Column B

- i. pubic symphysis
- ii. ears
- iii. kidney tubules
- iv. lung alveoli
- v. urinary bladder

Select the correct matching sequence:

- a. 1 – ii; 2 – v; 3 – iii; 4 – i; 5 – iv
- b. 1 – iii; 2 – iv; 3 – i; 4 – ii; 5 – v
- c. 1 – iii; 2 – v; 3 – i; 4 – ii; 5 – iv
- d. 1 – iv; 2 – ii; 3 – v; 4 – i; 5 – iii
- e. None of the above are correct.

21. A cytotechnologist would study _____.

- a. geographical data
- b. populations
- c. volcanic ash
- d. cells
- e. None of the above are correct.

22. Which of the following would be considered polar covalent?

- a. polyunsaturated fats
- b. water molecules
- c. steroids
- d. fatty acids
- e. All of the above, except b.

23. Which of the following is **not** true?

- a. Plasmodesmata allow for rapid communication in plant tissues.
- b. Glycogen is a storage form of glucose found in human liver tissues.
- c. Gap junctions are similar to plasmodesmata.
- d. Desmosomes or anchoring junctions are found in animal tissues.
- e. A lipid known as the sodium potassium pump is very important to nerve tissue in humans.

24. Two glucose molecules joined together by dehydration reactions will form ____.
- sucrose
 - fructose
 - galactose
 - maltose
 - None of the above are correct.

25. Match the terms in **Column A**, with their definitions in **Column B**.

Column A

- Halophile
- Acidophile
- Obligate anaerobe
- Thermophile
- Psychrotroph

Column B

- Microbes that grow at 15° C
- Microbes that grow in salty conditions
- Microbes that grow in acid conditions
- Microbes that grow without oxygen
- Microbes that grow at 80° C

Select the correct matching sequence:

- 1 – ii; 2 – iv; 3 – iii; 4 – i; 5 – v
- 1 – ii; 2 – iii; 3 – iv; 4 – v; 5 – i
- 1 – v; 2 – iii; 3 – ii; 4 – i; 5 – iv
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- 1 – v; 2 – iv; 3 – ii; 4 – i; 5 – iii

26. Which of the following is **not** true of ATP?

- It is produced through cellular respiration.
- It is a product of the light dependent reactions of cellular respiration.
- It is considered the energy currency of cells.
- It is the result of phosphorylation reactions.
- It is the abbreviation for adenosine triphosphate.

27. Which of the following is **not** a true association?

- bryophytes – seeds
- archegonia – egg
- lignin- support and conduction
- antheridia – sperm
- gametangia – sex organs

28. Which is the correct order of events for the lytic cycle?

- Attachment → replication → penetration → assembly → release
- Penetration → attachment → replication → assembly → release
- Attachment → penetration → replication → assembly → release
- Release → assembly → attachment → penetration → replication
- Penetration → replication → assembly → release → attachment

29. Egg-rolling behavior in European graylag goose is an example of a/an ____.
- imprinting
 - motor program
 - classical conditioning
 - habituation
 - operant conditioning
30. A Barr body ____.
- is an inactive X chromosome
 - is not found in females with Turner syndrome
 - is found in males with Klinefelter syndrome
 - causes the fur color of a calico cat
 - All of the above are correct.
31. Which of the following is **not** correctly matched?
- Spirochaetes – at least two axial filaments
 - Cyanobacteria – heterocysts
 - Bacillus* – produce endospores
 - Streptomyces* – obligate anaerobes
 - Mycobacterium* – waxy cell wall
32. Which of the following does **not** have a four chambered heart?
- turtle
 - humans
 - cats
 - pigs
 - birds
33. Which cell type is **not** correctly matched?
- parenchyma cells – ground tissue
 - tracheids – vascular tissue
 - trichomes – vascular tissue
 - guard cells – dermal tissue
 - sclereids – ground tissue
34. Genetic recombination takes place during ____.
- during crossing – over
 - transformation
 - transduction
 - conjugation
 - All of the above are ways genetic recombination takes place.

35. Using the information in the table, which of the offspring could **not** be produced from parents with these genotypes: $X^E Y$; Pp; hh and $X^E X^e$; pp; Hh

Trait	Type of Inheritance	Symbols
Red – green colorblindness	X-linked	X^E – normal vision; X^e – colorblind
Polydactylism	Dominant	P – polydactyl; p – 5 digits
Straight hair line	Recessive	H – widow’s peak; h – straight hair line

- a colorblind son with a widow’s peak and 5 digits
 - a colorblind daughter with a widow’s peak and 5 digits
 - a normal vision daughter with a straight hair line and polydactyl
 - a normal vision son with a straight hair line and polydactyl
 - a normal vision son with a widow’s peak and 5 digits
36. Fresh water wetlands are important because they_____.
- help recharge ground water
 - help in flood control
 - are habitats for many water fowl
 - trap pollutants
 - All of the above are correct.
37. Which scientist is **not** correctly matched to his/her discovery or finding?
- Lynn Margulis – endosymbiosis theory
 - Barbara McClintock – transposition
 - Thomas Morgan – sex linkage of white eyes in fruit flies
 - Rachel Carson – discovered DNA polymerase
 - Kary Mullis – polymerase chain reaction
38. There are advantages of using rRNA sequencing to determine how closely organisms are related. Which of the following is **not** an advantage?
- All cells have ribosomes
 - rRNA genes have not changed greatly over time.
 - Cells do not have to be cultured in lab.
 - All of the above are advantages.
 - None of the above are advantages.
39. Which disease is **not** matched to the pathogen/parasite that causes it?
- Scabies – *Sarcoptes scabiei*
 - Sleeping sickness – *Trypanosoma brucei*
 - Creutzfeldt-Jakob Disease – prion
 - Plague – *Yersinia pestis*
 - Lyme Disease – *Ixodes*

40. The ____ attaches the leaf to the stem.
- stipules
 - petiole
 - blade
 - axillary bud
 - node
41. Acorn worms are classified as ____.
- hemichordates
 - protostomes
 - ecdysozoa
 - nemertean
 - lophophorates
42. Which is **not** a function calcium ions in human cells?
- microtubule disassembly
 - muscle contraction
 - blood clotting
 - neural signaling
 - All of the above are functions of calcium ions.
43. Oxidation ____.
- is a process in which electrons are given up
 - is a process in which electrons are received
 - in covalent bonds involves the removal of a hydrogen atom
 - Both a and b are both correct.
 - Both a and c are both correct.
44. Which genetic traits is **not** correctly matched to the type of inheritance?
- Cystic fibrosis – pleiotropy
 - Labrador retrievers fur color – epistasis
 - Chicken combs – epistasis
 - Duchenne muscular dystrophy – autosomal recessive trait
 - Achondroplasia – autosomal dominant trait
45. Protein synthesis in bacteria is different from eukaryotes. Which of the following does **not** apply to bacterial cells?
- The half-life of mRNA is shorter than eukaryotes.
 - introns
 - 70 S ribosomes
 - operons
 - only occurs in the cytosol

46. _____ break down proteins that are misfolded.
- Lipase
 - Proteasomes
 - Endonuclease
 - Phosphokinase
 - Oxidase
47. Which of the following is **not** true?
- Endocrine glands lack ducts.
 - Goblet cells secrete mucous.
 - Skeletal muscles are considered voluntary and under control of the autonomic nervous system.
 - Vessel constriction and dilation may occur in response to both blood pressure and body temperature.
 - Both a and b are not true.
48. Which is **not** true about the light-dependent reaction?
- Photosystem II energizes electrons first, followed by Photosystem I.
 - Water is split and oxygen is released.
 - ATP is produced by photophosphorylation.
 - Carbon dioxide is required.
 - NADPH is produced.
49. Which fruit is **not** correctly matched to their fruit type?
- Multiple fruit – pineapple
 - Aggregate fruit – blackberries
 - Legumes – corn
 - Drupe – plum
 - Simple fruit – tomato
50. Which is **not** a characteristic of Domain Archaea?
- 80s ribosomes
 - ester linkage in plasma membrane
 - histone associated with DNA
 - prokaryote
 - single chromosome