2014 Academic Challenge

BIOLOGY TEST - STATE

This Test Consists of 50 Questions

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GENERAL DIRECTIONS

Please read the following instructions carefully. This is a timed test; any instructions from the test supervisor should be followed promptly.

The test supervisor will give instructions for filling in any necessary information on the answer sheet. Most Academic Challenge sites will ask you to indicate your answer to each question by marking an oval that corresponds to the correct answer for that question. Only one oval should be marked to answer each question. Multiple ovals will automatically be graded as incorrect answers.

Be sure ovals are marked as ● , not ⊙ , ⊕ , ◑ , etc.

If you wish to change an answer, erase your first mark completely before marking your new choice.

You are advised to use your time effectively and to work as rapidly as you can without losing accuracy. Do not waste your time on questions that seem too difficult for you. Go on to the other questions, and then come back to the difficult ones later if time remains.

***** TIME: 40 MINUTES *****

DO NOT OPEN TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO!

WYSE – Academic Challenge
Biology Test (State) – 2014

1. If a buffer is to maintain a pH of 7.35, then in alkaline environments it will ____.

   a. donate hydroxyl ions
   b. accept hydrogen ions
   c. release hydrogen ions
   d. both b and c
   e. both a and c

2. Which genetic disorder is caused by nondisjunction?

   a. Tay-Sach
   b. Downs syndrome
   c. albinism
   d. Huntington's disease
   e. cystic fibrosis

3. Which of the following is true of water?

   a. Rain water is acidic.
   b. Pure water has a neutral pH.
   c. It can change rapidly from one form to another.
   d. Both a and b are true.
   e. All the above are true.

4. Which biogeochemical cycle doesn't have a gaseous component?

   a. hydrological
   b. phosphorous
   c. nitrogen
   d. carbon
   e. All of the above have a gaseous component.

5. Chitin and cellulose are ____.

   a. polysaccharides
   b. lipids
   c. proteins
   d. both a and b
   e. none of the above

6. ____ is to bacteria, as ____ is to plants.

   a. Cell wall; cell membrane
   b. Peptidoglycan; cellulose
   c. Flagella; cilia
   d. Both b and c are correct.
   e. All the above are correct.

7. ____ is to lipids, as ____ is to proteins.

   a. Non polar covalent; amino acid
   b. Polar covalent; peptide
   c. Peptide; non polar covalent
   d. Amino acid; polar covalent
   e. None of the above are correct.

8. Which of the following is **not** photosynthetic?

   a. algae
   b. cyanobacteria
   c. ferns
   d. both a and b
   e. All the above are photosynthetic.

9. Which is the correct sequence of events?

   a. Krebs cycle – glycolysis – fermentation – electron transport chain
   b. Glycolysis – electron transport chain – fermentation – Krebs cycle
   c. Electron transport chain – fermentation – glycolysis – Krebs cycle
   d. Fermentation – transition reaction – glycolysis – electron transport chain
   e. None of the above are correct.

10. If Suzy has a deficiency in human growth hormone, which gland would be responsible?

   a. pituitary
   b. parathyroid
   c. adrenal
   d. thymus
   e. pancreas

11. Water is entering a root. Pick the correct sequence of the tissue the water will enter.

   a. root hair → endodermis → cortex → pericycle → root xylem
   b. root hair → cortex → endodermis → pericycle → root xylem
   c. root xylem → cortex → endodermis → pericycle → root hair
   d. cortex → root hair → endodermis → pericycle → root xylem
   e. root hair → pericycle → cortex → endodermis → root xylem

12. Which is **not** a component of the digestive system?

   a. larynx
   b. trachea
   c. pharynx
   d. both a and b
   e. both b and c

13. Which product is **not** matched to the type of photophosphorylation?

   a. Cyclic photophosphorylation – NADPH
   b. Noncyclic photophosphorylation – ATP
   c. Cyclic photophosphorylation – ATP
   d. Noncyclic photophosphorylation – NADPH
   e. All of the above are correct.

14. Green glands, digestive glands, chelipeds, and antennae would be found in ____.

   a. ticks
   b. crayfish
   c. rotifers
   d. polychaete
   e. snails

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

    a. Some carbohydrates are used for long term energy storage.
    b. NAD and FAD are coenzymes for cellular respiration.
    c. Fermentation produces more ATP than anaerobic cellular respiration.
    d. Both a and b are not true.
    e. Both a and c are not true.

16. Match the component in **Column A** with its location from **Column B**.

Column A	**Column B**
1. Yellow marrow	a. diaphysis
2. Red marrow	b. epiphysis
3. Spongy bone	
4. Compact bone	

Select the correct matching sequence.

a.	1-a,b	2-b	3-a	4-b
b.	1-b	2-a,b	3-b	4-a
c.	1-a	2-a,b	3-b	4-a
d.	1-b	2-a	3-a	4-b
e.	1-b	2-b	3-a	4-a

17. Which of the following statements is **not** true?

    a. Platelets are the largest of the formed elements in a normal sample of blood.
    b. When separated out by centrifugation, plasma is not considered to contain red blood cells, white blood cells, or platelets.
    c. Albumin is a protein in the plasma of human blood.
    d. Hemopoiesis or hematopoiesis both refer to the production of blood cells.
    e. Red marrow is involved in the production of blood cells.

18. Which of the following statements is true?

    a. Between meals, glucose levels are more likely to decrease.
    b. Between meals, reserves of glucose in liver cells may get tapped into.
    c. Glycogen is the storage form of sugar in human liver cells.
    d. Insulin is secreted by the pancreas in response to elevated blood sugar levels.
    e. All of the above are correct.

19. A positive Benedicts test would be ____.

    a. blue
    b. orange
    c. black
    d. purple
    e. all of the above

20. Cyanide ____.

    a. inhibits mRNA from attaching to a ribosome
    b. does not allow peptide bonds to form
    c. inhibits packaging of hormones
    d. denatures RNA polymerase
    e. inhibits ATP synthesis

21. An appropriate statistical test for a dihybrid would be ____ analysis.

    a. Chi square
    b. linear regression
    c. Hardy-Weinberg
    d. correlation
    e. regression

22. If a dihybrid cross yields a 9:3:4 ratio, the best explanation is ____.

    a. pleiotrophy
    b. epistasis
    c. codominance
    d. incomplete dominance
    e. polygenetic inheritance

23. ____ will excite electrons in the reaction center of chlorophyll during the light dependent reaction.

    a. Glucose
    b. An enzyme
    c. A neutron
    d. A photon
    e. A proton

24. One way species are reproductively isolated is by ____ isolation.

    a. geographic
    b. mechanical
    c. behavioral
    d. temporal
    e. All of the above are true.

25. Methanogens can be found in all of the following **except** ____.

    a. cow rumen
    b. swamps
    c. gills of sharks
    d. sewage sludge
    e. the gut of termites

26. In a DNA nucleotide, the carbon number 1 in deoxyribose will bond to ____.

    a. a phosphate
    b. a base
    c. a glycerol
    d. an amino acid
    e. mRNA

27. There are multiple ____ that code for the amino acid leucine.

    a. anticodons
    b. codons
    c. histones
    d. peptides
    e. ribozymes

28. The parasite that causes malaria is the, ____ and its vector is ____.

    a. *Anopheles* mosquito; *Plasmodium*
    b. *Plasmodium*; *Ixodes* tick
    c. *Borrelia burgdorferi; Ixodes* tick
    d. *Plasmodium*; *Anopheles* mosquito
    e. *Ixodes* tick*; Borrelia burgdoferi*

29. Match the plants in **Column A** with their taxon in **Column B**.

Column A	**Column B**
1. ferns	a. Bryophyta
2. spruce	b. Anthophyta
3. moss	c. Coniferophyta
4. peach tree	d. Pterophyta

    Select the correct order.

    a. 1 – d; 2 – c; 3 – b; 4 – a
    b. 1 – c; 2 – d; 3 – a; 4 – b
    c. 1 – d; 2 – c; 3 – a; 4 – b
    d. 1 – b; 2 – d; 3 – a; 4 – c
    e. 1 – c; 2 – d; 3 – b; 4 – a

30. Homeotherms ____.

    a. keep a constant body temperature
    b. gain body temperature through their environment
    c. have a body temperature that will fluctuate as the temperature changes
    d. Both b and c are true.
    e. None of the above are true.

31. Which is **not** a correct association between the bond types and their organic molecules?

    a. peptide bonds – proteins
    b. glycosidic linkage – carbohydrates
    c. ether linkage – nucleic acid
    d. triglyceride – ester linkage
    e. All of the above are true associations.

32. mRNA binds to the ____.

    a. large subunit of the ribosome
    b. promoter region of the DNA
    c. amino acid
    d. small subunit of the ribosome
    e. introns of the DNA

33. The allosteric site ____.

    a. can be used to control enzyme activity
    b. is a synonym for active site
    c. changes shape as the substrate enters
    d. allows the enzyme to be used over and over again
    e. All of the above are true.

34. In pea plants, round seeds (R) are dominant to wrinkled seeds (r) and tall plants (T) are dominant to dwarf plants (t). What are the possible offspring's phenotype for the following: Ttrr and TtRr?

    a. only tall round, short round, and tall wrinkled
    b. TtRr, ttRr, TTRr, TTrr
    c. Tr, tr, TR, Tr, tR, tr
    d. tall round, tall wrinkled, short round, and short wrinkled
    e. None of the above are correct.

35. Which scientist is **not** matched to their discovery or theory?

    a. Schleiden and Schwann – cell theory
    b. Lynn Margulis – endosymbiosis theory
    c. Louis Pasteur – germ theory
    d. Watson and Crick – structure of DNA
    e. Joseph Lister – father of the modern microscope

36. Bark is ____.

    a. also known as the inner part of xylem
    b. the inner part of the root
    c. the area outside the vascular cambium on the stem
    d. found in all plants
    e. the main conducting vessel of water

37. The cell organelle with cisternae is the ____.

    a. mitochondrion
    b. endoplasmic reticulum
    c. Golgi apparatus
    d. centriole
    e. ribosome

38. Which is a characteristic of Domain Archaea?

    a. peptidoglycan in cell wall
    b. phospholipids with ether linkage
    c. many are pathogens
    d. not very diverse
    e. All of the above are characteristics of Domain Archaea.

39. Which of the following would increase shoot development and decrease abscission?

    a. auxin
    b. ethylene
    c. cytokinins
    d. Both a and b are true.
    e. None of the above are true.

40. Which of the following is true?

    a. Light-dependent reactions utilize NADH.
    b. Light-independent reactions utilize NADH.
    c. Chlorophyll gives plants their green pigment.
    d. Both b and c are correct.
    e. All of the above are correct.

41. Which of the following is an incorrect association?

    a. cytosol – glycolysis
    b. matrix – Krebs cycle
    c. thylakoid – light dependent
    d. cristae – light independent reactions
    e. All the above are correct associations.

42. Which is **not** a common animal pollinator?

    a. bat
    b. bee
    c. beetle
    d. mosquito
    e. butterfly

43. A virus must first ____ before it can infect it.

    a. penetrate the cell
    b. attach to the cell
    c. replicate its DNA
    d. translate the viral RNA
    e. assemble its protein coat

44. Which vegetable listed was **not** produced by the artificial selection of *Brassica oleracea*?

    a. broccoli
    b. cauliflower
    c. cabbage
    d. brussels sprouts
    e. All were produced by artificial selection.

45. Which type of mutation is **not** properly matched?

    a. silent – same amino acid
    b. frameshift – a DNA nucleotide is deleted
    c. nonsense – codes for a stop codon
    d. missense – codes for a mutagen
    e. base-pair substitution – one nucleotide pair is changed

46. Which of the following is **not** a way to get materials into the cell?

    a. active transport
    b. pinocytosis
    c. exocytosis
    d. facilitated diffusion
    e. phagocytosis

47. Which statement about the following Punnett square is **not** true?

T – tall plants t – short plants
R – round seeds r – wrinkled seeds

Parents: TtRr x TtRr

	TR	Tr	tR	tr
TR	TTRR	TTRr	TtRR	TtRr
Tr	TTRr	TTrr	TtRr	Ttrr
tR	TtRR	TtRr	ttRR	ttRr
tr	TtRr	Ttrr	ttRr	ttrr

a. In row 1, all the phenotypes of the offspring are the same.
b. There are 9 tall and round seed plants in the Punnett square.
c. There is only 1 short and wrinkled seed plant.
d. There are 3 short and round seed plants in the Punnett square.
e. All the above are true statements about the Punnett square.

48. A person may form a goiter if they do not have enough ____ in their diet.

a. nitrogen
b. iodine
c. calcium
d. vitamin B 12
e. flax oil

49. Which disease is **not** matched with the organism that causes it?

a. Giardiasis – *Cryptosporidium*
b. Sleeping sickness – *Trypansoma*
c. Schistosomiasis – *Schistosoma*
d. Typhoid fever – *Salmonella typhi*
e. Elephantiasis – *Wuchereria*

50. Restriction enzymes cut DNA at the back bone usually at palindromic sequences. Which of the following is a palindromic sequence?

a. AAATTCG
   TTTAAGC
b. GAATTC
   CTTAAG
c. CCGGATA
   GGCCTAT
d. ACTGAG
   TGACTC
e. None of the above are palindromic sequences.