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TAMS Tournament 2011 Biology Exam Answer Sheet

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1. Which of the following contain enzymes and are the main organelles of digestion within the cells?
 - A) Golgi bodies
 - B) ribosomes
 - C) mitochondria
 - D) lysosomes
 - E) endoplasmic reticulum
2. The light-dependent reactions of photosynthesis _____.
 - A) involve photolysis of water
 - B) occur in mitochondria
 - C) fix carbon dioxide
 - D) occur in the outer chloroplast membrane
 - E) involve the capture of light energy but not electron transport chains
3. Major reshuffling of genes occurs during _____.
 - A) anaphase of meiosis I
 - B) anaphase of meiosis II
 - C) prophase of meiosis I
 - D) prophase of meiosis II
 - E) mitosis
4. The location on an enzyme where a substrate binds is called the _____.
 - A) binding site
 - B) reaction center
 - C) allosteric site
 - D) lock-and-key model
 - E) active site
5. The function of the Golgi apparatus is to _____.
 - A) package and store proteins for secretion
 - B) synthesize proteins
 - C) function in cellular respiration

- D) help the cell expel waste
 - E) digest foreign substances
6. A retrovirus requires which of the following enzymes in order to integrate its genome with its host's genome?
- A) Host's RNA polymerase
 - B) RNA dependent RNA polymerase
 - C) DNA dependent RNA polymerase
 - D) DNA dependent DNA polymerase
 - E) RNA dependent DNA polymerase
7. If one ribose molecule were bonded to one adenine molecule and one phosphate molecule, we would have a ____.
- A) ribosome
 - B) nucleotide
 - C) nucleic acid
 - D) ATP
 - E) ADP
8. An animal cell placed into a 0.9% solute solution would do which of the following?
- A) remain unchanged
 - B) swell and burst
 - C) shrivel
 - D) swell and divide
 - E) release solute by exocytosis
9. Which of the following organelles would be present in a eukaryote but NOT in a prokaryote?
- 1. Nucleus
 - 2. Mitochondria
 - 3. Ribosome
- A) 1 only
 - B) 2 only
 - C) 1 and 2 only
 - D) 2 and 3 only
 - E) 1, 2, and 3

10. Which types of cells will contain the biggest endoplasmic reticulum?
- A) Pancreas cells
 - B) Liver cells
 - C) Muscle cells
 - D) Brain cells
 - E) Skin cells
11. In the tertiary structure of a protein, which of the following help stabilize the structure of the polypeptide?
- A) Disulfide bridges
 - B) Hydrophobic interactions
 - C) Hydrogen bonds
 - D) All of the above
 - E) None of the above
12. Which of the following is the only six carbon sugar that forms a 5-sided ring?
- A) Fructose
 - B) Glucose
 - C) Galactose
 - D) Ribulose
 - E) Sucrose
13. Which of the following contributes to cytoplasmic streaming?
- A) Myosin
 - B) Actin
 - C) Sol-Gel interactions
 - D) ATP
 - E) All of the above
14. Which organelle can have three membranes?
- A) Mitochondria
 - B) Chloroplasts
 - C) Ribosomes
 - D) Lysosomes
 - E) Nuclei

15. Which of the following is NOT true about viruses?

- A) They infect organisms from every kingdom.
- B) They have a nucleic acid core encased in a protein capsid.
- C) Antibiotics are used to kill them.
- D) They cause diseases such as influenza, chicken pox, and cold sores.
- E) They are known to have evolved from plasmids or bacteria.

16. Most scientists do not consider viruses to be alive because _____.

- A) They do not have any genes.
- B) They are unable to reproduce.
- C) They do not have any structural features that can be detected microscopically.
- D) The genetic material is sometimes RNA.
- E) They use a host cell's metabolic machinery because they lack any of their own.

17. The hydrophobic tails of a phospholipid's bilayer are oriented toward _____.

- A) The interior of the plasma membrane.
- B) The extracellular fluid surrounding the cell.
- C) The cytoplasm of the cell.
- D) The nucleus of the cell.
- E) None of the above

18. The plant tissue that carries out photosynthesis and stores materials is _____.

- A) Vascular cambium
- B) Collenchyma
- C) Parenchyma
- D) Sclerenchyma
- E) Pericycle

19. What is a possible microtubule arrangement in cilia?

- A) 8+1
- B) 9+2
- C) 9+0
- D) All of the above
- E) None of the above

20. Cellular respiration is which of the following reactions?
- A) Oxidation
 - B) Reduction
 - C) Combustion
 - D) Double replacement
 - E) Single replacement
21. Which of the following replicates itself?
- A) Mitochondria
 - B) DNA
 - C) Chloroplasts
 - D) A & B
 - E) All of the above
22. Which of the following processes in cellular respiration do NOT require oxygen to occur?
- A) Glycolysis
 - B) Pyruvate dehydrogenase complex
 - C) Krebs cycle
 - D) Electron transport
 - E) None of the above
23. In the Krebs cycle, which of the following compounds is created first?
- A) Isocitrate
 - B) Oxaloacetate
 - C) Succinate
 - D) Citric acid
 - E) Succinyl Co-A
24. Which of the following are phases in mitosis?
- A) Interphase, prophase, metaphase, anaphase
 - B) Interphase, prophase, metaphase, anaphase, telophase
 - C) Prophase, metaphase, anaphase, telophase
 - D) Interphase, prophase, metaphase, anaphase, telophase, cytokinesis
 - E) None of the above

25. Which tRNA anticodon begins the mRNA sequence?
- A) GAA
 - B) UAC
 - C) CGU
 - D) AAC
 - E) GUC
26. Homologous structures, which have similar underlying structures but may have different functions, are formed by _____.
- A) Divergent evolution
 - B) Speciation
 - C) Segregation
 - D) Convergent evolution
 - E) Stabilizing selection
27. All of the following could be considered density-dependent factors affecting population growth EXCEPT _____.
- A) Limited nutrients
 - B) Climate temperature
 - C) Build-up of toxins
 - D) Predation
 - E) Limited water
28. An organism appears to be a segmented worm. It has a closed circulation system, a mouth, and an anus. However, it does NOT have an exoskeleton. Which phylum does this organism belong to?
- A) Mollusca
 - B) Annelida
 - C) Echinodermata
 - D) Arthropoda
 - E) Chordata
29. Plants that have true roots, stems, and leaves, as well as flowers and seeds enclosed in fruit, are classified as _____.
- A) Bryophytes
 - B) Tracheophytes
 - C) Gymnosperms
 - D) Angiosperms
 - E) Endosperms

30. Which of the following structures is NOT present at some point in the development of chordates?
- A) A dorsal hollow nerve cord
 - B) A notochord
 - C) Gill slits
 - D) Postanal tail
 - E) An exoskeleton
31. Yeast is cultured under anaerobic conditions. Which of the following describes yeast that is most fit?
- A) Ferment the fastest
 - B) Consume less of the limited oxygen supply
 - C) Produce the most buds
 - D) Produce the most ATP
 - E) Survive the longest
32. Which of the following behaviors involves a loss of sensitivity to unimportant stimuli?
- A) Reasoning/insight
 - B) Imprinting
 - C) Classical conditioning
 - D) Habituation
 - E) Instinct
33. After succession, a stable community is called _____.
- A) Final community
 - B) Climax community
 - C) Apex community
 - D) Summit community
 - E) Composite community
34. Which of the following contains blood poor in oxygen?
- A) Right ventricle
 - B) Pulmonary vein
 - C) Pulmonary artery
 - D) A & C
 - E) All of the above

35. From which of the primary germ layers does the nervous system develop?
- A) Ectoderm
 - B) Enteroderm
 - C) Epidermis
 - D) Mesoderm
 - E) Endoderm
36. Which of the following substances could be classified as a diuretic?
- A) Water
 - B) Sodium
 - C) Caffeine
 - D) Potassium
 - E) Sugar
37. In a marine biome, which of the following is the area of least productivity?
- A) Intertidal zone
 - B) Abyssal zone
 - C) Oceanic zone
 - D) Aphotic zone
 - E) Neritic zone
38. Which of the following types of graphs would best represent a growing population size with limited nutrients?
- A) Exponential
 - B) Linear
 - C) Logarithmic
 - D) Cubic
 - E) Logistic
39. The simplest nerve pathway is located where?
- A) In the midbrain
 - B) In the reflex arc
 - C) In the brainstem
 - D) In the automatic nervous system
 - E) In the peripheral nervous system

40. Which of the following would not be associated with vascular plants?
- A) Angiosperms
 - B) Bryophytes
 - C) Gymnosperms
 - D) Root systems
 - E) Shoot systems
41. Which of the following is NOT homologous to the bones of a human arm?
- A) Whale flipper
 - B) Bat wing
 - C) Bird wing
 - D) Butterfly wing
 - E) Frog forelimb
42. The ancestors of land plants most likely resembled which modern-day members?
- A) Chlorophyta
 - B) Rhodophyta
 - C) Phaeophyta
 - D) Cyanobacteria
 - E) Chrysophyta
43. Which biome is recognized for its coniferous forests and relatively infertile, acidic soil?
- A) Grassland
 - B) Taiga
 - C) Deciduous forest
 - D) Tundra
 - E) Tropical rain forest
44. Which phylum in the Protista Kingdom includes amoebas?
- A) Apicomplexa
 - B) Ciliophora
 - C) Euglenophyta
 - D) Phaeophyta
 - E) Rhizopoda
45. What is anemia caused by?
- A) Lack of iron in red blood cells
 - B) Lack of white blood cells
 - C) Overabundance of plasma

- D) Too many platelets in blood
- E) Death of T-cells

46. Which blood type is considered the universal acceptor?

- A) AB-
- B) O+
- C) AB+
- D) O-
- E) B+

47. What causes the “lub-dup, lub-dup” noise in your heart?

- A) Muscle contractions in the atrium and ventricles
- B) The successive closing of atrioventricular and semilunar valves
- C) Excessive flow of blood from Vena Cava to Aorta
- D) Over-exercising
- E) The transfer of blood between pulmonary and systemic circuits

48. What are three phases in the uterine cycle?

- A) Follicular phase, luteal phase, secretory phase
- B) Proliferative phase, luteal phase, menstruation
- C) Follicular phase, proliferative phase, secretory phase
- D) Menstruation, proliferative phase, secretory phase
- E) Luteal phase, menstruation, secretory phase

49. Which of the following is NOT true about the nitrogen cycle?

- A) Some bacteria release nitrogen from the soil into the atmosphere
- B) Most nitrogen is taken up from the soil by plants in the form of nitrites (NO_2^-)
- C) Bacteria convert nitrogen in the atmosphere into ammonium (NH_4^+)
- D) Nitrifying bacteria convert ammonium into nitrites (NO_2^-)
- E) Plants use the nitrogen from the soil to produce protein

50. A rattlesnake would be classified as a _____.

- A) Tertiary consumer and a heterotroph
- B) Secondary consumer and an autotroph
- C) Producer and an autotroph
- D) Producer and a heterotroph
- E) Primary consumer and heterotroph