

Exam 1 BioS 101 9 AM Spring 2008

19 February 2008  
80 points @ 2 per question  
Form A

NAME \_\_\_\_\_

TA Name \_\_\_\_\_

Choose the best available choice and mark your answer with a #2 pencil on the accompanying answer sheet. Read all choices before answering the question. Turn in both your answer sheet and this exam to your TA as you leave. Each question is worth 2 points.

1. The Genus is the first word in a scientific name. It is always capitalized. What is the name of the taxonomic level immediately above (more inclusive than) the genus? (hint: problem set 1) (p7)

A. Apomixis B. specific epithet C. Order D. Domain E. Family

2. Sperm and eggs are animal reproductive cells, termed \_\_\_\_\_; all other cell types are referred to as \_\_\_\_\_ cells. (p. 227)

A. embryos, regular B. G1, mitosis C. gametes, somatic  
D. prophase, interphase E. nasty, OK

3. Which two species are most closely related based on the following sequence information? (p10)

Species A AGTGCCTAAGCCTATCCAT  
Species B AGTACCTATGCCTATTCAT  
Species C GGTGCCTAAGCCTATTCAT  
Species D AGTAGCTAAGCCTATTGAT

A. A&B B. A&C C. A&D D. B&C E. None of Above

4. Experiments need a 'control' which provides an opportunity to make observations on individuals not receiving the treatment. The evaluation of the effectiveness of new drugs for humans is complicated by the observation that the results of the a control group that is given nothing is different than a control group given a 'pill' with inert ingredients. The necessity of using a 'control' group that thinks it is getting the drug is known as the \_\_\_\_\_ effect. (#2)

A. Scheeper's B. null C. careful control D. placebo E. wishful

5. How many different DNA sequences 6 bases long are possible? (Concept on p57)

A. 1024 B.  $6^4 = 1296$  C.  $4^6 = 4,096$  D.  $6^6 = 46,656$  E. over a million

6. Carbon dioxide in the air dissolves rain droplets making the pH of rain water 5.6. What is the pH of pure water? (p.42)

A. 1 B. 5 C. 6 D. 7 E. impossible to answer with available information

7. You have two different stable isotopes of the same element. Which of the following is the best description of the situation? (p22)

- A. The two isotopes have the same number of neutrons in their nucleus.
- B. The heavier isotope will undergo decay.
- C. Both isotopes can be found in the same compounds and both have the same number of protons.
- D. The isotopes will generally be in different compounds.
- E. The half life of the lighter isotope will be longer than 1000 years.

8. What type of macromolecule is the most reduced (and therefore has the most energy per gram)? (#4)

- A. nucleic acid
- B. lipid
- C. protein
- D. carbohydrate
- E. vitamins

9. If we graph the proportion remaining on the Y axis and time on the X axis, a constant per capita probability of decay (=change = death), i.e.,  $\Delta N/\Delta t \cdot N = -c$ , gives a curve we describe as? (Curve on p22)

- A. linear decline.
- B. linear increase.
- C. constant.
- D. exponential decay.
- E. exponential increase.

10. If a *Paramecium* can divide twice in an day, how long would it take for a single cell to have more than a billion ( $10^9 = 2^{29.9}$ ) descendants? (#7)

- A. 9 days
- B. 15 days
- C. 29 days
- D. 30 days
- E. 48 days

11. The unequal sharing of the electrons in a water molecule results in a covalent bond between the oxygen and hydrogen that is described as \_\_\_\_\_. (p39)

- A. hydrogen
- B. polar
- C. semi-covalent
- D. dynamic
- E. ionic

12. What process is essential to natural selection that is not part of the 'evolution of the universe' or the 'evolution of learning' or other forms of change. (#3)

- A. development
- B. mating
- C. translation
- D. reproduction
- E. birth

13. The two strands of DNA separate when the temperature is raised to 80° C. When the solution of single strands is cooled, the \_\_\_\_\_ strands find each other and reform double stranded DNA. (p81)

- A. antagonistic
- B. RNA
- C. complementary
- D. paired
- E. energetic

14. An \_\_\_\_\_ is the name for a groundwater resource with a lot of easily extractable water. (#5)

- A. aquifer
- B. well
- C. wetland
- D. pond
- E. glacier

15. If the human body is 70% water and the total amount of water entering the body per day is 1 kg per day, about how long does an average molecule of water spend in a person weighing 70 kg? (#5)
- A. 1 day    B. 7 days    C. 50 days    D. 70 days    E. 490 days
16. Biological information necessary for function is stored in the \_\_\_\_\_ of the DNA which is eventually manifest as \_\_\_\_\_ of amino acids in a protein.
- A. nitrogen    B. bases    C. sugar    D. sequence    E. energy
17. \_\_\_\_\_ is a new way to discover species that can not be grown in culture. (p590)
- A. phylogeny    B. horizontal transfer    C. direct sequencing    D. conjugation    E. lithotrophy
18. Which macromolecule can code information and is known to perform limited reaction functions. For those reasons, it is considered the mostly likely type to be involved in the origin of life? ( p74)
- A. Protein    B. RNA    C. Carbohydrate    D. DNA    E. Lipid
19. The Mean(to nearest tenth), Median and Range of the following observations, 5, 5, 5, 6, 7, 8, 8, is:
- A. 6.3, 6, [5,8]    B. 6.6, 6.5, [5,8]    C. 6.2, 6.3, [5,8]  
D. 6.6, 6, [5,8]    E. 6.2, 6, [6,8]
20. After duplication the DNA a eukaryotic chromosome is in two strands called \_\_\_\_\_? (p. 233)
- A. sister chromatids    B. haploid chromosomes    C. circular chromosomes  
D. Double stranded DNA    E. sister chromosomes
21. If the half-life of an isotope is 250 years, how many years later would you expect only 1/16th of the original amount to remain? ( p22)
- A. 16 years.    B. 30 years.    C. 250 years.    D. 500 years.    E. 1000 years
22. Heterotrophs get the energy they need by 'burning' reduced carbon compounds. The basic equation is sugar plus oxygen is converted to \_\_\_\_\_ and \_\_\_\_\_. (p35)
- A. CO<sub>2</sub>, H<sub>2</sub>O    B. SO<sub>2</sub>, H<sub>2</sub>O    C. CH<sub>4</sub>, H<sub>2</sub>O    D. CO, H<sub>2</sub>O    E. CO, SO<sub>2</sub>
23. Evidence that life began about 3.8 billion years ago is based not on fossils, but the ratio of <sup>12</sup>C to <sup>13</sup>C, and the fact that metabolism uses <sup>12</sup>C preferentially to <sup>13</sup>C. <sup>13</sup>C and <sup>12</sup>C are \_\_\_\_\_ of the element carbon. ( p23)
- A. isomers    B. radioactive isotopes    C. stable isotopes    D. polymers    E. compounds

24. Koch's postulates establish a causative link between a(n) \_\_\_\_\_ and a(n) \_\_\_\_\_. (p584)
- A. sequences, phylogeny    B. environment, disease    C. DNA, disease  
D. microbe, disease    E. RNA, earliest life
25. A disease is described as \_\_\_\_\_, if the disease is caused by an organism. (p583)
- A. contagious    B. pathogenic    C. cancerous    D. infectious    E. virulent
26. The Linnean Kingdoms of **Plants** and **Animals** have been superceded by 'trees of life' (phylogeny) based on DNA sequences. We now recognize 3 **Domains** as the major divisions of life. What domain was only 'discovered' (BTW at the Univ of Illinois) since 1975? (p9)
- A. Archea    B. Bacteria    C. Cercozoa    D. Discicristata    E. Eukarya
27. Morphologically distinct stages of *Plasmodium* reproduce in red bloods cells and liver cells of humans (and other animals) and in the gut and salivary glands of mosquitoes. That is an example of the generalization that parasitic protista have: (p609)
- A. great structural diversity    B. considerable metabolic diversity  
C. highly complex life cycles    D. a slightly different genetic code    E. cause human disease
28. What word best fits the following; "the collection of individuals and populations that are united by sharing of genes in the recent past and the potential sharing of genes in the future"? (#1)
- A. species    B. specific epithet    C. community    D. genus    E. taxa
29. Crop plants such as rice, wheat and corn, were derived from existing species via \_\_\_\_\_. (p.640)
- A. artificial selection    B. transport to new areas    C. they are unchanged from wild species  
D. stem cells    E. insertion of genes
30. The order -largest to finest- of mineral particles in the soil is: (#10)
- A. silt, sand, clay    B. grit, sand, slime    C. sand, clay, silt  
D. sand, silt, slime    E. sand, silt, clay
31. Koch's postulates are ordered. Which of the following is the fourth or last postulate?
- A. Organism can cause disease in monkey.  
B. Pure culture of organism can cause disease in healthy host.  
C. Organism can be recovered from host infected with pure culture.  
D. Organism can be isolated and grown in pure culture.  
E. Organism always found in diseased individuals.

32. You learn that the concentration of mercury in a lake is 0.6 ppm. You know that each day you drink 2 liters of water from the lake. Which of the following is a correct estimate the amount of mercury you consume per day?

- A.  $6 \times 10^{-4}$  g   B.  $1.2 \times 10^{-3}$  g   C.  $6 \times 10^{-4}$  mg   D.  $1.2 \times 10^{-4}$  g   E.  $1.2 \times 10^{-6}$  g

33. Electron microscopes accelerate electrons to high energy giving the electrons:

- A. a shorter wave length than light   B. a longer wave length than light  
C. a higher density than light   D. greater interaction with organic molecules than light  
E. a higher speed than light

34. There is a prairie plant with the common name 'Deam's rosinweed'. This taxa is a subspecies and given the scientific name *Silphium integrifolium deamii*. For that taxa the genus is? (#1)

- A. rosinweed                      B. *Silphium integrifolium*                      C. *Silphium*  
D. *integrifolium*                      E. *deamii*

35. A group of the same age that can be followed through time is called a \_\_\_\_\_? (p.1193)

- A. alliviator    B. group   C. cohort    D. Demography                      E. fecundity

36. For growth of crop plants, the best soils have all of the following **except**:

- A. water            B. air    C. mineral particles    D. organic matter                      E. Plasmodium

37. The end of the lytic cycle of a bacteriophage is:

- A. integration of the viral genome into the DNA    B. nucleic acid replication  
C. translation of capsid proteins                      D. host cell burst open  
E. viral DNA is injected into the cell

38. The temperature 70° F is the equivalent of?

- A. 15° C            B. 10° C            C. 32° C            D. 28° C            E. 21° C

39. The protist that is responsible for a major human disease is \_\_\_\_\_. (p608)

- A. *Paramecium*                      B. *Plasmodium*                      C. *Chlamydia*    D. *Yersina*                      E. *Salmonella*

40. Predicting a future happening is a common human activity of parents, sportscasters, astrologers, politicians and many others. Rarely is a record of the accuracy of the predictions available, though any predictions that were 'right' are often touted. In your Medieval Science lab, the predictions of an astrologer were match with the \_\_\_\_\_ of individuals and tested with Chi-squared test.

- A. hypotheses    B. crystal            C. wings            D. journal entries                      E. measurements