19. Proto-cells may not have all of the functions of either the first real cell or certainly of modern cells. Which of the four cellular characteristics listed below is the least likely to have been important in the proto-cell to cell transition?
a. metabolism
b. compartmentalization
c. membrane enclosure
d. heritability

20. Adaptive radiation
a. only occurs at branch points indicated in phylogenetic trees.
b. specifically occurs on large land masses and not on islands or archipelagos.
c. often occurs after a period of intense extinction because surviving species have physical, evolutionary and ecological access to new or altered niches.
d. is caused by fixation of alleles in small populations.

21. The fact that the hand of man, the wing of the bird, the wing of the bat, and the limb of the alligator all have the same bones in the same relative positions
a. is the result of the fact that there is only a certain way to make arms, hands, and wings in evolution.
b. is explained by common descent of all these organisms from a primitive reptile.
c. is due to a parallel evolution of arms and hands in these separate lineages.
d. is explained by each appendage having the same function.

22. An emergent property is
a. a new trait that has become fixed in the population.
b. a situation where the whole is greater than the sum of the individual parts.
c. the set of conditions that predispose a species to extinction.
d. predictable.

23. Suppose you add an antibiotic to a culture of Tuberculosis bacteria. A week later, there are just a few cells living. When these are grown up and tested by adding the antibiotic, all of them survive. What has happened?
a. Some of the bacteria in the first culture changed their genes and became resistant to the antibiotic.
b. The antibiotic was insufficient in amount to kill all the sensitive bacteria in the first culture, and after that it was too late.
c. In the first culture, there were a few bacteria that were already resistant to the antibiotic, and these survived to populate the second culture.
d. In the first culture the mortality of many bacteria produced a reaction in several that led to them developing heritable resistance during the treatment.

24. Exponential growth
a. can be continued for all species.
b. is limited by the resources in the habitat.
c. is represented by bacterial communities and not by higher plant or animal communities.
d. indicates discrete stepwise increases in the population.

25. One of the most important clues indicating that *A. afarensis* (Lucy) walked on two legs is:
a. her fossilized remains indicate that Lucy's legs were very long compared to her arms.
b. the structure of Lucy's pelvis is more human-like than chimpanzee-like.
c. her heel bones were extremely broad compared to those of apes.
d. she possessed the binocular vision necessary for walking upright.

an reason that pea hens mate with peacocks with large tails and many eye spots is
a. that these males are stronger and faster than less flashy ones, and can more easily catch the pea hens.
b. that peacocks that survive predation are more physically fit and make better mates.
c. that the male will draw predators to it and this indirectly protects the pea hen and offspring from predation.
d. that the size and spot density are indicative of peacock fitness shown as an increased two year survival rate of chicks.

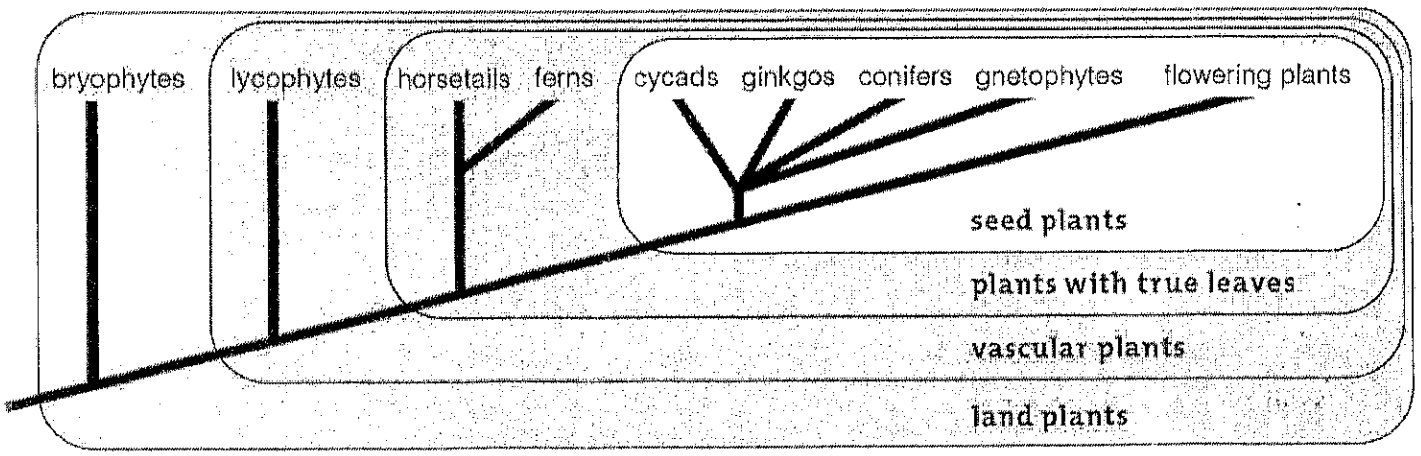
15. The Cambrian explosion describes a time when
a. The fossil record indicates that dinosaurs became extinct.
b. Many of the body plans for modern organisms appeared in the fossil record, including the ancestor of vertebrates.
c. *Anomalocarus*, the ancestor of all mammals, appeared in the fossil record.
d. The fossil record suggests that fish began to walk on land.

16. A student examined two different groups of cells and made the following observations

Trait	**Cell I**	**Cell II**
Ribosomes	Present	Present
Nucleus	Absent	Present
Ability to photosynthesize	Present	Absent
Cell respiration	Present	Present

These observations support which of the following conclusions?
a. Cell I is more complex in its organization than cell II.
b. Cell I is a prokaryote.
c. Cell II does not have a cell membrane.
d. Cell II has a cell wall.

17. Experimentation on the Viking mission to Mars failed to detect signs of life on the planet. Why have we recently sent another mission to Mars (Phoenix) asking the same question?
a. All experiments should be done more than once.
b. The equipment on the Viking mission was not sensitive enough to detect signs of metabolic activity and equipment on the Phoenix is more sensitive.
c. No water was detected in the Viking mission because it landed in the wrong place.
d. The Phoenix mission will look for life forms that are not carbon based whereas Viking only looked for carbon based forms of life.



18. In the diagram above
a. the difference between bryophytes and cycads is the formation of seeds.
b. all major groups have existing species.
c. cycads are more closely related to flowering plants than to conifers.
d. lycophytes are the only vascular plants.

7. When did photosynthetic organisms evolve?
a. Photosynthetic bacteria had to be the very first cells because all life depends on photosynthesis.
b. There are fossil colonies of cyanobacteria in stromatolites that date from 3.0 BYA so photosynthesis had to evolve before that time
c. Banded iron oxide deposits exposed on land, but running from 1 billion to 0.75 billion years ago show that oxygen-producing photosynthesis originated about 1 billion years ago when the first organisms started to appear on land.
d. DNA sequence analysis shows that the proteins of plants and algae go back to a common ancestor with animals and bacteria that lived 300 million years ago

8. Suppose *A. hypotheticus* and *A. postulatus* are names for beetles found in a single tropical environment. Physically the individuals of one group all fall within the range of appearance, in every visible character, of the other group. They are all apparently indistinguishable. However, no member of one group ever mates with a member of the other. According to the Biological Species Concept, these two groups are separate species. By what mechanism of speciation did these two species arise?
a. parapatric
b. sexual incompatibility
c. sympatric
d. allopatric

9. During the formation of the universe
a. all chemical elements are found in equal proportions in all planets, stars, and asteroids.
b. the formation of iron causes stabilization of planetary masses.
c. hydrogen and helium are the most common elements found.
d. new elements come from the breakdown of complex molecules.

10. *Homo sapiens* is very unlikely to go extinct any time soon because the species
a. has a large dispersed population and is very adaptable.
b. is culturally more sophisticated than any other animal.
c. continues to eliminate other species that compete for its resources.
d. is a very intelligent species.

11. Evolution may be defined as descent with modification, as Darwin originally proposed. His main mechanism for this was natural selection; but another mechanism that he did not imagine also exists, and results in evolution only in small populations. That mechanism is _____.
a. mutation.
b. genetic drift.
c. physical isolation.
d. Disruption.

12. Speciation has often occurred in plants by increasing the ploidy level (i.e., the number of sets of chromosomes). When the ploidy level doubles from 2n to 4n, a new species is created in one generation because
a. the gametes from the 2n and 4n plants have a chromosome imbalance and can not fertilize each other.
b. the gametes from the 2n and 4n plants fertilize each other but the 3n product of the fertilization is unable to develop into a plant because of the 3 copies of each gene.
c. 3n plants do develop from the combination of 1n and 2n gametes but they are out competed by the 2n and 4n plants.
d. normal looking and viable plants develop from the combination of 1n and 2n gametes but these plants are unable to produce viable gametes themselves because of the 3 copies of each chromosome.

13. Extinction of a species is not uncommon throughout evolutionary time. In fact,
a. no organisms live for more than several million years.
b. an extinction must precede a speciation event.
c. estimates predict that over 99% of all species that ever lived are extinct.
d. cataclysmic events, such as comets, are entirely responsible for extinctions.

Ev tion Exam Biology 1010 Fall 2008

E F08

me: _____

Instructions: Using #2 pencil, put your Last Name in the LAST NAME and your RIN in the bubbles on your answer sheet. Read each question carefully, looking at all the suggested answers. Select the best answer and mark it on the form. Check all your answers at least once to make sure you have chosen the best answer and marked the corresponding place on the form.

1. Evolution operates to produce changes in
a. individuals.
b. domains.
c. populations.
d. the best adapted organism.

2. Evolution is promoted in a natural population
a. if replication of DNA is 100% correct and other types of mutations do not occur.
b. if mating is always random.
c. if some genotypes produce phenotypes that are more adaptive than other phenotypes.
d. if the population is very large in size.

3. Pangea is the name given to a land mass on Earth present at about 260 MYA. What is the evidence that Pangea existed as a single continental land mass that subdivided and moved to form our current existing continents?
a. All Extinctions of species between 260 MYA and 10 MYA are due to the breakup and movement of the Pangean land mass.
b. All mountain ranges that were present in Pangea are present and distributed among the current continents.
c. The fossil record supports the subdivision and movement of the land masses from a large land mass to several smaller continents.
d. The only other candidate land mass, Gondwana, is a poor choice for leading to the development of our current continents because it represents only the northern portion of Pangea.

4. Which of the following statements concerning sexual selection and raising the offspring is accurate for most species of seahorses?
a. The male chooses the mate and raises the offspring.
b. The female chooses the mate and the male raises the offspring.
c. The male chooses the mate and the female raises the offspring.
d. The female chooses the mate and raises the offspring.

5. The human fossil record shows
a. a straight line from descent from *Australopithecus* to *Homo sapiens.*
b. that at several times there were more than one hominid species alive on the earth at the same time.
c. that most of our knowledge of primitive man has to be inferred from linguistic and cultural studies of remote tribes.
d. chimpanzees are more closely related to us than to any other hominid species.

6. Which of the following is the most likely cause of the extinction of *Homo neanderthalensis*?
a. Since the genomes of *H. neanderthalensis* and *H. sapiens* are so similar, breeding in areas where there was overlap between the two species diluted out the Neanderthal traits or blended them into early *H. sapiens.*
b. *H. sapiens most* likely outcompeted *H. neanderthalensis* after several thousand years of coexistence in Europe and Asia.
c. *H. neanderthalensis* could not maintain its species after several exposures to ice ages which finally caused the extinction of their habitat followed by their own extinction.
d. *H. neanderthalensis* was the most highly mobile of the early *Homo* species and their spread had an adverse affect on their ability to maintain a vigorous gene pool with small numbers of species per unit area.