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NAME: _____ KEY _____ SCORE: 100 /100

Notes:

1. Make sure you have your name on the test.
 2. Make sure you have the correct number of pages — check now!
 3. Be sure to show ALL your work on problems — credit is given for correct steps in solving the problem. The correct answer without a clear showing of the derivation of the answer will receive little or no credit.
 4. Maintain silence throughout the test.
 5. For multiple choice questions, put the letter of the correct answer in the blank to the left of the question number.
 6. DO NOT GET UP — if you have a question, raise your hand and the instructor will come to you.
 7. Read the questions carefully — misreading is a primary cause of point loss. Also be sure to answer the question that was asked.
 8. USE ONLY THE SPACE GIVEN BELOW THE QUESTION TO WRITE YOUR ANSWERS
 9. Papers are due on the instructor's desk at 2:05 PM. **NO LATE PAPERS WILL BE ACCEPTED!!** Class will resume at 2:15 PM, and last until 2:50 PM.
1. (6) Define the word hypothesis as used in science and give 2 of the 4 characteristics of a good hypothesis
- a. A hypothesis is **a carefully thought-out and perhaps preliminarily-tested explanation for a natural phenomenon.**
 - b. one characteristic of a good hypothesis is **it must be internally consistent.**
 - c. Another characteristic of a good hypothesis is **it must have explanatory value. (it should be consistent with known information it must be able to be tested empirically)**
- c 2. A theory, as the term is used in science, is: a. just a guess about how something happened b. an initial, well thought-out explanation of an observation, but without much, if any, supporting evidence c. an explanation which has been tested and supported to a reasonable degree

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- e 3. The unification of Mendelism and Darwinism which occurred in the 1930s and 1940s is called: a. natural selection b. adaptation c. Lamarckism d. evolution **e. none of the preceding (answer is: modern synthesis)**
- c 4. Which of the following is **NOT** a line of evidence for organic evolution: a. direct observation of microevolutionary changes b. the order of groups in the fossil record **c. the fact that genes are on chromosomes in higher organisms** d. homologous similarities among species e. imperfect adaptations
- e 5. Which of the following periods is earliest in time: a. Carboniferous b. Tertiary c. Triassic d. Permian **e. Ordovician**
- b 6. Trilobites lived in which era? a. Archaic **b. Paleozoic** c. Mesozoic d. Cenozoic
- a 7. A fossil is: **a. any trace of past life** b. bones that have turned into rocks c. rocks containing bones, shell or other parts of ancient organisms d. mineralized parts of past life e. none of the preceding
- b 8. Darwin's main contribution was: a. the origination of the idea that evolution has occurred **b. the proposal of and supporting evidence for a mechanism for evolution** c. journals of his trip around the world d. the proposal of and supporting evidence for the idea that fossils represented ancient creatures long since extinct e. the origination of the idea that the earth was very old
- c 9. *Australopithecus afarensis* lived about how many years ago? a. 15 million b. 5 million **c. 3.5 million** d. 1.2 million e. 50,000
- e 10. The evidence indicates that which of the following was the first to use fire regularly? a. *Australopithecus africanus* b. *Australopithecus afarensis* c. *Homo habilis* d. *Homo sapiens* **e. none of the preceding (answer is: Homo erectus)**
- c 11. Of the following human traits, which apparently evolved first: a. use of fire b. modern-sized brain **c. walking upright** d. use of chipped stone tools e. active hunting of animals for meat
- b 12. For a simple Mendelian trait, if a homozygote mates to a heterozygote, and half of their offspring look like each parent, the homozygote was: a. a dominant homozygote **b. a recessive homozygote** c. a codominant homozygote d. a pleiotropic plesiomorphic homozygote e. can't tell from information given

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13. (20) List, in order, starting with the most ancient, the periods and the eras to which they belong Give the approximate dates for the start and end of each era.

FOR EACH ERA, list a typical life form that existed in that era. "Typical" means either a common form that lived in no other era, or a common form that may have lived in another era(s), but which was not a dominant life form except in the era you list it in.

Paleozoic era *~600-~225Ma* *Trilobites*
Cambrian
Ordovician
Silurian
Devonian
Carboniferous
Permian

Mesozoic Era *~225-65Ma* *Dinosaurs*
Triassic
Jurassic
Cretaceous

Cenozoic Era *65Ma - present* *large mammals & large birds*
Tertiary
Quaternary

14. (21) If one atom out of every 10 billion atoms of ^{133}Ab decays to ^{132}Cd in a year, and you find a rock in which 10% of the original ^{133}Ab has decayed to ^{132}Cd , how old is the rock?

$$t = \frac{1}{r} \ln \frac{N_0}{N_t} \qquad r = \frac{1}{10,000,000,000}$$

$$t = 10000000000 \ln \frac{1}{.90} = 10000000000(.105361) = 1,053,605,156.57$$

or, a little over a billion years

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15. (20) List, in order, 5 human ancestors, giving approximate dates when they lived, and for each, tell whether it made stone tools, and approximately what size its brain was compared to modern humans. Use the following table to record your answers.

Name of Ancestor	Approximate Dates	Made stone tools? (Y/N)	Small, medium or large brain?
<i>Australopithecus afarensis</i>	~3.8-2.8 Ma	N	small
<i>Australopithecus africanus</i>	~3-2 Ma	N	small
<i>Homo habilis</i>	~2.2-1.6 Ma	Y(crude)	medium
<i>Homo erectus</i>	~1.6 - 0.4 Ma	Y (good)	large
<i>Homo sapiens</i>	~0.4 Ma - present	Y (excellent)	large

