

Anthropology 105: Human Variation
Midterm Exam, Winter 2007

You must bubble in your name and seven-digit Perm number on your Scantron sheet in order for your exam to be graded.

MULTIPLE CHOICE (1 point each, 50 points total). Select the ONE **best** answer for each question. Record your answer in the appropriate bubble on the Scantron form.

1. What is the source of human variation?
 - A) Genetic variation.
 - B) Polymorphisms.
 - C) Environmental differences
 - D) Both a and c**
 - E) All of the above.

2. A sequence of DNA that codes for a specific output is commonly known as a:
 - A) Chromosome
 - B) Mutation
 - C) Gene**
 - D) Particle
 - E) Atom

3. Non-Europeans were once believed by Europeans to be products of separate creations and thus lesser beings. Which of the following confounded this theory?
 - A) *Natives* could be taught to speak English
 - B) Europeans could learn the *natives'* language
 - C) Explorers could interbreed with *natives***
 - D) The friendliness of the *natives*
 - E) Similarities in jewelry design

4. An individual's gender is:
 - A) A direct reflection of their chromosomal makeup.
 - B) Determined by their reproductive identity.
 - C) Their socio-sexual identity that reflects only in part their biological sex (i.e. chromosomal makeup).**
 - D) Their social identity and thus is completely unrelated to biological factors.
 - E) None of the above.

5. What is pseudo-speciation?
 - A) The classification of members of our own species as non-human.**
 - B) The biological difference between Asians, African and Europeans.
 - C) Lyell's argument against slavery.
 - D) Descent with modification *a la* Darwin.
 - E) Both A and C.

6. The *Scala Naturae*

- A) was first suggested by Pythagoras (582-500 BC).
- B) is the ranking of all organisms from less perfect to most perfect.**
- C) was seen as mutable.
- D) was seen as heresy by the Catholic Church.
- E) Was proven as scientific fact by Copernicus.

7. Which of the following is part of the theory of polygenesis?

- I. All humans descended from Adam.
- II. Non-Europeans are more distantly related to Adam than Europeans, and are therefore farther from God.
- III. Only Europeans are descents of Adam.
- IV. Rejection of Buffon's criteria of infertility for species.
- V. Non-Europeans are environmentally determined degenerate forms.

- A) All of the above.
- B) I, II and V.
- C) II, III and IV.
- D) III only.
- E) **III and IV.**

Correctly match the discovery/invention/scientific theory with the scientist.

8. B Georges-Louis De Buffon (1707-1788)

9. E Carolus Linnaeus (1707-1778)

10. D Isaac Newton (1642-1727)

11. A Antony van Leeuwenhoek (1632-1723)

12. C Jean-Baptiste de Lamarck (1744-1829)

- A) Used the microscope to discover previously unknown microorganisms.
- B) Variation within a species is the result of organisms adapting to the environment through phenotypic plasticity.
- C) Organisms develop adaptive traits through interacting with the environment and pass these acquired traits on to their offspring.
- D) Estimated that the earth must be older than 100,000 based on the time it would take to cool down.
- E) The binomial nomenclature of *Genus species* for organisms that is still used today.

- 13 The theory of Catastrophism was proposed by _____ and states that _____.
- A) Ussher; the world is approximately 6000 years old.
 - B) Lyell; processes that happen today have happened in the same way and at the same rate throughout time.
 - C) Buffon; members of one species cannot breed with members of another species.
 - D) Lyell; a series of catastrophes, such as floods, have resulted in the creation of new species.
 - E) **Curvier; a series of catastrophic events caused the extinction of animals found in fossil beds.**
14. Which of the following experiments would most likely have been conducted by Lamarck?
- A) crossing fruit flies to study patterns of bristle variation
 - B) crossing begonias to study the phenomenon of co-dominance
 - C) **chopping off rats' tails to study taillessness in their offspring**
 - D) breeding true breeding strains.
 - E) b and d. above
15. Mitosis
- A) results in haploid cells.
 - B) **is necessary for an individual's growth.**
 - C) creates gametes.
 - D) allows mutations to be inherited by future generations.
 - E) none of the above.
16. Is it possible for two parents homozygous for albinism (a recessive trait) to have a non-albino child?
- A) No. All children will be albino.
 - B) Yes. Mendelian genetics predicts that 50% of the children will be normal.
 - C) Yes. Mutation reverting back to the normal gene occurring during mitosis in the parents will result in a small percentage of normal children.
 - D) **Yes. Mutation reverting back to the normal gene occurring during meiosis in the parents will result in a small percentage of normal children.**
 - E) Yes. All children will be normal, as albinism is not heritable.
17. What type of inheritance is illustrated by the ABO blood system?
- A) Dominate/recessive
 - B) **Codominance**
 - C) Incomplete dominance
 - D) Somatic
 - E) Sex linked
18. A blue-eyed woman married to a blue-eyed man gives birth to a brown-eyed baby. What explanation(s) is/are reasonable?
- A) Eye color is a polygenic trait with incomplete dominance.

- B) The husband was cheating.
- C) The wife was cheating.
- D) A mutation occurred.
- E) A, C, and D.**

19-20. In a population of Martians, the gene for arm number (four or three) and the gene for the presence of warts are both simple, dominant/recessive, autosomal genes that are not linked to each other. The allele for four arms (F) is dominant over the recessive allele for three arms (f) and the allele for presence of warts (W) is dominant over the recessive allele for no warts (w). Given a mother with the genotype Ffww and a father with the genotype FFww, answer the following questions. (hint: Try creating a Punnett square for each trait)

19. What percentage of the F1 generation will have warts?

- A) 0%
- B) 25%
- C) 50%**
- D) 75%
- E) 100%

20. What percentage of the F1 generation will have three arms?

- A) 0%**
- B) 25%
- C) 50%
- D) 75%
- E) 100%

21. Galapagos finches appear to be a result of

- A) convergent evolution operating on a variety of dissimilar species to adapt them to similar niches
- B) the effects that population growth and natural selection have on geographically isolated populations**
- C) the effects of continuous gene flow between the islands and the mainland over many thousands of years
- D) provide a good example of the artificial selection that is common in equatorial areas.
- E) all have similar sized beaks because of their shared common ancestry.

22. Linneaus

- A) developed the quadrinomial system for the classification of plants and animals
- B) believed that the types of plants and animals on earth were a product of God's divine wisdom and did not change**
- C) believed that if given enough time one species could gradually evolve into another species.
- D) insisted that only biological traits be used in the classification of human
- E) None of the above

23. Most natural historians of the 17th and 18th centuries
- A) believed in natural selection but were afraid to speak out for fear of being burned at the stake
 - B) believed that their investigations of biological diversity could be justified to the extent that they increased our understanding and appreciation of God and his divine wisdom**
 - C) believed that the earth was millions of years old
 - D) rejected the idea of a “scala naturae”
 - E) Both A and C
24. Adaptation through natural selection
- A) could not possibly occur in a highly technological society such as our own
 - B) is more rapid than cultural adaptation
 - C) has a rate that depends on the length of a reproductive generation**
 - D) is caused by random mating
 - E) Both A and C
25. Meiosis
- A) normally results in a the reduction of chromosome number by one half
 - B) sometimes results in the uneven division of chromosomes between the daughter cells
 - C) can not result in heritable mutations because it occurs in somatic cells
 - D) is the British spelling of Mitosis.
 - E) Both A and B**
26. Crossing-over
- A) is impossible in sexual reproducing organisms
 - B) makes it possible for genetic material to recombine in favorable ways**
 - C) is only possible in asexually reproducing organisms
 - D) causes Turner's syndrome
 - E) none of the above
27. Which of the following is(are) normally not inherited
- A) point mutations
 - B) somatic mutations**
 - C) mitochondrial mutations
 - D) recombinations of genetic material produced through crossing-over
 - E) Both A and C
28. All of the following are true of Albinism EXCEPT
- A) it occurs in many animal species
 - B) it results from a mutation that inhibits the synthesis of an enzyme necessary for the production of melanin in the skin
 - C) it is rare among the Hopi because people who have it are considered to be a bad omen and avoided as marriage partners**

- D) it is likely to have an effect on vitamin D synthesis in the people who have it
E) it is a recessive trait
29. People with Down Syndrome
A) have an extra X chromosome
B) have a missing autosome
C) are always phenotypically female
D) have three of chromosome number 21
E) All of the above
30. Eugenics
A) developed in Germany and spread from there to the United States
B) refers to the idea that the frequency of “good” genes can be increased through various “positive” and “negative” means
C) has never had a wide following in the United States
D) is the same as bioengineering
E) A, B, and C
31. Which of the following is NOT an argument in Darwin’s Theory of Evolution?
A) Variations exist among individuals of a species
B) Variations are passed to future generations though particulate inheritance.
C) Species tend to over-reproduce.
D) There is a struggle for survival.
E) Through accumulation of favorable heritable traits, new species eventually developed.
32. According to lecture, which of the following is NOT true about symbols?
A) They are, by definition, logical and universal.
B) They facilitate cooperation.
C) They facilitate competition.
D) Human are unique in their extensive use of symbols.
E) They allow us to construct favorable boundaries between them and us.
33. Theories postulated by Greek philosophers from 600-300 BC discussed in lecture include all of the following EXCEPT:
A) All of life is made up of atoms.
B) Mathematics is at the heart of reality.
C) The world is in a constant state of slight change.
D) Everyday reality is an imperfect reflection of a perfect form.
E) The most satisfying form of human existence is found the rational thought.
34. If a woman has a particular allele, such as MTRNR1 or MTTS1, on her mitochondrial DNA, who will also inherit that trait?
I) Her sons
II) Her daughters
III) Her sons’ sons

IV) Her daughters' daughters

- A) I and II only
- B) II and IV only
- C) I and III only
- D) I, II, and IV only**
- E) All with have the trait.

35. If a given recessive allele is deleterious in homozygotes, but gives a heterozygote advantage in the form of resistance to a particular viral infection, what distribution pattern would you expect to see for the trait?

- A) The allele would be found equally in all populations due to random mutations.
- B) The allele would be common in populations where the viral infection is rare.
- C) The allele would have higher frequencies in places where the rates viral infection is high.**
- D) The allele would be wiped out due to its deleterious affects.
- E) The allele would have the highest frequency in populations with low immigration rates.

37. Epigenetic imprinting

- A) Can result from the methylation of DNA.
- B) Will always be inherited.
- C) Can result in an adaptive response to the environment.
- D) Only results in changes for one generation.
- E) Both A and C.**

38. The impressive tail of the peacock

- A) is favored by natural selection as a defense against predators
- B) is used by males as a shield during fights over females
- C) may provide peahens with an index of the health status prospective mates**
- D) is most likely a result of the founder effect instead of natural selection
- E) both C and D

39. Directional selection

- A) is a form of genetic drift .
- B) reduces genetic variability by selecting out extremes.
- C) can have an effect that is similar to that of epigenetic imprinting.
- D) may explain the relatively low mortality rates experience by babies of average birth weight.
- E) results in a change in the average value of a trait.**

40. Natural selection in which individuals with average traits have fewer offspring than those on either extreme is called:

- A) Multi-directional selection
- B) Stabilizing selection
- C) Social selection.

- D) Allopathic selection.
- E) **Divergent selection.**

41. Survival of the fittest

- A) Refers to the fact that aggressive animals are always better off
- B) Refers to reproductive success**
- C) Refers to the evolutionary edge of individuals who exercise.
- D) Refers to the fact that well adapted individuals live longer.
- E) Justifies exploitation of weaker individuals by fit individuals.

42. Thomas Malthus *An Essay on Population* stated that

- A) the only way to stop people from having so many children is to institute social security programs so that they will be confident that they will be taken care of in old age.
- B) Eugenics is the only way to balance population and resources.
- C) "Preventive" checks such as postponing marriage, birth control, and so on are relatively ineffective in maintaining a balance between population and resources.
- D) the geometric growth of population inevitably outpaces the food supply and will lead to competition.**
- E) the poor must be allowed to have as many children as they want since they don't know any better.

Match the following disorders with their genetic basis (only one correct match for each disorder):

- 43. C Turner's syndrome
- 44. B Sickle cell anemia
- 45. A Hemophilia
- 46. D Cri du Chat syndrome

- A) caused by an allele carried on the X chromosome
- B) caused by a point mutation
- C) found in people with a single X chromosome
- D) caused by the deletion of part of a chromosome
- E) caused by an autosomal dominant mutation

47. Buffon

- A) believed that the species was the highest level at which animals could be organized.**
- B) was a staunch believer in the theory of evolution.
- C) felt that species had changed greatly since creation.
- D) thought that new species had come into existence since creation.
- E) was a supporter of Linnaeus.

48. According to Franz Boas, biological evolution could not be the cause of cultural evolution because

- A) biology changed too slowly to account for cultural changes.**

- B) cultural evolution was not a valid construct.
- C) there are significant biological differences among people.
- D) they have the same mechanism of transmission.
- E) all of the above

49. According to the film *Race: The Power of Illusion*,

- A) You will share most of your genes with people of your ethnic/racial group.
- B) There is more variation between races than there is within races.
- C) For any given stretch of DNA you are as likely to be similar to someone completely outside your group as within it.**
- D) The large amount of human variation between groups is due to the long time that humans have been evolving in different parts of the world.
- E) B and C.

50. In Thomas Gregor's article on the Mehinaku in Brazil, Gregor found that height was correlated with

- A) Penis size.
- B) Number of girlfriends
- C) Wealth
- D) Ritual participation
- E) All of the above except A.**