

Ecology and Evolution - Exam 3 Spring 2007 Review Sheet

Exam 3 will cover chapters 4, 5 & 6 of your text and all notes since the last exam.

Please do not just study these questions – **also study the book and the notes.**

1. The process of transcription creates which of the following?

- A. DNA      B. Protein      C. Enzyme      D. mRNA      E. mutations

2. What are “introns?”

- A. RNA                      B. Chromosomes                      C. Dominant alleles  
E. The portion of a gene that is not transcribed.      E. The promoter sequence

3. What is the portion of the gene that is transcribed called?

- A. Exons      B. Introns      C. mRNA                      D. tRNA                      E. semiconservative replication

4. How many different codons are there?

- A. one      B. two                      C. four                      D. 20                      E. 64

5. How many different amino acids are there?

- A. one      B. two                      C. four                      D. 20                      E. 64

6. Which of the following is the best description of proteins.

- A. polymers composed of long strings of DNA      B. polymers composed of long strings of amino acids  
C. monomers composed of a single codon.                      D. polymers composed of long strings of RNA  
E. Cellulose

7. Which of the following is not part of DNA?

- A. a deoxyribose sugar                      B. phosphates                      C. nitrogenous bases  
D. Amino acids                      E. Starch

8. Which part of DNA is different in every gene.

- A. The deoxyribose sugars                      B. The phosphates      C. the sequence of nitrogenous bases  
D. The bonding of the sugars                      E. The sequence of the phosphates

9. How many different kinds of nitrogenous bases are found in DNA?

- A. none      B. 1                      C. 2                      D. 4                      E. 64

10. How many different sequences (permutations) of DNA are possible?

- A. one      B.  $4^2=16$                       C.  $4^3=64$                       D. nearly infinite                      E. 2.

11. How would a single-point-substitution type mutation that occurs in an intron effect the phenotype?

- A. it would cause a deleterious mutation                      B. It would cause a beneficial mutation  
C. It would have no effect of the phenotype      D. It would cause an allele to become dominant  
E. It depends on whether the mutation resulted in a new codon that coded for a different amino acid than the old codon.

12. Which of the following is the best description of a mutation?
- A. a change in the sequence of DNA of a gene
  - B. A change in the phenotype
  - C. An error during transcription
  - D. A new phenotype
  - E. A change in the amino acid sequence of a protein.
13. Which of the following would result in a mutation being “neutral?”
- A. It changes the sequence of amino acids in a protein but has no effect of the function of the protein.
  - B. It change a codon to a synonymous codon.
  - C. it occurs in an intron
  - D. It occurs in a noncoding region of the promoter region but has no effect on transcription
  - E. All of above
14. How is speciation different from evolution?
- A. They are the same thing.
  - B. Evolution is the change of frequency of alleles in a population: Speciation is the formation of new species
  - C. Evolution is the formation of species: Speciation is the extinction of species
  - D. Speciation is the formation of new species: Evolution is speciation plus extinction
  - E. Evolution can not occur unless speciation occurs
15. What is meant by the term “allopatric speciation?”
- A. Speciation occurs after the population is divided into two geographically isolated populations
  - B. Speciation occurs while two populations are not geographically isolated?
  - C. Speciation occurs because of postzygotic barriers top reproduction
  - D. Speciation occurs because an infertile hybrid is formed
  - E. Speciation is occurs after bottleneck in population size has reduced variability within the population
16. According to the “Biological Species Concept” what is a species?
- A. a species is a population of interbreeding or potentially interbreeding organisms
  - B. A species is a population consisting individuals with a distinct and recognizable phenotype.
  - C. A species is a population with a minimum of phenotypic variation
  - D. A species is a population with many hybrids
  - E. A species is a population of closely related individuals who all share the same alleles
17. What is a species?
18. Which of the following best summarizes the central dogma of molecular biology
- A. DNA – replication → DNA – transcription→ RNA – translation→ protein
  - B. DNA –transcription→ DNA –replication→ RNA – translation→ protein
  - C. DNA – replication → DNA – transcription → Protein –translation→ RNA
  - D. DNA ←replication-- DNA ←transcription-- RNA ←translation-- protein
19. How many proteins does each gene code for?
- A. 1
  - B. 2
  - C. Many
  - D. 4
  - E. 6

20. Which of the following is not a nucleic acid? Which is not found in DNA?

- A. Cytosine                      B. Adenine                      C. Thymine                      D. Uracil                      E. Guanine

22. Which of the following is true of both DNA and RNA?

- A. double stranded                      B. Contain a deoxyribose sugar                      C. formed by transcription  
D. contain guanine                      E. contain phosphate group.

23. Why would two species have very similar DNA sequences in the non-coding regions of their DNA?

- A. selection favored the same sequences  
B. Chance mutations led to the same sequences occurring  
C. they inherited the sequences from the same sequences from the same ancestor  
D. the sequences were created by convergent evolution  
E. all of above

24. Which of the following is an example of pre-zygotic barrier to reproduction.

- A. Population A does not recognize the mating call of population B  
B. A cross between a male donkey (jack) and female horse (mare) produces a sterile mule.  
C. A Shetland pony crossed with Clydesdale dies during labor.  
D. Adaptive radiation  
E.

25. Which of the following is an example of pre-zygotic barrier to reproduction.

(come up with your own answers)

26. Which of the following is an example of sympatric speciation?

- A. Host-plant specialization in apple and hawthorn maggot flies (*Genus Rhagoletis*)  
B. Polyploid species of phlox.  
C. Purple and eastern Finches  
D. Adaptive radiation of Darwin's Finches  
E. Both A & B.

27. What does the theory of punctuated equilibrium predict?

- A. that evolution and speciation always occurs at the same rate  
B. That speciation never occurs  
C. That speciation occurs at predictable intervals after microevolution has accumulated mutations  
D. That over long periods of time very little speciation occurs and these periods are followed by brief periods of adaptive radiation  
E. macroevolution is fundamentally different from microevolution.

28. What the K-T (cretaceous-tertiary) border occurred when?

- A. 100mybp                      B 1mybp                      C. 650mybp                      D 300mybp

29. Which of the following is not evidence of a meteorite impact at the K-T border?  
A. a mass extinction      B. the chixulub crater      C. shocked quartz deposits in the sediments  
D. an iridium enriched sediment      E. fossil UFOs
30. Approximately When did the Cambrian explosion occur  
A. 600-650 mybp      B. 60-65mybp      C. 6-6.5 mybp      D. 0.6-0.65 mybp
31. What was the Cambrian explosion?  
A. a meteorite strike that caused a mass extinction  
B. a massive volcano that cause 100,000 years of cooler climate  
C. The sudden disappearance of thousands of animal species from the fossil record  
D. The appearance of thousands of animal species in the fossil record over a very short time period.  
E. the burgess shales
32. Does the theory of punctuated equilibrium contradict our knowledge of the mechanisms of evolution?  
A. yes      B. no
33. What is a "frame-shift mutation?"  
A. A mutation that inserts or deletes a nitrogenous base therefore will probably change the sequence of all subsequent codons and result in a very different protein.  
B. A neutral substitution      C. A beneficial mutation  
D. A mutation that results in new chromosomes      E. An synonymous substitution
34. Which of the following best summarizes the central dogma of molecular biology  
A. DNA → translation → DNA → transcription → RNA → replication → protein  
B. DNA → transcription → DNA → replication → RNA → translation → protein  
C. DNA → replication → DNA → transcription → Protein → translation → RNA  
D. DNA ← replication → DNA ← transcription → RNA ← translation → protein  
E. DNA → replication → DNA → transcription → RNA → translation → protein
35. What is a zygote?  
A. One half the chromosomes      B. A gamete      C. a barking deer  
D. A hooved mammal similar to a sheep      E. The cell formed from the fusion of an egg and a sperm.
36. What is one different between the Chinese and Indian Muntjac?  
A. One has 46 pairs of homologous chromosomes the other has 6 pairs of homologous chromosomes  
B. One is a small deer the other is a mouse  
C. One is a sterile hybrid the other is a viable species  
D. One has 12 pairs of homologous chromosomes the other has 6 pairs of homologous chromosomes
37. What is "non-disjunction"?  
A. a confusing double negative  
B. The failure of chromosomes to segregate during meiosis  
C. A type of physical incompatibility that resulting a prezygotic barrier to reproduction  
D. The ability of chromosomes to change over evolutionary time.

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38. What is macroevolution?

- A. the evolution of big animals
- B. the evolution of small organisms
- C. the creation of new species and groups of species
- D. change in allele frequencies in the population
- E.

39. Which of the following is an example of sexual selection?

- A. Female peahens preferring to mate with male peacocks that have large symmetrical tails
- B. The rarer color form of a caterpillar are less likely to be found and eaten by birds than the more common colored caterpillar.
- C. Melanic (black colored) moths becoming more common where soot coats tree trunks.
- D. New species of Phlox being formed because of polyploidy
- E.

40. Which of the following is thought to be an example of allopatric speciation

- A. Hawthorn and Apple maggots
- B. Wheat and Eikorn
- C. Two species of squirrills on the two rims of the grand canyon