

BIOLOGY: A HUMAN APPROACH, EBIO 1030 - EXAM II

Nov. 1, 2010

NAME _____

READ THE DIRECTIONS

INSTRUCTIONS: Use a **SOFT-LEAD** pencil (#1 or #2) for writing in and mark-sensing your name, CU I.D. number, lecture section number and answers on the exam answer sheet, erasing completely when necessary. For the lecture section, use either 0001 or 0002 in the "1,2,3,4" slot on the top left of the sheet. An answer key and test scores will be posted in the glass cabinet at the foot of the stairway in Ramaley across from room **N1B54 (=N.E. corner basement)** as soon as they are available, hopefully by Wednesday noon. Be sure to guess any time you don't know an answer. There are no deliberately tricky questions, so if something doesn't make sense to you, ask one of the proctors. On the bottom of your **answer sheet** you may defend your answer to any question you feel is ambiguous, but you must **FIRST** mark-sense your best guess among the choices. To ensure your not running out of time, complete the entire exam before defending a specific answer. Expect to have the equivalent of one question deducted from your exam score if you are **not** taking the exam in the proper lecture hall!

Your cell phone is to be turned off and if you must wear a hat, turn the bill to the back. You are **not** to use iPods, cell phones, digital media players, Zunes, Blackberries, computers or calculators during the exam. There cannot be any ear phones, ear pieces, *etc.*, in or around your ears at any time. Any answers you have put on your answer sheet or exam are to be covered in such a way that no one can see them, and do not let your eyes wander.

STOP – MAKE SURE YOU ARE SITTING IN THE PROPER LECTURE HALL.

The 9:00 a.m. TR LECTURE SESSION (#0001) use CHEM 142

The 12:30 p.m. TR LECTURE SESSION (#0002) use CHEM 140

Please spread out as much as possible in these lecture halls.

KEEP YOUR ANSWERS AND ANSWER SHEET COVERED AT ALL TIMES.

- Which is **FALSE**?
 - Mitosis / meiosis = division of nuclear material
 - Cytokinesis = division of cells after mitosis / meiosis
 - Somatic cells ($2n$) = body cells, as opposed to germinal ($2n$ or n) cells.
 - Germinal cells = gametes (n) (eggs or sperm), or reproductive cells ($2n$) capable of forming gametes.
 - Diploid cells ($2n$) are cells with unpaired chromosomes. Each chromosome came from either the mother or the father.
- Which of the following about human cells is **FALSE**?
 - A zygote has a $2n$ chromosome number.
 - None of the germ cells in an ovary divide by mitosis.
 - Some of the germ cells in an ovary have a $2n$ chromosome number
 - Some of the germ cells in an ovary have an n chromosome number.
 - Sperm cells always have an n chromosome number.

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3. In following the sequence of forms that genetic materials take, the form that comes after the duplicated chromatin network would be:
A) Haploids C) Monads E) Unduplicated chromatin network
B) Diploids D) Diads
4. The location on a pair of homologous chromosomes which houses a gene is defined as a/an:
A) Allele C) Centromere E) Alternative form of a gene
B) Gene locus D) Diad
5. The point of contact / breaking / and reattachment of the chromatids during the process of crossing over is called:
A) Crossing over C) Synapsis E) Chiasma
B) Contact merging point D) Genetic locus
6. Which is **FALSE**?
A) After the first meiotic division the chromosomes are monads.
B) After the first meiotic division the resulting cells are haploids.
C) After mitosis the resulting cells are diploids.
D) After the second meiotic division the resulting cells are haploids.
E) After the second meiotic division the resulting chromosomes are monads.
7. The DNA would be in the chromatin network form during:
A) Telophase B) Anaphase C) Metaphase D) Prophase E) Interphase
8. The point-for-point contact between alleles at identical loci on homologous diads at the beginning of meiosis is called:
A) Metaphase C) Chiasma E) None of the above
B) Crossing over D) Synapsis
9. With respect to mitosis/meiosis, all of the following are found exclusively in **meiosis EXCEPT**:
A) Crossing-over B) Monads C) Tetrads D) Chiasmata E) Synapses
10. Which of the following is **FALSE**?
A) There is no DNA replication during Meiosis II. D) Diads only form in meiosis.
B) There are no synapses during mitosis. E) Mitosis involves only one nuclear division.
C) Tetrads only form in meiosis.
11. Mendel reasoned that his results could be explained if all of the following conditions existed **EXCEPT**:
A) The traits are controlled by particulate factors.
B) Each individual possesses two factors for each trait.
C) Only one of the factors goes to its offspring.
D) None of the factors were linked to one another.
E) One factor is dominant over another.
12. Which of the following would most accurately represent a **phenotype**?
A) Pp B) F₁ C) Purple flower D) Test cross E) Genetic makeup

13. That the inheritance of one pair of factors (alleles) is not influenced by the inheritance of another pair is called:
A) Phenotypic shift B) Genotypic shift C) Epistasis D) Independence E) Segregation

For the following two problems (#s 14 & 15), assume a Mendelian cross in garden peas of a round, yellow seeded parent times a wrinkled, green seeded parent, where both **round** and **yellow** seeds are **dominant** traits. Both parents are homozygous at both loci.

14. How many different types of gametes can the round, yellow seeded parent produce?
A) 1 B) 2 C) 3 D) 4 E) 16
15. What proportion of the F₂ offspring would be predicted to have yellow seeds?
A) 10% B) 20% C) 25% D) 50% E) 75%
16. If Mendel would have crossed a round yellow F₁ hybrid pea plant with a wrinkled green parent, how many different types of offspring would have been expected?
A) one B) two C) three D) four E) more than four
17. An individual having two independent loci expressing the genotype AaBB would be able to have how many different kinds of gametes?
A) 1 B) 2 C) 3 D) 4 E) None of these is correct
18. Simple Mendelian inheritance demands all of the following **EXCEPT**:
A) Two (and only two) alleles at a locus
B) One locus being responsible for one trait or one phenotypic effect
C) Presence of complete dominance or recessiveness
D) Occurrence of the F₁ offspring with a phenotypic ratio of 3:1.
E) No influence of loci by adjacent, or other, loci.
19. A person with type B blood has children with a person with type A blood. What are the possible blood types of the children?
A) AB only B) AB + A C) AB + A + B D) AB + A + B + O E) A + B + O
20. Which is **FALSE**?
A) Meristic traits tend to be countable.
B) Meristic traits tend to be significantly influenced by environmental factors.
C) Mensural traits are often coded by non-Mendelian systems.
D) Meristic traits are discontinuous traits.
E) Meristic traits are coded by Mendelian systems.
21. Which is **FALSE**?
A) Crossing over is an abnormal exchange of genetic material between homologues during meiosis.
B) Crossing over is an exception to linkage.
C) Alleles that occur on the same chromosome are said to be linked.
D) Linkage is an exception to Mendel's Law of Independence.
E) Linkage is a very common phenomenon.

22. Which is **FALSE**?
- A) The male determines the sex of the offspring in humans
 - B) Sex linkage is the same as X linkage in humans.
 - C) The Y chromosome has fewer alleles than the X chromosome in humans.
 - D) A color blind person with a “cc” genotype could be either male or female.
 - E) A single allele on an X chromosome can determine the phenotype in a male.
23. If color blindness is due to a sex-linked recessive allele “a,” which of the following is **FALSE**?
- A) An Aa genotype would have normal vision.
 - B) An aY genotype would be color blind
 - C) An AY genotype would be a male
 - D) An XX genotype would always have normal vision.
 - E) An Aa genotype would be a carrier.
24. In humans, all of the following would represent an example of **nondisjunction** resulting in **aneuploidy EXCEPT**:
- A) Trisomy X
 - B) Klinefelter’s syndrome
 - C) Turner’s syndrome
 - D) Downs syndrome
 - E) Chondrodystrophic dwarfism
25. Individuals who should routinely seek genetic counseling before having children would include all of the following **EXCEPT** those who:
- A) Have a close relative with a genetic disorder.
 - B) Are from upper latitudes such as northern Scandinavia.
 - C) Have a history of spontaneous abortions or stillbirths.
 - D) Are of a relatively advanced reproductive age.
 - E) Are members of a relatively small gene pool.
26. All of the following apply to **mutations EXCEPT**:
- A) Are mostly detrimental.
 - B) Have rates that are influenced by temperature.
 - C) Occur at different rates in different species.
 - D) May occur in somatic or germinal cells
 - E) Occur more-or-less in a non-random fashion
27. Color blindness in humans is due to a recessive, sex-linked allele. What is the probability that a normal-visioned man and a colorblind woman would have a normal-visioned son?
- A) 0
 - B) $\frac{1}{4}$
 - C) $\frac{1}{2}$
 - D) $\frac{3}{4}$
 - E) 100%
28. Preventive measures to improve public health in a community would include all of the following **EXCEPT**:
- A) Education
 - B) Water fluoridation
 - C) Pest control
 - D) Postnatal surgery
 - E) Water treatment
29. Which of the following would **not** be considered a genetic novelty?
- A) Duplications
 - B) Mutations
 - C) Inversions
 - D) Deletions
 - E) Translocations
30. Humans have influenced genetic processes in all the following ways **EXCEPT**:
- A) Slowing successions after community disturbances

- B) Recombinant DNA technology
 C) Cytogenetics / the green revolution
 D) Molecular genetics / genetic engineering
 E) Plant and animal breeding
31. The study of the diversity and kinds of organisms and the genetic (historical) relationships among them is called:
 A) Behavioral ecology C) Systematics E) Population genetics
 B) Biogeography D) Population ecology
32. Imagine a room containing 30 people with type AB blood, 20 with type B blood and ten with type O blood. How many **alleles** for “A” blood type would be in the room?
 A) 10 B) 15 C) 30 D) 40 E) 60
33. If within the MN blood group locus the frequency of the “N” allele is 6/10 (0.6), what per cent of the population has the MN blood type?
 A) 24 B) 36 C) 40 D) 48 E) 6
34. Albinism is due to a simple recessive allele. If nine out of 10,000 people in Transylvania are found to be albinos, what is the frequency of the allele for normal skin color?
 A) 42% B) 75% C) 90% D) 97% E) 98%
35. The term that would most appropriately describe the population of elephant seals along the western coast of North America from the early 1900s until today would be:
 A) Random mating C) Bottleneck effect E) Genetic drift
 B) Founder effect D) Large population
36. If the ability to roll one’s tongue is due to a simple Mendelian dominant allele, and if 99% of the population are rollers, what percentage of this same population are heterozygous for the trait?
 A) 9% B) 10% C) 18% D) 27% E) 33%
37. Major evolutionary questions of the past would include all of the following **EXCEPT**:
 A) What is the nature of the obvious relationships among organisms?
 B) How can a very diverse individual evolve into a new species?
 C) What is the meaning of fossils?
 D) Why are there so many different kinds of organisms?
 E) Why do organisms seem to fit their environments?
38. All of the following in some way characterize or were associated with Charles Darwin **EXCEPT**:
 A) Alfred Russell Wallace D) Studied in the ministry
 B) Beagle E) Completed one year of medical school
 C) *Origin of the Species*
39. All of the following are true about Charles Darwin **EXCEPT**:
 A) He was intelligent, had a mind for details and was curious about organisms.
 B) His father said he would never amount to anything.
 C) He had a willingness to accept new explanations.
 D) His first year in college was as a medical student.
 E) He was a procrastinator when it came to publishing his results.

40. Darwin set forth several observations and one conclusion. Which of the following represents his conclusion?
- A) Species resources are always limited.
 - B) Some individuals are better at becoming parents.
 - C) There is significant variation within populations.
 - D) Species tend toward over population
 - E) There are similarities within close relatives