

# READ THE DIRECTIONS

**BIOLOGY: A HUMAN APPROACH EXAMINATION II NAME \_\_\_\_\_**

**EBIO 1030, SECS. #0001 & #0002**

**7 November 2005**

**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 your CU I.D. number, use the same number you used on Exam I. 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)**, 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 location!

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**STOP – MAKE SURE YOU ARE SITTING IN THE PROPER SECTION.**

**The 8:00 a.m. LECTURE SESSION should be in CHEM 142 = Sec. #0001**

**The 12:30 p.m. LECTURE SESSION should be in CHEM 140 = Sec. #0002**

**KEEP YOUR ANSWERS AND ANSWER SHEET COVERED AT ALL TIMES.**

1. Which is **FALSE**?

- A) On a percentage basis, developing countries use more **renewable** energy today than developed countries.
- B) On a percentage basis, developing countries use significantly less natural gas today than developed countries.
- C) In the US today, it takes about 3.6 K cal of energy to produce 1 K cal of corn.
- D) People from industrialized countries use slightly less than 50% of the world's fossil fuels.
- E) People in the US use more than 100 times the energy today as did primitive people of the past.

\*2. Which of the following is **FALSE**?

- A) Before the advent of fire, primitive people used about 2000 kilocalories of energy per person per day.
- B) More energy was needed to feed the livestock and power the tractors.
- C) Some fossil fuels are used today to make pesticides and herbicides.
- D) Some fossil fuels are used today to make fertilizers.
- E) About 50 times more energy is used today here in the US than primitive peoples used.

3. All of the following statements are **true EXCEPT**:

- A) With projections from trends in global warming, some areas in the world, including most of the lower 48 states, are expected to become drier.
- B) A significant number of the fisheries in the North Atlantic have become depleted.
- C) Radioactive fallout from the Chernobyl nuclear plant spread around the world, traveling in a westerly direction.
- D) Constituting about 4.2% of the world population, the US produces about 72% of the world's hazardous waste production.
- E) Developing countries use a significantly greater percentage of renewable energy resources compared to that of developed countries.

4. In following the sequence of forms that genetic materials take, the form that comes after the duplicated chromatin network would be:

- A) Haploids
- B) Diploids
- C) Monads
- D) Diads
- E) Unduplicated chromatin network

5. Which of the following statements is **FALSE**?

- A) Haploid cells will never have diad chromosomes.
- B)  $N$  vs.  $2N$  refers to cells.
- C) **Monad** vs. **Diad** refers to chromosomes.
- D) **Haploid** vs. **Diploid** refers to cells.
- E) The **chromatin network** is one of the forms the genetic material takes.

6. The location on a pair of homologous chromosomes which houses a gene is defined as a/an:

- A) Allele
- B) Gene locus
- C) Centromere
- D) Diad
- E) Alternative form of a gene

7. The point of contact / breaking / and reattachment of the chromatids during the process of crossing over is called:

- A) Crossing over
- B) Contact merging point
- C) Synapsis
- D) Genetic locus
- E) Chiasma

8. The separation of a previously duplicated system might most appropriately be referred to as:

- A) Mitosis
- B) Meiosis
- C) Cytokinesis
- D) Gametogenesis
- E) Cell divisions in general

9. Which is **FALSE**?

- A) Somatic cells only divide by mitosis.
- B) Germinal cells only divide by meiosis.
- C) Mitosis always ends with  $2n$  cells.
- D) Meiosis always ends with  $n$  cells.
- E) Mitosis is more ancestral (primitive) than meiosis

10. 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.

11. The equal exchange of alleles between homologous diads during synapsis is called:

- A) Transformation
- B) Crossing over
- C) Chiasmata
- D) Synapsis
- E) Meiosis I

12. All of the following would be represented in the process of **mitosis EXCEPT**:

- A) Diploid cells to haploid cells
- B) Diploid cells to diploid cells
- C) Mother cell to daughter cells
- D) One cell to two cells
- E) Diads to monads

13. 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

14. The single organism that has contributed the most to our knowledge of genetics would be the:

- A) *E. coli* (bacteria)
- B) Snapdragon
- C) Corn
- D) Garden pea
- E) Fruit fly

15. Garden peas were a great choice for Mendel for all the following reasons **EXCEPT**:

- A) Their flowers contained male parts or female parts, but not both together.
- B) They were easy to grow.
- C) There were lots of true breeding varieties available commercially.
- D) They were of a reasonable size (0.1 – 1m. tall).
- E) Their characteristics could easily be studied macroscopically.

16. Phenotype would most accurately be represented by which of the following?

- A) Pp
- B) F<sub>1</sub>
- C) Purple flower
- D) Test cross
- E) Genetic makeup

17. Which of the following is **FALSE**?

- A) “Tt” implies a dihybrid.
- B) Genotype refers to the alleles possessed.
- C) True breeding implies homozygosity
- D) Homozygous implies the same alleles as in TTYy.
- E) Phenotype is the appearance of a trait.

- \*18. The phenotypic ratio resulting from a test cross of a hybrid individual at one locus and the homozygous recessive individual would be:  
 A) 1 : 1      B) 1 : 2 : 1      C) 3 : 1      D) 2 : 3      E) 1 : 2 : 1
19. Assume that in crossing F<sub>1</sub> hybrid round, yellow garden peas, Mendel got 1200 F<sub>2</sub> individual pea plants. Of these, how many would be expected to be wrinkled?  
 A) 100      B) 300      C) 400      D) 600      E) 800
20. 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) Non of these is correct
21. All of the following would be exceptions to simple Mendelian inheritance **EXCEPT**:  
 A) Two alleles (factors) at each locus      D) Multiple alleles  
 B) Incomplete dominance      E) Multiple genes  
 C) Linkage
22. Crossing snapdragons with pink flowers among themselves would result in which of the following genotypic ratios?  
 A) 1:1      B) 3:1      C) 4:1      D) 1:2:1      E) 9:3:3:1
23. Measurable (continuous) traits often coded by non-Mendelian systems would be referred to as:  
 A) Pleiotrophy      C) Co-dominance      E) Epistasis  
 B) Mensural traits      D) Incomplete dominance
24. A person with the genotype AaBbCc would be able to produce, normally, which of the following types of gametes?  
 A) AaB      B) AbB      C) bBc      D) AbC      E) BcC
25. A normal process of genetic recombination mixing up the hereditary material inherited from the parents is called:  
 A) Crossing over      B) Independence      C) Chiasmata      D) Synapsis      E) Segregation
26. Which is **FALSE**? Crossing over....  
 A) Is an exception to Mendel's law of segregation.  
 B) Is a natural process.  
 C) Increases the number of different gametes.  
 D) Breaks apart linkage groups  
 E) Is an adaptive process

27. Which of the following is **FALSE**?
- A) The normal range of variability is often inherited by complex, non-Mendelian systems.
  - B) Outside normal-range characteristics are often inherited by simple Mendelian systems.
  - C) Albinism is due to simple Mendelian recessive alleles.
  - D) Extra loci added to a chromosome is called a duplication.
  - E) A reversal of some genetic loci on a chromosome is called translocation.
28. The most harmful or detrimental chromosomal change would be called a:
- A) Deletion
  - B) Crossing over
  - C) Translocation
  - D) Duplication
  - E) Inversion
29. Abnormal changes in **chromosomes** would include all of the following **EXCEPT**:
- A) Polyploidy
  - B) Duplications
  - C) Translocations
  - D) Deletions
  - E) Inversions
30. 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) Down's syndrome
  - E) Chondrodystrophic dwarfism
31. About one in \_\_\_\_\_ human gametes has a newly mutated gene at one of its loci.
- A) 2
  - B) 10
  - C) 100
  - D) 1000
  - E) 10,000
32. In humans, albinism is due to a Mendelian recessive allele, *c*. All of the following are true about a man who is heterozygous for albinism **EXCEPT**:
- A) One half of his gametes would be *c*.
  - B) One half of his gametes would be *C*.
  - C) He must have had at least one parent who was albino.
  - D) One half of his children with an albino woman would likely be albinos.
  - E) One fourth of his children with a heterozygous woman would likely be albinos.
33. In humans, albinism is recessive to a dominant allele for normal skin pigmentation. If two normal parents each carry an allele for albinism, what is the chance that their next child will be an albino daughter?
- A) 1/8
  - B) 1/6
  - C) 1/4
  - D) 1/3
  - E) 1/2
34. 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) 1/4
  - C) 1/2
  - D) 3/4
  - E) 100%

35. A man with type OM blood has children with a woman with type ABMN blood. How many different types of gametes with respect to these blood types can the two of them together produce?  
A) One                      B) Two                      C) Three                      D) Four                      E) Five
36. 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
37. 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
38. If there are two alleles at a particular locus in a population and one of them has a frequency of  $\frac{1}{4}$  (=25%), what is the frequency of the heterozygous individuals in that same population?  
A) 1/16                      B) 3/16                      C) 6/16                      D) 9/16                      E) 12/16
39. If 4% of the Native Americans on this continent possess type N blood, what is the frequency of the M allele in this same population?  
A) 0.2                      B) 0.3                      C) 0.4                      D) 0.8                      E) 0.9
40. 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%