Exam #2 BSC 2011 2004 Fall

NAME____**Key – answers in bold** _ **FORM B**

Before you begin, please write your name and social security number on the computerized score sheet. Mark in the corresponding bubbles under these. Fill in the Form (A or B), instructor (Winn), and course (BCS 2011-02) lines.
Select the best answer to each question: ONLY ANSWERS RECORDED ON THE COMPUTERIZED SCORE SHEET WILL BE GRADED

1. How many different kind of gametes can be produced by an individual with the genotype AaBBCcDd?
a. 4 b. 6 **c. 8** d. 16 e. 32

2. In a cross between a parent that is homozygous recessive at a locus and a parent that is heterozygous at that locus, what is the expected frequency of offspring that are homozygous recessive?
a. 0 b. 1/4 **c. 1/2** d. 3/4 e. 3/8

3. For a trait determined by 2 co-dominant alleles at a single locus, the expected ratio of phenotypes in a cross between two heterozygotes is
a. 9:3:4 b. 9:3:3:1 c. 3:1 d. 1:1 **e. 1:2:1**

4. What is the probability that the first child of a man with ABO blood type O and a woman with type AB blood will be either a boy with type B blood **or** a boy with type A blood?
a. 1/2 b. 1/4 c. 1/8 d. 1/16 e. 1/32

5. What is the probability that a woman who is a carrier for the X-linked trait hemophilia and a man who does not express the trait will produce a son who is a hemophiliac?

a. 1/2 **b. 1/4** c. 1/8 d. 1/16 e. 0

6. What is the probability that a woman who is a carrier for the X-linked trait hemophilia and a man who does not express the trait will produce a daughter who is a carrier for hemophilia?
a. 1/2 **b. 1/4** c. 1/8 d. 1/16 e. 0

7. The S and G loci are linked and there are 2 possible alleles with one showing complete dominance at each locus. The correct notation for the genotype of a heterozygote with the loci linked in repulsion is
a. SsGg b. Ss//Gg c. SG//sg **d. Sg//sG** e. SGsg

Use the following information to answer the next 3 questions: The loci for height (T = tall is dominant to t = short) and for thorns (H= thorns is dominant to h = thornless) are linked.

8. In the absence of crossing over, what gametes can be produced by the following individual: TH//th

a. TH and th b. T, H, t, and h c. T and H
d. Th, and th e. tH and Th

9. If the frequency of crossing-over between these loci is 20%, the expected frequency of gametes produced by an individual with the genotype TH//th is

a. 10% TH, 10% th, 40% tH, and 40% Th
b. 20% TH and 80% th
c. 10% tH, 10% Th, 40% TH, and 40% th
d. 20% Th and 80% tH
e. 20% TH, 80% th, 20% Th, and 80% tH

10. If the frequency of crossing-over between these loci is 20%, what fraction of the offspring from the cross TH//th x th//th would be expected to be short and have thorns

a. 5% **b. 10%** c. 20% d. 40% e. 80%

11. The gametes produced by an individual with the genotype aB//Ab are 43% aB, 47% Ab, 4% ab, and 6% AB. What is the map distance between these two loci?

a. 5 map units **b. 10 map units** c. 20 map units
d. 47 map units e. 90 map units

12. In the cross AaBBCCDd x aabbCcdd, what is the expected frequency of offspring with the genotype aabbCcdd?

a. 0 b. 1/4 c. 1/2 d. 3/4 e. 1/16

13. In the cross AABbccDd x aaBBCCDD, what is the expected frequency of offspring that are homozygous at the C locus?

a. 0 b. 1/4 c. 1/2 d. 3/4 e. 1/16

14. Six children of the same parents have the ABO blood types AB (two have this type), A (two have this type), B, and O. What are the genotypes of the parents?

a. I^AI^A and I^AI^B
b. I^AI^B and I^A I^B
c. ii and I^AI^B
d. I^Ai and I^Bi
e. none of the above

15. Which of the following is true about meiosis?

a. centromeres divide in the first meiotic division
b. synapsis occurs during the second meiotic division
c. no new DNA is synthesized between the first and second meiotic divisions
d. cells produced by meiosis are identical to the parent cell
e. none of these is true

16. An individual that carries 2 different alleles at the locus for a given trait is

a. homologous for the trait
b. heterozygous for the trait
c. hemizygous for the trait
d. homozygous for the trait
e. homogametic for the trait

17. Which of the following is **not** true of crossing over
a. each cross-over event results in 2 recombinant gametes
b. the greater the map distance between loci the less likely is crossing over between them
c. the probability of crossing over between some loci is different than the probability of crossing over between other loci
d. chiasmata are physical evidence of the occurrence of crossing over
e. all of these are true

18. The ability of genes at one locus to mask the expression of alleles at a different locus is called
a. pleiotropy
b. dominance
c. incomplete penetrance
d. incomplete dominance
e. none of the above

19. Non-disjunction during meiosis causes
a. translocation
b. linkage between traits
c. autosomal recessive mutations
d. aneuploid gametes
e. none of the above

20. Which of the following human cell types would contain 22 pairs of autosomes and 2 X chromosomes
a. an unfertilized egg cell
b. a sperm cell
c. a male somatic cell
d. a female somatic cell
e. both a and d

21. Recombinant gametes are the result of

a. mutation **b. crossing over** c. non-disjunction
d. phenotypic plasticity e. aneuploidy

22. Which is not part of Mendel's theory of inheritance that differs from previous theories
a. traits are passed between generations by an indirect mechanism
b. it is possible to predict the expected frequencies of offspring phenotypes
c. offspring traits are not a blend of parental traits
d. the factors that determine traits are not changed as they are passed between generations
e. all describe ways that Mendel's theory was different

23. Which of the following is NOT true of sex chromosomes

a. sex chromosomes of the same species can be of different sizes
b. one sex may have fewer sex chromosomes than the other
c. different sexes may be the heterogametic sex in different species
d. some loci on the sex chromosomes may not contribute to determining sex
e. all are true of sex chromosomes

24. Which of the following occurs during the second meiotic division
a. pairing of homologous chromosomes
b. separation of sister chromatids
c. separation of homologous chromosomes
d. reduction of chromosome number
e. production of identical daughter cells

25.Which of the following is not true for traits determined by X-linked loci in species with XY sex determination

a. more phenotypes may be possible in females than males
b. males with a recessive allele will always express it
c. phenotypes due to recessive mutations will be more common in males
d. males inherit genes for these traits only from their mother
e. all of these are true

26. Which is true of traits for which more than 2 alleles are possible at a locus

a. it is usually not possible to predict offspring phenotype and genotype ratios for these traits
b. there are more possible phenotypes than if there were only 2 alleles
c. the traits will have a continuous distribution
d. some individuals will be hemizygous for these traits
e. dominance at these loci will be incomplete

27. Linkage is different from pleiotropy because
a. pleiotropy is due to the effects of genes located on different chromosomes
b. traits affected by pleiotropy undergo recombination
c. the effects of linkage are due to a single gene product
d. effects of linkage can be broken up by crossing over
e. none of the above

28. Which of the following describes a non-chromosomal mechanism of sex determination
a. in some species, haploid individuals are all male
b. in some species the ratio of autosomes to X chromosomes determine sex
c. in some species, reproduction is parthenogenetic
d. in some species, both sexes are heterogametic
e. in some species, low nest temperature produces males

29. Which of the following does not describe a way that sexual reproduction promotes genetic variation
a. fusion of egg and sperm nuclei from different parents to form a zygote
b. exchange of genetic material between homologous chromosomes
c. potential for different arrangements of homologous chromosome pairs during meiosis

d. linkage caused by genes for different traits being located on the same chromosome

e. all describe how sexual reproduction promotes genetic variation

30. Which of the following types of mutation is **most** likely to be deleterious

a. an insertion in a non-coding region of the genome
b. a substitution in a non-coding region of the genome
c. an insertion in a coding region of the genome
d. a substitution in a non-coding region of the genome
e. a deletion in a non-coding region of the genome

31. Which of the following occurs in both mitosis and meiosis

a. separation of sister chromatids
b. synapsis
c. production of haploid cell products
d. crossing over
e. none of the above

32. Polygenic inheritance describes the inheritance of

a. traits for which heterozygotes have the same phenotype as one homozygote
b. multiple traits influenced by a single locus
c. multiple traits whose genes interact
d. traits influenced by more than one locus
e. None of the above

33. Which of the following techniques would be **most** useful for determining with certainty that a particular individual has the genotype XYY

a. a pedigree analysis
b. a karyotype analysis
c. analysis of sex chromatin (Barr bodies)
d. a and c would be equally useful
e. b and c would be equally useful