EXAM-1 (100 points), General Genetics pcb3063-02, sp00, HW Bass, 02 Feb 2000

Section I (26 points) VOCABULARY & DEFINITIONS

Section II (24 points) MULTIPLE CHOICE

Section III (22 points) SHORT PROBLEMS

Section IV (28 points) LONG PROBLEMS

TOTAL (100 PT.)

EXAM 1 GRADE

CLASS AVERAGE

CLASS RANGE

HONOR CODE (must be signed to receive grade)

"I did not and will not give or receive help on this exam"

Name (written) _______________________

Student ID # _______________________

Signature _______________________

Date _______________________

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Section I  VOCABULARY  (from this pg; of 14 pts)  ________

DEFINITIONS  (from next pg; of 12 pts)  +  ________

[Vocab. + Definitions (of 26 pts tot.)]  =  ________

VOCABULARY, fill in the blanks

1  (2 pt) The individual subunits making up each strand of DNA are called _____________________.

2  (2 pt) The synthesis of a protein by a ribosome under the direction of an mRNA template is called _____________________.

3  (2 pt) When a mutant gene affects a number of seemingly unrelated traits, it is said to show _____________________.

4  (2 pt) An individual having different alleles of a given gene on homologous chromosomes is said to be _____________________.

5  (4 pt) Mitosis is conventionally divided into four stages known as ______________,

    ______________, ______________, ______________.

6  (2 pt) In chickens, unlike mammals, the male is called the ______________ sex because only one type of gamete (W bearing) is produced.
DEFINITIONS (12 pt., 3 pt. each)

Give brief, less than 30 word, definitions for each; cite examples where possible

7  co-dominant alleles

8  Mendel's 1st Law of inheritance

9  pachytene

10  neomorph
11 Miescher's weak acid, the chemical substance making up genes, is called

A. Deoxyribonucleic acid
B. Ribonucleic acid
C. Protein
D. Carbohydrate
E. RNA

12 Which of the following is not a base found in DNA?

A. Adenine
B. Guanine
C. Uracil
D. Thymine

13 The subunits which make up a protein are called

A. Nucleotides
B. Polypeptides
C. Amino acids
D. Amino bases

14 Starting with a P1 cross between AA and aa, the proportion of heterozygotes in the F2 progeny will be

A. 1/8
B. 1/4
C. 1/3
D. 1/2
E. All heterozygote
Section II, MULTIPLE CHOICE, cont.

15 Probabilities are calculated using the multiplication rule when they

A. Are equally likely
B. Are independent
C. Are mutually exclusive
D. Occur disproportionately

16 In ABO blood grouping, a person with B antigens on their red blood cells would normally have antibodies to which antigen

A. A
B. B
C. Neither
D. Both

17 The cells of a multicellular organism, other than gametes and the germ cells from which it develops, is known as

A. Germ cells
B. Haploid cells
C. Maternal cells
D. Somatic cells

18 The mitotic phase in which the chromosomes are located at the central plate of the spindle is called

A. Anaphase
B. Telophase
C. Interphase
D. Metaphase
E. Prophase
Section III (22 points) SHORT PROBLEMS

19 (6 pts) Compare and contrast variable expressivity with incomplete penetrance.


21. (9 points) Fill in the 9 blanks using answers like the ones provided as examples of correct answers.

<table>
<thead>
<tr>
<th>Per Nucleus</th>
<th>DNA Status</th>
<th>Ploidy level</th>
<th>DNA amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1 nucleus</td>
<td>unreplicated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G2 nucleus</td>
<td></td>
<td>haploid</td>
<td>10 pg (picogram)</td>
</tr>
<tr>
<td>Meiosis I</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meiosis II</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section IV (28 points) LONG PROBLEMS

22 (8 pts) The autosomal recessive allele, $bw$ for brown eyes in Drosophila, interacts with the X-linked recessive allele, $v$, for vermilion eyes, to produce white eyes. What genotypes and what eye color phenotypes would be expected from a cross of a white-eyed female (genotype $v^+v; bw^+bw$) with a brown-eyed male (genotype $v^+Y; bw^+bw$)? (give different answers for male progeny and female progeny)

23 (10 pts) The $DE$, $LA$, and $SOL$ genes of soybean assort independently. $DE$, $LA$, and $SOL$ are completely dominant over their respective recessive alleles $de$, $la$, and $sol$. In the cross $DE^+DE^+, LA^+la^+, SOL^+SOL^+ \times de^+de^+, LA^+la^+, SOL^+sol^+$, What proportion (answer as % or fraction) of the progeny are expected to be:

A) $DE^+, la^+, SOL^+$?

B) $DE^+, LA^+, sol^+$?

C) $de^+, la^+, SOL^+$?

D) $DE^+, LA^+, SOL^+$?

24 (10 pts) Draw a complete human pedigree with as much information as possible. Indicate individuals names (eg II-3) and genotype or possible genotypes and phenotypes:

I-1 (father) and I-2 (mother) have 6 children (boys = II-1, II-2, II-6; girls = II-3, II-4, II-5). Two of the children are affected with $solidemia$, a disease that results from the X-linked recessive mutation $s$. Neither the father nor the mother are affected.