ANIMAL AND VETERINARY SCIENCE 109
FIRST HOUR EXAM

Sept 19, 1997
Section 1
Name - _______ _______
Row _______

I. Short answer: (19 points)
A. The two methods that describe cell division are ____________ and ____________.
B. Bringing animals into the home is called _____________.
C. Swine were derived from the wild swine and have the species name of ________.
D. One of the most significant pieces of national legislation was the Land Grant College Act of 1862. Who was the author of this bill _______.
E. The comparison of the amount of essential nutrients in a food in relation to the number of calories is called _______.
F. Three guides consumers have to good nutrition are ____________, ________, and _________.
G. Six major classes of nutrients are ________, ________, ________, ________, ________, and _________.
H. What are three external environmental factors that could affect gene expression ________, ________, and _________.

II. Definitions: (9 points)
A. Agriculture - the utilization of biological processes to produce food
B. Kwashiorkor - it when a person is so malnourished that the stomach pouches out, but they are not actually starving
C. Cholesterol - a white fatty substance that builds up on injured artery walls in heart tissue and _________. In all cells, vitamin transmission found _________.
D. Omega three fatty acids _________.

SATURATED fatty acids
2 Double bond on the 3rd
E. Codons - are what code the gene for expression with recessive - dominant alleles.

3 nucleotides in a row

F. Alleles - genes that when put together express that alternate form of the gene

III. Explain the following items: (0 points)
A. Land Grant College Act of 1862
   It was a law passed that gave each state 30,000 acres of land to sell or lease for money to be used on a public state university. This school must be coed, not charge tuition, teach agriculture, military, etc, and cannot have religion or politics involved.

B. Four bases used in DNA structure
   Adenine
   Guanine
   Thymine
   Cytosine

C. The basic need of the human and how animals help supply those basic needs.
   Food - meat, milk
   Shelter - hides
   Clothing - wool, hair
   Fuel - manure
   Emotional well-being - companions, disease testing

D. Consumption trends of Meat products only since 1970.
   Consumption of meat products since 1970 has increased.
   Poultry ↑
   Beef ↓
   Lamb same
D. Deoxyribonucleic acid.
A group of chains of nucleotides (phosphates, deoxyribose, one of the bases)
A portion of a chain located on gene.

E. Gregory Mendel
The father of genetics. He used pea plants, purple and certain traits and tested to see which traits were dominant and which were recessive. He proved that alleles can be dominant or recessive.

F. Heritability estimates
- high heritability >30% heritable - size, muscle structure
- moderate heritability between 10% to 30% heritable - growth, milk production
- low heritability <10% heritable - adaptability, fertility

F. 'A nucleotide'
Phosphoric deoxyribose and one of the 4 bases combine to create a nucleotide. A chain of nucleotides forms one half of a DNA molecule.
IV. Essay: (20 points) Use back if necessary
   A. Explain the relationship between Cholesterol and Coronary Heart Disease or Atherosclerosis. Include at least six potential causes of CHD today.

   Atherosclerosis is a build up of cholesterol or plaque on the inside walls of an artery. When a small wall breaks they may sustain an injury to the artery wall. That though the area is repaired, Cholesterol builds up on the outside to try to heal it. If there is high stress, smoking, high blood pressure, obesity, or high blood pressure, it is very difficult to get rid of these buildups. This is what causes Coronary Heart Disease. If the buildup never goes away there could be thrombosis which would lead with a myocardial infarcts. Many times high cholesterol is genetic and there is very little you can change to reduce it.

   B. Discuss the theory of gene function. What turns them on and what causes their expression.

   There is the structural gene that causes the expression. Then there are two types of control genes:
   - Regular type - that controls the structural gene
   - Operator type - that turns the regulator gene on and off.

   Reserved
   Van Derwell
V. Problems: Show all work. (15 points)
A. What are the possible genotypic and phenotypic ratios produced by the mating of two heterozygous individuals, each having the same genotype (BbWw)?
Where B is black color and b is red. W is white faced and w is colored face.

\[
\begin{array}{ccc}
& Ew & Bw & bw \\
Bw & BbWw & BbWw & BbWw \\
Bw & BbWw & BbWw & BbWw \\
bw & BbWw & BbWw & BbWw \\
\end{array}
\]

Genotypes:
- \(E_1B_1W_1W_1=1\)
- \(E_1B_1W_2W_2=2\)
- \(E_1B_2W_1W_2=2\)
- \(E_2B_1W_2W_2=1\)
- \(B_1W_1W_2W_2=2\)
- \(B_1W_2W_1W_2=2\)
- \(B_2W_1W_2W_2=1\)
- \(B_2W_2W_1W_2=1\)

Phenotypes:
- Black \(W_1W_1=9\)
- Red \(W_1W_2=3\)
- Black \(W_2W_2=3\)
- Red \(W_2W_1=1\)

B. Multiple alleles are expressed in human blood type. If A is dominant to O and B is dominant to O, but A and B show no dominance to each other what would be all the possible offspring from the following blood type matings. A male with blood type B marries a female with blood type A.

\[
\begin{array}{ccc}
& B & A \\
A & A & A \\
B & A & B \\
\end{array}
\]

If the father was B and the mother AO the alleles expressed were AO. Two females - AB and B and Two males AB and O.

If the father was AB and the mother AO the alleles expressed by offspring would be: 1 females - AB and Two males - AO.

C. In Llamas the heritability of yearling weight is 30 percent. If the average yearling weight is 260 pounds and the selected males are 325 pounds and females 300 pounds, what would be the annual genetic increase in yearling weight. Generation interval in Llamas is 3 years.

\[
\begin{align*}
325 - 260 &= 65 \\
\therefore \frac{65}{2} &= 32.5 \\
300 - 260 &= 40 \\
\therefore \frac{40}{2} &= 20 \\
9.75 + 16 &= 25.75 \\
\therefore \frac{25.75}{3} &= 8.58 \\
\therefore 8.58 &\text{ lbs/yr.}
\end{align*}
\]