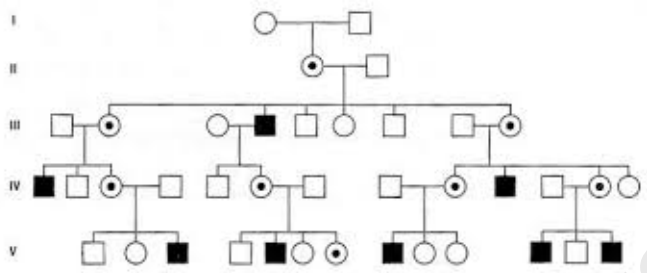
NAME: _____STUDENT NUMBER:_____

Life Science 2G03
Term Test 2 – practice questions
*This is not meant to represent the length of a whole test.

Topics covered on the test:
Module 3 (Slide 36 onwards which is on dosage compensation)
Module 4 (Mitochondrial genome and inheritance)
Module 5 (Aneuploidy)
Module 6 (blood typing)

Question 1. In the following pedigree you are examining the inheritance of an X-linked disorder that affects the skin called haemophilia.



(a) How does this pedigree illustrate that this is an X-linked disorder? (2 marks)

(b) Individual V-7 is indicated as a carrier, however, she does not have any affected children , an observation that could be used to indicate carrier status. What other evidence might suggest that she is a carrier? (1 mark)

Question 2. Which of the following cell types would you expect to have the fewest mitochondria?

a) nerve cells
b) adipose cells
c) cardiac muscle cells
d) sperm cells

Question 3. Which of the following is related to individual A based upon mitochondrial DNA sequence?

A. CCCTCACCCACTAGGATACCAACAAACCTACCCACCCTTAACAGTACATAGTACAT

a) #1. CCCTCACCCACTAGGATACCAACAAACCTACCCACCCTTAACAGCACATAGTACAT
b) #2. CCCTTACCCACTAGGATACCAACAAACCTACCCACCCTTAACAGTACATAGTACAT
c) #3. CCCTCACCCACTAGGATACCAACAAACCTACCCATCTTTAACAGTACATAGTACAT
d) #4. CCCTCACCCACTAGGATACCAACAAACCTACCCACCCTTAACAGTACATAGCACAT
e) #5. CCCTCACCCACTAGGATACCAACAAACCTACCCACCCTTAACAGTACATAGTACAT

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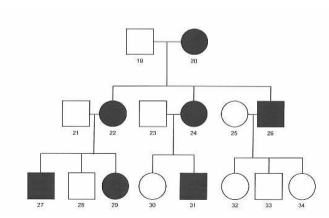
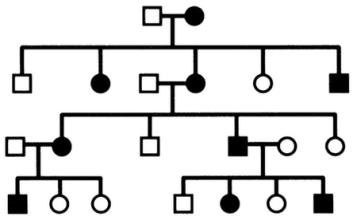
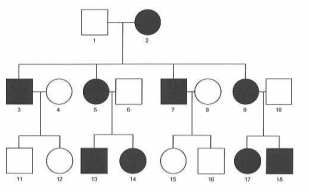
Question 4. The following pedigrees are associated with three different degenerative disorders. Which pedigree shows a pattern of inheritance that is consistent with maternal inheritance?



Pedigree A



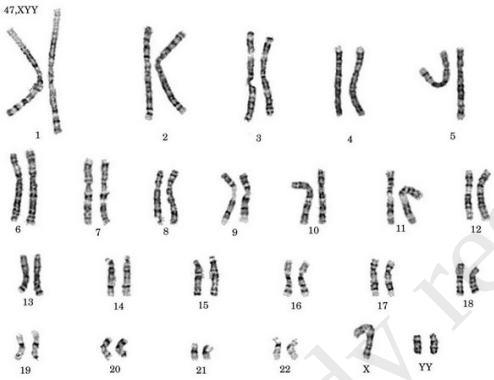
Pedigree B

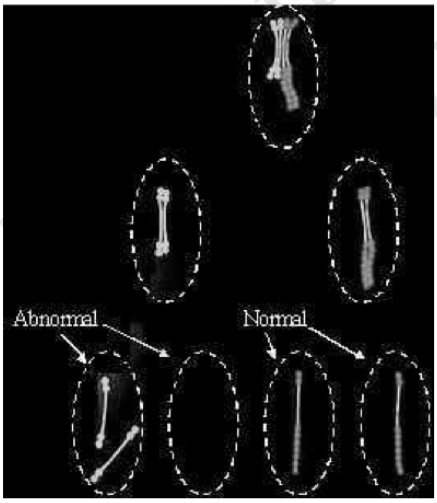


Pedigree C

a) A only
b) A and B
c) A and C
d) B and C
e) A, B, and C

Question 5. Explain how a person could have the following karyotype. Draw a diagram that illustrates the chromosome segregation events and nondisjunction events.





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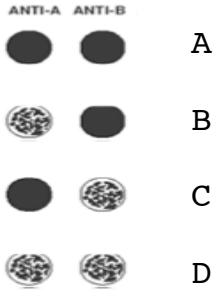
Questions 6. You are given the following results of four blood tests.



Which pattern in the blood test indicates O blood type?

a) A
b) B
c) C
d) D

Question 7. A woman with type O, N, Rh+ blood is married to a man with type A, MN, Rh- blood. They had a child. Unfortunately, there was a mix-up at the hospital. Of the five children listed below, which one could have been conceived by this couple? (note: you are familiar with the AB and Rh blood types; as a reminder, MN blood types exhibit codominance like AB, but there is no recessive allele for this locus.)

a) AB, MN, Rh+
b) B, N, Rh-
c) A, M, Rh+
d) AB, M, Rh-
e) O, N, Rh+

Questions 8 through 10. In a certain breed of dog, the dominant, *B*, is required for black fur; the recessive, *b*, produces brown fur. However, *w/w* is epistatic to the color locus and can inhibit pigment formation. Instead, the fur appears white. What would be the phenotypes of the following sets of parents and what would be the results of the mating?

B/B w/w x *b/b W/w*

8. Phenotype of *B/B w/w* ?
   a) White fur
   b) Brown fur
   c) Black fur

9. Phenotype of *b/b W/w* ?
   a) White fur
   b) Brown fur
   c) Black fur

10. What would be the results of the mating?
   a) All black furred offspring
   b) All white furred offspring
   c) Half of the offspring have brown fur, half have white fur
   d) Half of the offspring have black fur, half have white fur
   e) Half of the offspring have brown fur, half have black fur