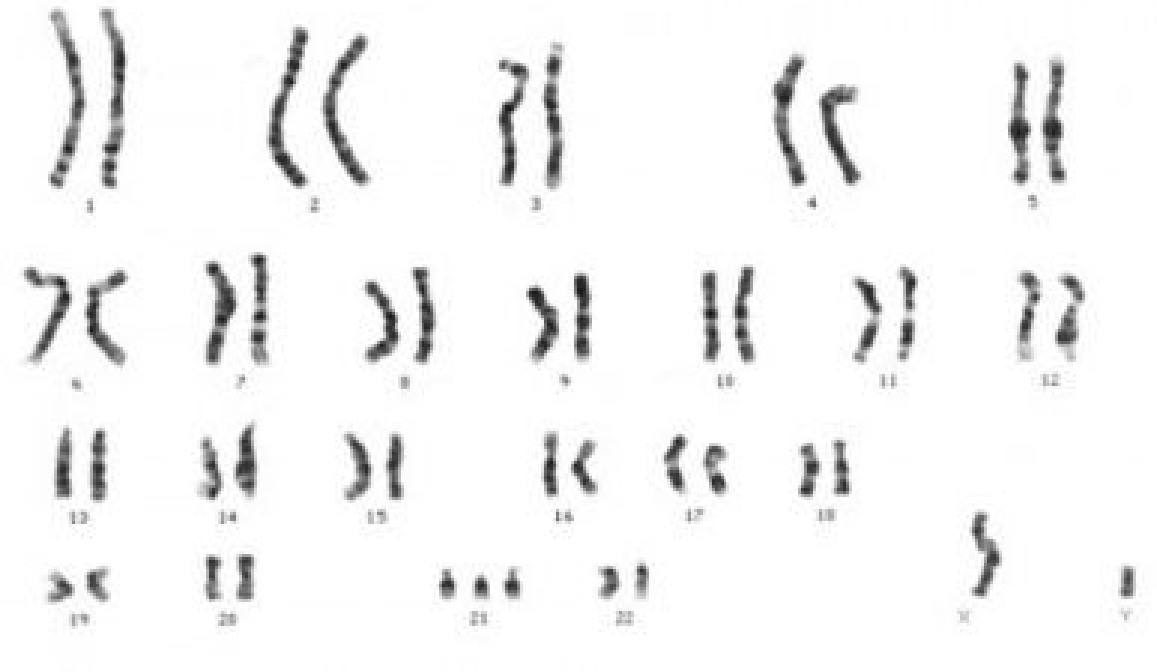
Heredity Test: DISCO Competition 2/9/2019

Student Name(s): _____

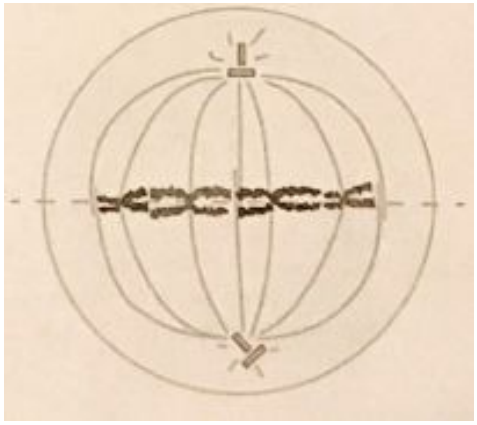
School: _____

1. What is true of populations that are in Hardy-Weinberg equilibrium?
    a. Organisms are constantly migrating
    b. Mating is random
    c. The population must be small
    d. Natural Selection is occuring
2. In a certain African population, 4% of the population is born with sickle cell anemia (aa). What is the percentage of individuals who enjoy the selective advantage of the sickle cell gene (increased resistance to malaria)? Assume the population is in Hardy-Weinberg equilibrium.

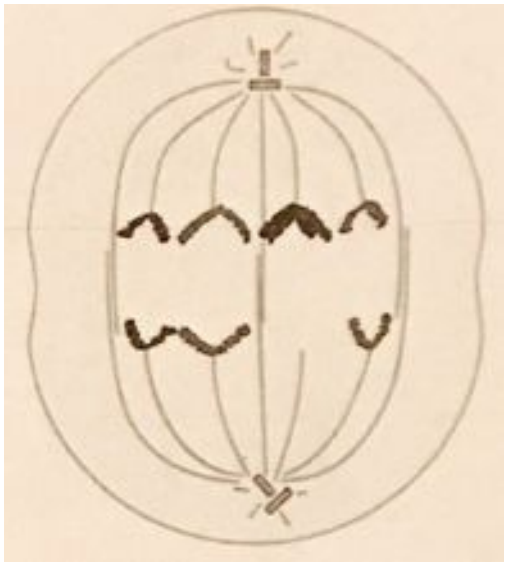
3. A Punnett Square shows you all the ways in which _____ can combine.
    a. Alleles
    b. Eggs
    c. Sperm
    d. Colors
4. What does the notation TT mean to geneticists?
    a. Two dominant alleles
    b. Heterozygous alleles
    c. At least one dominant allele
    d. One dominant, one recessive allele
5. Phenotype is _____.
    a. Unique / different molecular forms of a gene that are possible at a given locus
    b. Particular genes carried by an individual
    c. Observable (expressed, can physically see) inherited traits
    d. Crossing over results
    e. Having a pair of non-identical alleles at a gene locus
6. Females have _____.
    a. Two X sex chromosomes
    b. Two Y sex chromosomes
    c. Only one sex chromosome which would be X
    d. Only one sex chromosome which would be Y
    e. One X sex chromosome and one Y sex chromosome
7. Adenine binds with thymine (in DNA), and guanine binds with _____.
8. What is the special purpose of Taq Polymerase in PCR?
    a. It supplies final phosphodiester bond that seals the new strands together.
    b. It produces 5S rRNA and tRNA in the nucleoplasm for replication.
    c. It fills in the necessary nucleotides between Okazaki fragments.
    d. It is a polymerase that synthesizes new DNA at high temperatures.



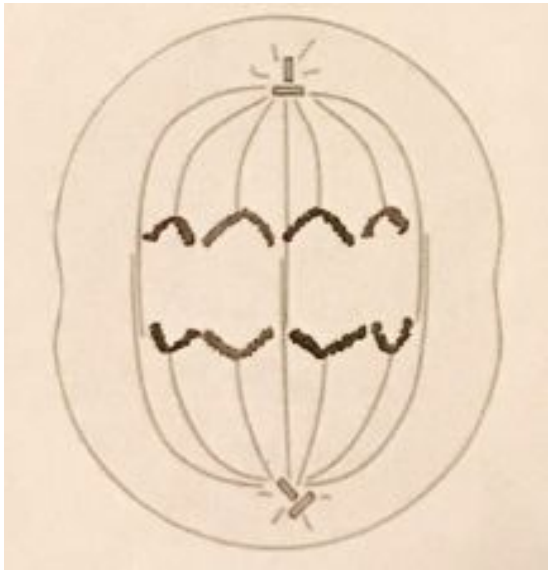
9. Using the image above, this is a _____.
    a. Female
    b. Male
    c. Cannot determine from this image
10. Using the same image above, is there something wrong with this person?
    a. No, nothing is wrong.
    b. Yes, Klinefelter Syndrome.
    c. Yes, Down Syndrome.
    d. Yes, Turner Syndrome.



11. This cell (above) is in what stage of mitosis?
    a. Early Prophase
    b. Late Prophase (prometaphase)
    c. Metaphase
    d. Anaphase



12. Something is wrong with this image. What might explain the unusual pattern seen in this cell?
    a. During metaphase, one of the chromosomes failed to bind microtubules from both spindle poles.
    b. During prophase, one of the chromosomes failed to condense.
    c. The cell made too many copies of its chromosomes.
    d. The cell is actually undergoing meiosis.



13. This cell is in what phase of mitosis?
    a. Prophase
    b. Prometaphase
    c. Metaphase
    d. Anaphase
    e. Telophase

14. What must this cell do in order to carry out mitosis? (This cell has a diploid number of 4 chromosomes. 2n=4)

a. Replicate its DNA.
b. Duplicate its centrosome.
c. Undergo cytokinesis.

15. A population of sheep is in Hardy-Weinberg equilibrium. The allele for white wool (W) has an allele frequency of 0.19, and the allele for black wool (w) has an allele frequency of 0.81. What is the percentage of heterozygous individuals in the population?

a. 15%
b. 31%
c. 66%
d. 4%

16. This cell is in which of the following stages?
    a. Cytokinesis
    b. G2
    c. Anaphase
    d. G1
    e. Metaphase
17. An example of epistasis is:
    a. When you breed a white snapdragon flower with a red snapdragon flower and get a pink snapdragon flower.
    b. When the baldness gene “covers” the gene for brown hair.
    c. When your parents have A and B blood types, and you have O.
    d. When you breed a red bull with a white cow and the result is a mottled calf.
18. A plant species has two alleles for seed shape: F(flat) and f(round). If you breed a homozygous flat with a homozygous round, what is the probability that the offspring will be heterozygous?

19. In purple people eaters, one horn is dominant and no horn is recessive. Draw a Punnett Square showing the cross of a purple people eater that is hybrid for horns with a purple people eater that does not have horns.

20. In #19, what are the genotypes and phenotypes of the possible offspring?

21. If all the possible offspring of a certain set of parents have Dd for their genotype, what are the genotypes of the parents?

22. In guinea pigs, black hair (B) is dominant over white hair (b). Short hair (L) is dominant over long hair (l). If you breed a heterozygous black, short-hair male with a heterozygous white, short-hair female, how many of the offspring are:

a. Black short-hair? _____
b. Black long-hair? _____
c. White short-hair? _____
d. White long-hair? _____

23. Colorblindness is an X-linked recessive disorder. A couple has four children: 2 are unaffected, one girl is colorblind, and one boy is colorblind. What are the genotypes of the parents?

24. Humans have ____ pairs of autosomes.

a. 22
b. 23
c. 44
d. 46

25. If a male has type AB blood, and a female has type AB blood, what type of blood is it not possible for their child to have?

26. Name the types of RNA:

Match the enzyme with its function.

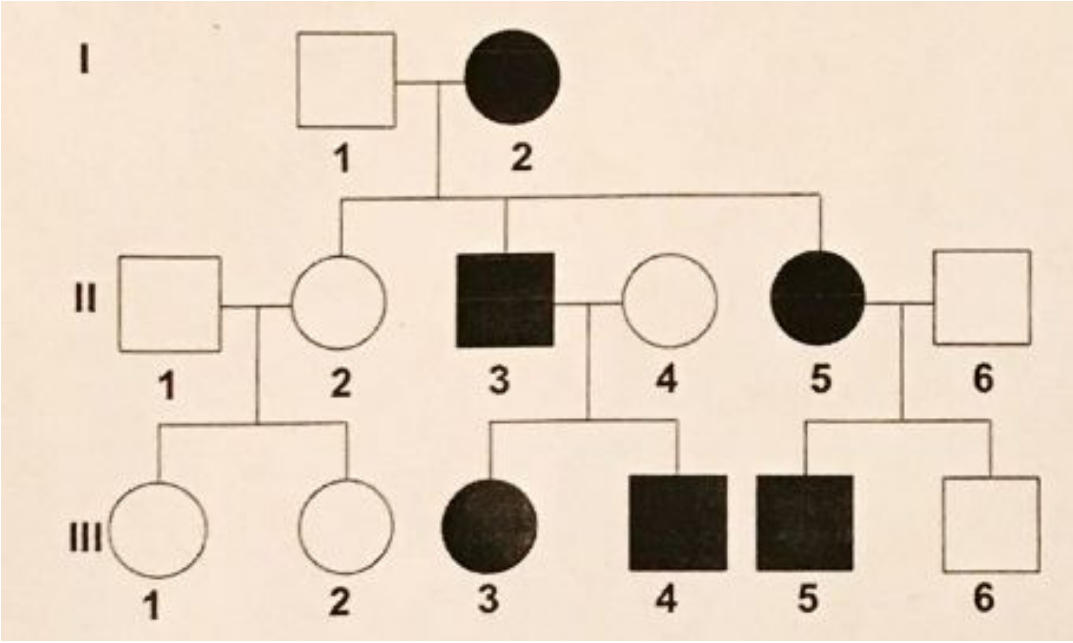
DNA Ligase	A. Unwinds the DNA
DNA Primase	B. Attaches the nucleotides after the primer
DNA Polymerase I	C. Seals up the fragments of DNA
DNA Polymerase II	D. Replaces RNA primers with nucleotides
Helicase	E. Unzips DNA
Topoisomerase	F. Creates starting strand of RNA primers

Solve the following transcriptions: (All/some are not true DNA chains)

33. CGAUTUUA

34. TGATCGATA

35. UUTUGGCA



36. Which of the following numbers in each section are female?
Section I:
Section II:
Section III:

37. Which of the following numbers in each section are male?
Section I:
Section II:
Section III:

38. Is the pedigree above X-linked or autosomal?

39. An organism with two different alleles for a trait is said to be:
   a. Recessive
   b. Hybrid
   c. Dominant
   d. Purebred

40. Structural abnormalities in chromosomes cannot be caused by:
    a. Deletion
    b. Multiplication
    c. Inversion
    d. Translocation

41. Name the only full monosomic disorder found in humans: _____

42. DNA stands for: _____

43. The recessive allele b occurs with a frequency of 0.8 in a population of crabs that is in Hardy-Weinberg equilibrium. What is the frequency of the homozygous dominant individuals?
    a. 0.32
    b. 0.8
    c. 0.04
    d. 0.64

44. What are the pyrimidine nitrogenous bases in DNA?

_____ _____

45. What is the start codon's three bases and what is its job?

_____ _____

46. How long what the Human Genome Project, when was it, and what was it?

_____ _____ _____

47. Dwarfism in humans is a dominant trait that is also lethal if an individual inherits two alleles for dwarfism. Show the genotypes of a family where both parents are dwarfs and they have two children, where one is a dwarf and the other is not.

48. What is a Barr body?