A2 Genetics Quiz

Name: _____

Multiple-choice section

Choose the answer which best completes each of the following statements or answers the following questions and so make your tutor happy ☺!

1. Which of the following conclusions could **not** be attributed to Gregor Mendel?
a) Two inherited factors govern each trait.
b) Each human carries a number of lethal alleles.
c) One factor comes from each parent.
d) In the heterozygous condition, one allele for a trait may mask the expression of the other allele for the trait.
e) Only one of two possible factors from a parent can be passed on to each offspring.

2. The expression of a gene in an individual is termed the
a) genotype of the individual
b) incomplete dominance in the individual
c) linked gene
d) locus
e) phenotype of the individual

3. "Only one of two possible alleles from each parent is passed on to each offspring" is known as:
a) The law of dominance
b) The law of segregation
c) The law of independent assortment
d) The law of incomplete dominance
e) The law of disjunction

4. A typical phenotypic ratio for a dihybrid cross is
a) 9:1 b) 3:4 c) 9:3:3:1 d) 1:2:1:2:1 e) 6:3:3:6

5. Metabolic diseases, such as cystic fibrosis or albinism, are usually the result of a(n)
a) lethal gene that is recessive
b) lethal gene that is dominant
c) nondisjunction of sex genes
d) codominant alleles
e) incomplete dominance such as in snapdragons

6. The position of a gene on a chromosome is known as the gene's
a) centromere
b) phenotype
c) genotype
d) expression
e) locus

7. A man of blood type A, whose mother had blood type O, marries a woman of blood type B, whose father was blood type O. The chances of this couple's having a child with blood type O are
a) 25% b) 50% c) 75% d) 100% e) 0 %

8. A very dark skinned individual is mated with a light skinned individual. The F-1 individuals are all intermediate in skin colour. The skin colour of the F-2 individuals is variable; there are individuals as dark as the dark parent and as light as the light parent, with many other individuals showing many graduations in skin colour between the two extremes. What is the most likely mode of inheritance for skin colour?
a) pleiotropy
b) multiple alleles
c) complementary genes
d) epistasis
e) multiple gene inheritance

9. The gene for Rh^+ blood is dominant over the gene for Rh^- blood. An Rh^+ woman whose mother was Rh^- marries a Rh^- man, both of whose parents were Rh^-. What percentage of their children will be expected to be Rh^+?
a) 0% b) 25% c) 50% d) 75% e) 100%

10. Pleiotropism is the condition of
a) a single gene having multiple effects
b) interaction of multiple alleles
c) a single gene being influenced by several traits
d) a trait that is not expressed for several generations
e) multiple gene inheritance

11. Haemophilia is a genetic disease that has plagued the royal houses of Europe since the time of Queen Victoria, who was a carrier (and mutant!). Her granddaughter Alexandra married Nicholas II, the last Tsar of Imperial Russia. Alexandra was a carrier of the gene for haemophilia; Nicholas was normal. Their son, the Tsarevich Alexis, was afflicted with the disease. Alexis and his four sisters were massacred during the 1917 Revolution. It is likely that
a) all four sisters were fully normal with regard to haemophilia
b) one or more of the sisters may have been carriers of haemophilia
c) all of the sisters were carriers of haemophilia
d) one or more of the sisters may have had haemophilia
e) all of the sisters had haemophilia

12. Theoretically, if a female haemophiliac married a normal male, what percentage of their male offspring would be expected to have haemophilia?
a) 100% b) 50% c) 25% d)75% e) 0%

13. A man who is red-green colour-blind marries a woman who is neither colour-blind nor a carrier for this trait. Which statement would best describe their probable offspring?
a) All of their sons would be colour-blind.
b) All of their children would be colour-blind.
c) Fifty percent of their sons would be colour-blind.
d) Fifty percent of their daughters would be colour-blind.
e) None of their children would be colour-blind but all of their daughters would be carriers.

Match each of the following phenotypes with the genetic condition creating it. Some choices may be used once, more than once or not at all. To further confuse the issue, in some cases more than one answer may be acceptable ☹!

14. Haemophilia, red-green colour-blindness, tortoiseshell cats. _____

15. Type O blood. _____

16. Types A and B blood. _____

17. Flower colour in snapdragons _____

18. 2:1 phenotypic ratio _____

19. Sickle-cell anaemia _____

20. Skin colour _____

21. Ginger hair and freckles _____

22. Andalusian fowl _____

23. Roan cattle _____

A = co-dominance

B = recessive condition

C = sex linkage

D = lethal gene

E = multiple loci (polygenes)

F = non-disjunction

G = multiple alleles

H = gene linkage

I = incomplete dominance

Answer questions 24 and 25 based on your knowledge of biology (eh?) and the information given.

In the fruit fly *Drosophila,* the allele for normal body (***B***) is dominant over the allele for hairy body (***b***) and the allele for normal leg (***L***) is dominant over the allele for short leg (***l***). A cross is made between a homozygous normal body/homozygous short fruit fly and a heterozygous normal body/heterozygous normal leg fruit fly.

24. What ratio of the offspring of this cross are hybrid normal body and hybrid normal leg?
a) 1/16 b) 2/16 c) 4/16 d) 6/16 e) 8/16

25. What ratio of the progeny of this cross would appear normal bodied and normal legged?
a) 1/16 b) 2/16 c) 4/14 d) 6/16 e) 8/16

Fill in the blanks below. Those in your knowledge should have been done ages ago - by you!

1. The condition _____ is also known as trisomy-21 because it results from non-disjunction involving chromosome-21.
2. Any change in the nitrogenous base sequence of an organism's DNA is called a(n) _____.
3. The sex of an individual is determined by gametes from the _____.
4. Resistance to malaria is found in any individual that is a(n) _____ for sickle cell anaemia.
5. A picture of the chromosomes of an organism is called a(n) _____.
6. _____ is the condition of having an extra set of chromosomes in an organism.
7. Red hair and freckles are associated with individuals having _____.
8. _____ is a condition in which the blood of individuals homozygous for the condition fails to clot properly.
9. When a carrier for red-green colour-blindness is crossed with a diseased male, _____ percent of the male offspring are colour-blind.
10. When two heterozygous tall pea plants are crossed, _____ percent of the offspring are short.
11. The trait expressed in a cross between two contrasting alleles for the same characteristic is said to be _____.
12. A body chromosome is called a(n) _____.
13. _____ involves taking a sample of the fluid surrounding the foetus to determine any genetic abnormalities it may possess.
14. The point on a chromosome where a gene is found is called its _____.
15. If two grey Andulusian fowl are crossed, _____ percent of the offspring will be grey.
16. In the cross in question # 15 above, _____ percent of the offspring of this cross will be black.
17. Only one of two possible alleles from each parent is passed on to the offspring for a trait. This is known as Mendel's Law of _____ _____.
18. The _____ involves crossing a pure recessive with a homozygous dominant or heterozygous individual to determine its genotype.
19. The condition _____ involves an inability to metabolize a particular amino acid to the compound tyrosine.
20. _____ is the general term which describes when a pair of homologous chromosomes fails to separate during meiosis.

True/False Section – designed to give those with double recessive hair colour a chance ☺!
Note: only **one** of those two options is allowable ☹!

1. Chromosomal inversions do not affect the phenotypes of organisms because all of same genes are still present on the same chromosome. (T/F)
2. Most genes are probably pleiotropic. (T/F)
3. The phenotypic ratio of 1:2:1 is characteristic of the F-2 of a monohybrid cross where dominance is lacking. (T/F)
4. The closer two linked genes are on a chromosome, the more frequently crossing over will occur between them. (T/F)
5. Crossing over involves the exchange of parts between non-homologous chromosomes. (T/F)
6. If a man and a wife have type B blood, none of the children could have type O blood. (T/F)
7. A man with type A blood cannot be the father of a child with type B blood. (T/F)
8. In a rhesus baby syndrome, the first child is more affected than any subsequent children. (T/F)
9. Cystic fibrosis is a disorder which only affects males. (T/F)
10. Sickle cell trait is quite common in native West Africans, but rarely in Afro-Americans. (T/F)

"D'Sa" or bonus questions (2 pts. each) ☺.

Explain what is meant by each of the following in one sentence or less.

1. Barr body

_____

_____

2. Somatic cell

_____

_____