BIO 121 **Practice Exam #4**

Be sure that you understand why the correct answer is the best one. Memorizing the answers, without understanding why the answer is correct, is not likely to improve your score on the test!

1. If a new allele is to be passed on to the next generation, it must be present in a(n):

a. intron
b. operon
c. germ cell
d. cancer cell
e. somatic cell

2. CFTR is a:

a. Gene that causes Tay Sachs disease
b. Gene that causes cystic fibrosis
c. Method for diagnosing disease
d. Chloride transport protein

3. What is believed to be the heterozygote advantage of the allele ΔF508?

a. Resistance to malaria
b. Resistance to cholera
c. Longer telomeres
d. Opposable thumbs

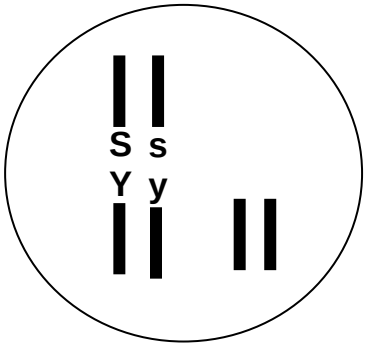
4. If the frequency of an allele is 20%, what is the expected frequency of individuals that are homozygous for that allele? Use $p^2 + 2pq + q^2 = 1$

a. 80%
b. 8%
c. 40%
d. 4%
e. 2%

5. The tendency of two genes on the same chromosome to be inherited together (linkage) is:

a. increased by crossing-over.
b. reduced by crossing-over.
c. less if they are far apart.
d. b and c
e. a and c

Next two questions refer to the diagram below:



6. This individual is:

a. Homozygous at both loci
b. Heterozygous at both loci
c. Homozygous on both homologs
d. Both a and c

7. If this individual were crossed with a fully homozygous dominant individual, which genotype would be a possible recombinant genotype for the offspring?

a. SSYY
b. SsYy
c. SSYy
d. Ssyy
e. ssYY

8. If recombinant genotypes are rare, that means that two genes are:

a. on separate chromosomes
b. close together
c. far apart
d. either a or c.

9. An individual with Huntington's disease, a genetic disorder caused by a dominant allele, inherited the allele from one affected parent and the other parent was normal. Assuming that this individual marries a normal spouse, what are the odds that their child will eventually express the disease?

a. 0%
b. 25%
c. 50%
d. 75%
e. 100%

10. Amniocentesis allows examination of:

a. fetal cells
b. transposons
c. proviral DNA
d. maternal chromosomes
e. none of the above.

11. Trisomy 21 is an example of _____, which is usually caused by _____.

a. nondisjunction, aneuploidy
b. epistasis, nondisjunction
c. aneuploidy, nondisjunction
d. epistasis, pleiotropy
e. epistasis, aneuploidy

12. The risk of trisomy-21:

a. increases with increased age of the mother.
b. decreases with increased age of the father.
c. both A and B.
d. none of the above.

For the next five questions, match the inherited conditions listed below with the descriptions of inheritance pattern.

a. cystic fibrosis
b. hemophilia
c. sickle-cell anemia
d. Huntington's disease
e. hairy ears

13. autosomal, incomplete dominance
14. autosomal, recessive
15. autosomal, dominant
16. X-linked
17. Y-linked

18. Color blindness is an X-linked recessive trait. A woman heterozygous for color blindness (X_G X_g) marries a man having normal color vision (X_G Y). If their child is a girl, what is the probability of her being color blind?

a. 0%
b. 50%
c. 100%

19. If their child is a boy, what is the probability of him being color blind?

a. 0%
b. 50%
c. 100%

20. Tortoiseshell cats are always female. The patches of color are the result of (see Chap. 15):

a. movement of transposons.
b. random inactivation of X chromosomes.
c. inheritance of a dominant autosomal allele.
d. inheritance of a Y-linked allele.

21. Whether an individual develops basically male or female anatomy is believed to be triggered by:

a. a single gene on the Y chromosome.
b. a single gene on the X chromosome.
c. many genes on the X chromosome.
d. many genes on the Y chromosome.
e. genes on both the X and Y chromosomes.

22. Assume that your maternal grandfather has a genetic disorder of the mitochondrial gene cytochrome oxidase. Are you at risk of inheriting the disease, and why?

a. Yes, because of maternal inheritance
b. No, because of maternal inheritance
c. Yes, because of genomic imprinting
d. No, because of genomic imprinting
e. Yes, because of linkage

23. Which of the following is an enveloped retrovirus?

a. T4 bacteriophage
b. lambda bacteriophage
c. Esherichia coli
d. HIV
e. none of the above

24. A lysogenic bacteriophage is one that:

a. has tail fibers
b. is usually lytic.
c. is usually temperate.
d. carries DNA rather than RNA

25. The RNA transcripts of a retrovirus serve as both:

a. capsid and envelope
b. genome and messenger RNA
c. ribozyme and messenger RNA
d. ribosome and genome

26. The process of conjugation in bacteria is analogous to gametic sex because:

a. two haploid cells become one diploid cell.
b. new combinations of alleles result.
c. two bacteria become one zygote.
d. all of the above

27. The F plasmid allows a bacterial cell to:

a. produce sex pili.
b. donate genes to an F- cell
c. become an HfR cell
d. all of the above
e. none of the above

In the following three questions, match the descriptions to the answers below. Answers may be used more than once.

a. prokaryote
b. eukaryote
c. both prokaryote and eukaryote

28. Coordinated genes are usually physically adjacent to one another.

29. mRNA processing removes introns

30. Coordinated gene expression involves multiple enhancer sites.

31. Genetic elements that move from place to place in the genome without replication are called

a. Transposase
b. Transposons
c. Retrotransposons

32. What are the two major classes of repetitive DNA in eukaryote genomes?

a. Microsatellite and minisatellite
b. Alu elements and Alu isotopes
c. Tandem and interspersed
d. Complex and simple
e. Exons and introns

33. Which of the following classes of eukaryote DNA are translated into proteins?

a. introns
b. telomeres
c. promoters
d. satellite DNA
e. none of the above

34. Satellite DNA is:

a. not found near the centromere
b. tandem repetitive sequences
c. transcribed and translated
d. not very common

35. Which statement is false, regarding Alu elements?

a. Each is about 300 base pairs long
b. Each Alu element is transcribed simultaneously
c. About 10% of human DNA consists of Alu elements
d. Alu elements probably resulted from retrotransposition

36. Alternative RNA splicing means that:

a. Oncogenes can be turned off
b. Introns sometimes get translated
c. Proteosomes may not work on RNA as well as on proteins
d. Eukaryotes might make fewer kinds of proteins than the number of genes
e. All of the above

37. Somatic recombination:

a. Happens in developing lymphocytes.
b. is important in resisting disease.
c. results in unique immunoglobins.
d. rearranges parts of a gene.
e. all of the above

38. The α-globin and β-globin families of genes:

a. are descended from a shared ancestor
b. are on different chromosomes
c. include some pseudogenes
d. include hemoglobin genes
e. all of the above

39. Recombinant DNA technology is used to:

a. insert genes from one cell into another.
b. selectively destroy genes within bacteria.
c. make copies of DNA in cell-free systems.
d. all of the above
e. none of the above

40. A mutation in the gene for Ras protein tends to (indirectly) stimulate cell division. This is an example of a(n):

a. SINE
b. oncogene
c. microsatellite
d. retrotransposon
e. tumor suppressor gene

41. If a eukaryote gene is to be translated by prokaryote cells it may be necessary to use _____ for recombination, in order to exclude introns.

a. cDNA
b. lambda phage
c. retrotransposition
d. gel electrophoresis
e. reverse transcriptase

42. In the discussion of cloning a gene using bacterial plasmids, the purpose of the LacZ (galactosidase) gene in the plasmid was to:

a. Indicate if the gene of interest was present
b. Show if the plasmid was present in a clone
c. Indicate if the clone plasmids were recombinant
d. Allow bacteria to grow in the presence of ampicillin

43. Which is false regarding restriction enzymes?

a. They cut both DNA strands
b. There are only 4 different kinds
c. They cut DNA at specific recognition sites
d. Most restriction enzymes leave staggered ends
e. They are derived mainly from bacteria and viruses

44. The transduction method of inserting foreign DNA into a cell uses:

a. Virus particles
b. An electrical current
c. Plasmids and detergent
d. A gun with tiny bullets

45. Which determines what portion of the DNA will be amplified by PCR?

a. Heating
b. Cooling
c. Primers
d. DNA polymerase
e. Nucleoside triphosphates

46. During electrophoresis, a positively charged molecule should move toward the:

a. Cathode
b. Anode

47. The Southern Blot method is used to:

a. Label specific DNA sequences on an electrophoresis gel
b. Slow movement of molecules in an electrophoresis gel
c. Isolate messenger RNA from cells
d. Clean up spills

48. The purpose of dideoxynucleotides in DNA sequencing is to:

a. cause mutations
b. allow replication to continue
c. bind impurities in the solution
d. prevent replication from continuing

49. The use of computers to analyze biological structures and functions is called:

a. Mendelian genetics
b. Bioinformatics
c. Pharmacology
d. Genomics
e. Forensics

50. Persons skeptical of Roundup Ready crops believe that they are a scheme to sell more:

a. soybeans
b. insurance
c. herbicides
d. insecticides

KEY

1. C	11. C	21. A	31. B	41. A
2. D	12. A	22. B	32. C	42. C
3. B	13. C	23. D	33. E	43. B
4. D	14. A	24. C	34. B	44. A
5. D	15. D	25. B	35. B	45. C
6. B	16. B	26. B	36. B	46. B
7. C	17. E	27. D	37. E	47. A
8. B	18. A	28. A	38. E	48. D
9. C	19. B	29. B	39. A	49. B
10. A	20. B	30. B	40. B	50. C