

PASS MOCK EXAM – FOR PRACTICE ONLY

Course: BIOL 1003 Facilitator: Naomi Reaka
Date and location of mock exam take-up: 3:00 – 5:00 Thurs Dec. 6 302 Patterson
12:00 – 3:00 Fri Dec. 7 4499 ME

IMPORTANT:

It is **most beneficial** to you to write this mock midterm **UNDER EXAM CONDITIONS**.
This means:

- Complete the midterm in 1.5 hours.
- Work on your own.
- Keep your notes and textbook closed.
- Attempt every question.

After the time limit, go back over your work with a different colour or on a separate piece of paper and try to do the questions you are unsure of. Record your ideas in the margins to remind yourself of what you were thinking when you take it up at PASS.

The purpose of this mock exam is to give you practice answering questions in a timed setting and to help you to gauge which aspects of the course content you know well and which are in need of further development and review. Use this mock exam as a *learning tool* in preparing for the actual exam.

Please note:

- Come to the PASS session with your mock exam complete. There, you can work with other students to review your work.
- Often, there is not enough time to review the entire exam in the PASS session. Decide which questions you most want to review – the facilitator may ask students to vote on which questions they want to discuss.
- Facilitators do not bring copies of the mock exam to the session. Please print out and complete the exam before you attend.
- Facilitators do not produce or distribute an answer key for mock exams. Facilitators help students to work together to compare and assess the answers they have. If you are not able to attend the PASS session, you can work alone or with others in the class.

DISCLAIMER: PASS handouts are designed as a study aid only for use in PASS workshops. Handouts may contain errors, intentional or otherwise. It is up to the student to verify the information contained within. PLEASE NOTE: THIS HANDOUT IS NOT TO BE POSTED ON THE INTERNET

1. One way in which cells are able to increase the level of membrane fluidity is by:
 - a. Increasing the number of phospholipids in the membrane
 - b. Decreasing the number of glycolipids in the membrane
 - c. Decreasing the number of double bonds between membrane lipids
 - d. Decreasing the amount of cholesterol in the membrane
 - e. Increasing the number of unsaturated phospholipids in the membrane

2. Each of the following small molecules easily diffuses through the cell membrane EXCEPT:
 - a. glycerol
 - b. O₂
 - c. H₂O
 - d. glucose
 - e. N₂

3. The process by which mitochondria and chloroplasts probably evolved is called:
 - a. exocytosis
 - b. endocytosis
 - c. endogenous translocation
 - d. exosymbiosis
 - e. endosymbiosis

4. In the following reaction, the carbon atom of carbon dioxide is _____ to form glucose while the oxygen atom of water is _____ to form oxygen:
$$6 \text{ CO}_2 + 6 \text{ H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{ O}_2$$
 - a. oxidized, oxidized
 - b. oxidized, reduced
 - c. reduced, oxidized
 - d. reduced, oxidized
 - e. this equation does not depict an oxidation- reduction reaction

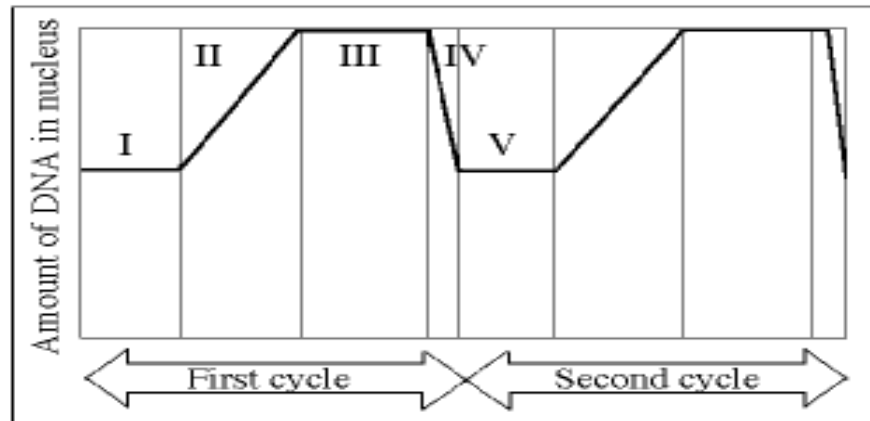
5. What are the two secondary structures that amino acids form?
 - a. alpha pleated sheets and beta-helix
 - b. alpha-helix and gamma pleated sheets
 - c. alpha-helix and beta pleated sheets
 - d. alpha pleated sheets and gamma helix
 - e. chair and boat conformations

6. A genetically modified purple apple has the genotype PP, the autosomal recessive apples are pink. Another gene in the apple turns it blue when autosomal recessive. This interaction is known as
 - a) Pleitrophy
 - b) Codominance
 - c) Incomplete Dominance
 - d) Epistasis
 - e) Gene Interaction

7. Upon chemical analysis, a particular protein was found to contain 59 amino acids. How many peptide bonds are present in this protein?
- 30
 - 58
 - 59
 - 60
 - The secondary structure of the protein must be known to answer this question
8. If a strand of RNA has 32% uracil, how much cytosine does it have?
- 32%
 - 64%
 - 18%
 - 34%
 - It is impossible to tell
9. If the ΔG of a chemical reaction is negative and the change in entropy is positive, what can one conclude about the reaction?
- It is endergonic.
 - It is exergonic.
 - It requires energy.
 - It is anabolic.
 - It will not reach equilibrium.
10. The Miller-Urey experiment...
- Used an atmosphere rich in O_2
 - Demonstrated that abiotic protein synthesis was possible
 - Did not require a source of energy
 - Did not require water as a reactant
 - Demonstrated that abiotic synthesis of amino acids was possible
11. Which statement about ATP synthesis is FALSE?
- ATP is synthesized only in chloroplasts and mitochondria
 - ATP synthesis in the chloroplast occurs in the thylakoid region of this organelle
 - Proton motive force (proton gradient) drives the formation of ATP in mitochondria
 - ATP synthases are protein complexes that allow protons to cross membranes
 - Substrate level phosphorylation of ADP does not require ATP synthase to catalyze the reaction
12. Glycogen is...
- A type of cholesterol
 - A Seine molecule
 - Another word for one glucose sugar
 - a disaccharide made up of two glucose monomers
 - none of the above

13. At the end of glycolysis, each molecule of glucose has yielded 2 molecules of _____, 2 molecules of _____, and a net of 2 molecules of _____.
- FAD; NAD^+ ; ADP
 - CO_2 ; NAD^+ ; ADP
 - lactic acid; ethanol; CO_2
 - pyruvate, NADH, ATP
 - H_2O ; CO_2 ; ATP
14. In the absence of oxygen, the primary purpose of fermentation is to:
- produce amino acids for protein synthesis
 - generate a proton gradient for ATP synthesis
 - oxidize glucose to generate reduce electron carriers
 - regenerate NAD^+ from NADH allowing glycolysis to continue
 - generate alcohol for beverages
15. The electron transport chain is located predominantly in the:
- Outer membrane of the mitochondria
 - Intermembrane space of the mitochondria
 - Inner membrane of the mitochondria
 - Matrix of the mitochondria
 - Cytoplasm of the cell
16. As a result of glycolysis, pyruvate oxidation and the citric acid cycle, only a small portion of the energy of glucose has been converted to ATP. At this point, the majority of the usable energy is contained in:
- oxidized electron carriers NAD^+ and FAD
 - carbon dioxide
 - pyruvate
 - acetyl coenzyme A
 - reduced electron carriers NADH and FADH_2
17. The terminal electron acceptor during mitochondrial respiration is:
- H_2O
 - NAD^+
 - FAD
 - ATP
 - O_2
18. In the first step of glycolysis, the enzyme hexokinase uses ATP to transfer a phosphate to glucose to form glucose-6-phosphate. The product continues to be oxidized forming pyruvate in glycolysis and is a precursor to acetyl-CoA for the citric acid cycle. Suppose that a cell has only glucose available for energy and that the activity of hexokinase is suddenly stopped in this cell. Which of the following conditions will occur?
- The cell will continue to produce energy from mitochondrial electron transport.
 - The cell will continue to produce ATP using the citric acid cycle.
 - The cell will ultimately be unable to produce ATP.
 - The cell will be forced to switch to fermentation to produce ATP.
 - The use of oxygen by the cell will increase.

19. During the light phase of photosynthesis _____ is oxidized and _____ is reduced.
- CO₂ and Water
 - Water and CO₂
 - Water and NADP
 - NADPH₂ and CO₂
 - ADP and NAD⁺
20. With regard to the enzyme rubisco, oxygen...
- Is an allosteric activator of the enzyme.
 - Is a competitive inhibitor.
 - Helps prevent photorespiration.
 - Increases the catalytic efficiency of the carboxylation reaction.
 - Is produced when rubisco “splits” water.
21. Unidirectional flow of electrons in non-cyclic photophosphorylation can be denoted as follows:
- PS II -- e⁻ ---> PS I -- e⁻ ---> NADP -- e⁻ ---> water
 - Water -- e⁻ ---> PSII -- e⁻ ---> PS I -- e⁻ ---> NADP
 - PS I -- e⁻ ---> NADP -- e⁻ ---> water -- e⁻ ---> PS II
 - Water -- e⁻ ---> PS I -- e⁻ ---> PS II -- e⁻ ---> NADP
 - Oxygen -- e⁻ ---> PS II -- e⁻ ---> PS I -- e⁻ ---> ATP



22. Consider the above diagram of the cell cycle.

Which of the following statements is true?

- mitosis is represented by V
- G₀ is represented by I
- chromosomes are comprised of 2 sister chromatids during I and V
- the chromosomes are replicated during II
- G₂ is represented by I

23. Which of the following types of RNA is/are translated?
- mRNA
 - rRNA
 - tRNA
 - miRNA
 - (a) and (d) only
24. As you are writing this mock exam, you are breathing in O₂ and breathing out CO₂. The CO₂ arises from the
- Oxidation of acetyl-CoA by the citric acid cycle.
 - Conversion of glucose to pyruvate during glycolysis.
 - Conversion of pyruvate to acetyl-CoA.
 - Oxidative phosphorylation.
 - Both (a) and (c) are correct

		Second Letter				
		T	C	A	G	
First Letter	T	TTT } Phe TTC } TTA } Leu TTG }	TCT } TCC } Ser TCA } TCG }	TAT } Tyr TAC } TAA } Stop TAG } Stop	TGT } Cys TGC } TGA } Stop TGG } Trp	T C A G
	C	CTT } CTC } Leu CTA } CTG }	CCT } CCC } Pro CCA } CCG }	CAT } His CAC } CAA } Gln CAG }	CGT } CGC } Arg CGA } CGG }	T C A G
	A	ATT } ATC } Ile ATA } ATG } Met	ACT } ACC } Thr ACA } ACG }	AAT } Asn AAC } AAA } Lys AAG }	AGT } Ser AGC } AGA } Arg AGG }	T C A G
	G	GTT } GTC } Val GTA } GTG }	GCT } GCC } Ala GCA } GCG }	GAT } Asp GAC } GAA } Glu GAG }	GGT } GGC } Gly GGA } GGG }	T C A G

Answer questions 44-49 using the table above and the following template strand of DNA:

3'-GCTACCCGATGTACGGAGTCACTATTG-5'

25. If the sequence above were transcribed, which of the following mRNA sequences would be produced?
- 3'-CGAUGGGCUACAUGCCUCAGUGAUAAC-5'
 - 5'-CGAUGGGCUACAUGCCUCAGUGAUAAC-3'
 - 3'-GCUACCCGAUGUACGGAGUCACUAUUG-5'
 - 5'-GCU ACC CGA UGU ACG GAG UCA CUA UUG-3'
 - 5'-CGATGGGCTACAUGCCTCAGTGATAAC-3'

26. If this mRNA sequence is in a eukaryote, what is the name of the enzyme which would transcribe the sequence?
- RNA polymerase
 - RNA polymerase II
 - DNA polymerase
 - DNA polymerase II
 - Ribosome
27. If the mRNA sequence were then translated, which of the following polypeptide chains would be produced?
- Arg-Trp-Ala-Thr-Cys-Leu-Ser-Asp-Asn
 - Met- Arg-Trp-Ala-Thr-Cys-Leu-Ser-Asp-Asn
 - Ala-Thr-Arg-Cys-Thr-Glu-Ser-Leu-Leu
 - Met-Gly-Tyr-Met-Pro-Gln
 - Met-Tyr-Gly-Val-Thr-Ile
28. Which of the following is a possible anticodon sequence of the tRNA which could deliver methionine to the growing polypeptide chain?
- 3'-TAC-5'
 - 5'-TAC-3'
 - 3'-AUG-5'
 - 5'-AUG-3'
 - 3'-ATG-5'
29. If the DNA sequence were mutated, such that the second thymine in the sequence became a guanine, what sequence polypeptide sequence would be produced?
- 3'-GCTACCCGAGGTACGGAGTCACTATTG-5'
- Met-Tyr
 - Met-Arg-Trp-Ala-Pro-Cys-Leu-Ser-Asp-Asn
 - Arg-Trp-Ala-Pro-Cys-Leu-Ser-Asp-Asn
 - Ala-Thr-Arg
 - Met-Gly-Ser-Met-Pro-Gln
30. What type of mutation is the mutation in question 29?
- Silent mutation
 - Missense mutation
 - Nonsense mutation
 - Frameshift mutation
 - Replacement mutation
31. A gene that normally encodes for a protein that is 65000 g/mol in mass is exposed to a hazardous chemical. After it is transcribed into a protein, it is found that the protein is 15000 g/mol in mass. What kind of mutation likely occurred?
- Nonsense
 - Missense
 - Frameshift
 - Silent
 - Continuous

32. A chemical that impairs the ability of spindle fibres to function normally in a diploid cell would likely result in offspring in the F1 generation that are:
- Polyploid
 - Diploid
 - Large
 - Recombined
 - Haploid
33. Could a type O blood type father ever have an offspring with blood type AB?
- Yes, but only if the mother has type AB blood
 - Yes, but only if the mother also has type O blood
 - Yes, but only if the father is RH(d) negative
 - Yes, but only if the mother is RH(d) negative.
 - No
34. The dominant C allele of a gene that controls colour in corn produces kernels with colour; plants homozygous for a recessive c allele of this gene have colourless or white kernels. If a CC plant and a Cc plant were crossed, what would be the expected phenotypic ratios of the offspring?
- 1 coloured kernels: 1 white kernels
 - 3 coloured kernels: 1 white kernels
 - 1 coloured kernels: 3 white kernels
 - 4 coloured kernels: 0 white kernels
 - It is impossible to tell
35. A researcher crosses plants that are heterozygous for the dominant 'tall' trait and the recessive 'short' trait. 585 plants in the F1 generation are tall. Approximately how many plants in the F1 generation would you expect to be short?
- 195
 - 585
 - 146
 - 780
 - 245
36. In Mendel's experiments, the spherical seed character (SS) is completely dominant over the dented seed character (ss). If the characters for height were incompletely dominant, such that TT are tall, Tt are intermediate and tt are short, what would be the phenotypes resulting from crossing a spherical-seeded, short (SStt) plant to a dented-seeded, tall (ssTT) plant?
- All the progeny would be spherical-seeded and tall.
 - 1/2 would be spherical-seeded and intermediate height; 1/2 would be spherical-seeded and tall.
 - All the progeny would be spherical-seeded and short.
 - You cannot predict the outcome.
 - All the progeny would be spherical-seeded and intermediate height.

37. Two unlinked loci effect mouse hair color. AA or Aa mice are agouti. Mice with genotype aa are albino because all pigment production is blocked, regardless of the phenotype at the second locus. At the second locus, the B allele (agouti coat) is dominant to the b allele (black coat). What would be the result of a cross between two agouti mice of genotype AaBb?
- 4 agouti: 4 black: 8 albino
 - 9 agouti: 3 black: 3 albino: 1 grey
 - 9 agouti: 3 black: 4 albino
 - 8 agouti: 4 black: 4 albino
 - None of the above
38. In guinea pigs, an allele for rough fur is dominant over an allele for smooth fur; an allele for black coat is dominant over that for white. You have an animal with rough, black fur. What cross would you use to determine whether the animal is homozygous for these traits?
- Cross the animal with a rough, black fur individual.
 - Cross the animal with a rough, white fur individual.
 - Cross the animal with a smooth, black fur individual.
 - Cross the animal with a smooth, white fur individual.
 - Two generations of crosses are required to determine whether the animal is homozygous for these traits.
39. If freckles were coded by an autosomal dominant gene and one parent had freckles, what percentage of the offspring would have freckles?
- 50%
 - 25%
 - 100%
 - 75%
 - More information is required in order to accurately answer this question.
40. If a father passes a genetically dominant disease on to his son, it cannot have a(n) _____ inheritance pattern.
- Autosomal dominant
 - Autosomal recessive
 - Sex-linked recessive
 - None of the above
 - A father cannot pass a genetically inheritable disease to his sons, he can only pass on a disease to his daughters
41. In a dihybrid cross, SsYy x SsYy, what fraction of the offspring will be homozygous for both traits?
- 1/16
 - 1/8
 - 3/16
 - 1/4
 - 3/4

42. What offspring would you expect from a cross between the female *Drosophila* with red eyes and a yellow body (homozygous recessive for the yellow body color allele and homozygous dominant for the eye colour allele) and a male fruit fly with white eyes and a tan body (hemizygous for both the recessive (white) eye color allele and dominant (tan) body color allele).

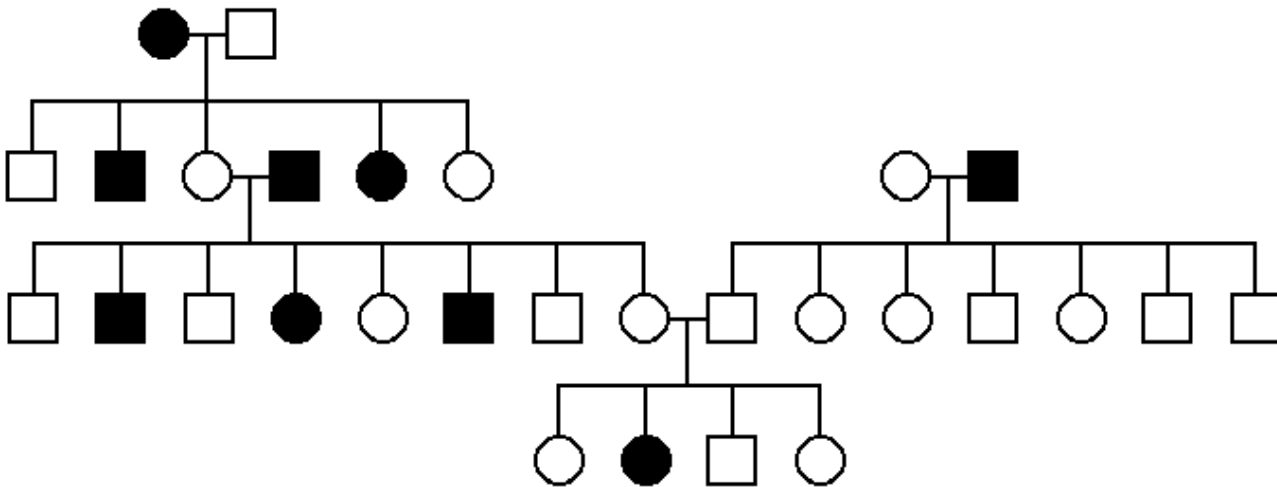
The alleles for eye color and for body color are on the X chromosome of *Drosophila*. Red eye color (w^+) is dominant to white eye color (w), and tan body color (y^+) is dominant to yellow body color (y).

- a. Daughters would be yellow-bodied, red-eyed; the sons would be tan-bodied, white-eyed
 - b. Daughters would be tan-bodied, red-eyed; the sons would be yellow-bodied, white-eyed
 - c. Daughters would be tan-bodied, red-eyed; the sons would be yellow-bodied, red-eyed
 - d. Daughters would be yellow-bodied, white-eyed; the sons would be tan-bodied, white-eyed
 - e. Daughters would be yellow-bodied, red-eyed; the sons would be tan-bodied, red-eyed
43. Individuals with three copies of most autosomes do not survive. Individuals with an extra X chromosome, however, survive with relatively mild (compared to autosomal abnormalities) consequences. Why?
- a. The X chromosome contains few genes while autosomes contain a large number
 - b. The extra X chromosome(s) are inactivated
 - c. The X chromosome determines sex only
 - d. This is not true, individuals would not survive with three X chromosomes
 - e. The X chromosomes do not undergo recombination
44. Consider a parental cross AABBCc x AabbCc. Assume complete dominance and independent assortment. What proportion of the progeny will be expected to **phenotypically** resemble the AABBCc parent?
- a. 1/4
 - b. 1/8
 - c. 3/4
 - d. 1
 - e. 3/8
45. How many different types of gametes could be produced through independent assortment by an individual with a genotype Aa Bb CC Dd EE?
- a. 4
 - b. 8
 - c. 32
 - d. 16
 - e. 1/32
46. During conjugation, the purpose of the sex pilus is to...
- a. Facilitate the movement of nutrients between a donor and a recipient cell.
 - b. Allow for the transfer of gametes.
 - c. Facilitate DNA exchange between a donor cell and a recipient cell.
 - d. Stabilize a network of bacterial cells.
 - e. Facilitate the movement of pollen from the anther to an egg situated in the ovule.

47. Centromeres of sister chromatids uncouple and chromatids separate during...
- Anaphase of Meiosis I
 - Anaphase of Meiosis II
 - Anaphase of Mitosis
 - Answers (b) and (c) are both correct.
 - All of the above are correct.
48. A principle difference between Prophase I of meiosis and prophase of mitosis is that...
- Tetrads form in prophase I of meiosis but not during prophase of mitosis
 - The chromosomes are highly condensed only during prophase I of meiosis
 - In prophase I of meiosis, homologous chromosomes separate, whereas in prophase of mitosis, sister chromatids separate
 - A spindle apparatus forms in prophase of mitosis, but not during prophase I of meiosis.
 - Answers (a) and (d) are both correct.
49. Genetic differences in prokaryotic cells will arise as a result of:
- Mutations arising during DNA replication
 - Unequal crossing over and recombination during prophase I
 - Independent assortment of chromosomes during meiosis I
 - Recombination between the recipient chromosome and DNA entering the cell through transformation, conjugation and transduction.
 - Answers (a) and (d) are both correct.
50. Double-stranded viruses can reproduce the lytic cycle and the lysogenic cycle. Which of the following is characteristic of the lytic cycle?
- The viral genome replicates without destroying the host
 - The virus-host relationship usually lasts for generations
 - Many bacterial cells containing viral DNA are produced
 - Viral DNA is incorporated into the host chromosomes
 - A large number of phages are released at a time
51. Bacteriophage DNAs that have become integrated into the host cell chromosome are called:
- plasmids
 - T-even bacteriophages
 - prophages
 - transposons
 - intemperate bacteriophage
52. What is the function of the operator locus of the lactose operon?
- Terminate production of repressor molecules
 - Initiate production of mRNA
 - Identify the substrate allolactose
 - Bind steroid hormones and control translation
 - Control the binding of RNA polymerase to the operator region

53. Which of the following statements about sex determination is true
- All organisms have sex chromosomes
 - Human sex is determined by the presence or absence of SRY
 - Female organisms possess two copies of the same chromosome
 - Sex in humans is determined by the number of X chromosomes present
 - All of the above

54. Human sex linked disorders predominantly affect men because
- Sex linked disorders are usually carried on the y chromosome
 - Sex linked disorders are usually caused by dominant alleles
 - The mitotic spindle often doesn't attach properly to the y chromosome because of its small size
 - An X recessive allele will always be expressed in a male
 - Human sex disorders are actually seen predominantly in females



55. Which of the following best describes the afflicting allele in the above pedigree

- autosomal dominant
- autosomal recessive
- X-linked dominant
- X-linked recessive
- Y-linked

56. The genotype of the first generation male is thus

- rr
- RR
- Rr
- $X^R X^r$
- $X^r X^r$

57. A red flower (RR) is crossed with a yellow flower (rr), the F1 generation is 100% orange.
This pattern of inheritance is called
- Codominance
 - Shared Dominance
 - Epistasis
 - Incomplete dominance
 - Polygenic Inheritance
58. Which of the following statements about the Y chromosome is false?
- It has very few protein coding regions
 - It contains a region known as YQ12 that is homologous with an identical region on the X chromosome
 - It confers maleness through only one gene
 - Its satellite repeat regions can be used to trace evolutionary history
 - The satellite repeat regions are heterochromatic
59. At one point in Meiosis can nondisjunction occur?
- Anaphase 1
 - Anaphase 2
 - Telophase 1
 - Prophase 1
 - Both a and b
60. The law of segregation states that
- Allele pairs separate during the production of gametes
 - Homologous chromosomes separate during meiosis
 - Alleles separate independently of each other
 - Certain alleles cannot cross over
 - The same number of chromatids go into each daughter cell
61. For the sake of this question, red hair is autosomal recessive to brown hair. A person who is autosomal dominant for hair colour mates with someone who is heterozygous for hair colour.
What is the phenotype of their child?
- BB
 - Bb
 - Red Hair
 - Brown Hair
 - Either Bb or BB
62. Griffith's experiments on mice relied on which form of recombination?
- Transduction
 - Meiotic Crossover
 - Transformation
 - Conjugation
 - Bacterial Reformation

63. The major microtubule organizing centre of the animal cell is
- chromosomes, composed of chromatids
 - the centrosome, composed of centrioles
 - the chromatin, composed of chromatids
 - chromosomes, composed of centromere
 - centrioles, composed of centrosome
64. Which of the following lists the three sources of variability in meiosis in the correct chronological sequence?
- Independent assortment, recombination, random fertilization
 - Recombination, transformation, independent assortment
 - Independent assortment, separation of sister chromatids, random fertilization
 - Recombination, independent assortment, random fertilization
 - There are only two sources of variability in meiosis
65. Which of the following is correctly matched?
- Phagocytosis – excretion of large particles from the cell
 - Facilitated Diffusion – uses ATP to move large particles against the concentration gradient
 - Simple Diffusion – ions and other charged particles are let through open pores in the membrane
 - Pinocytosis – takes in both liquid and solid particles
 - Osmosis – fast diffusion of water through protein pores fuelled by ATP
66. When is the lactose operon likely to be transcribed? When...
- There is more lactose in the cell than glucose
 - There is more glucose in the cell than lactose
 - There is lactose but no glucose in the cell
 - The cyclic AMP levels are high within the cell
 - Both (c) and (d) are correct
67. Amphipathic...
- is a characteristic of phospholipids
 - refers to a molecule being hypotonic and hypertonic
 - refers to a molecule being both hydrophobic and hydrophilic
 - refers to a molecule that interacts with water
 - answers a and c are both correct
68. A missense mutation cannot be
- The code for the sickle cell gene
 - Caused by a frameshift
 - The deletion of a base in a coding sequence
 - The addition of two bases in a coding sequence
 - The same as silent mutation

69. A plant cell in a hypertonic solution will be
- Shriveled
 - Lysed
 - Flaccid
 - Turgid
 - Plasmolyzed
70. Enzymes function through
- Decreasing the activation energy of the reaction
 - Increasing the temperature of the molecules
 - Acting as a reactant
 - Increasing the activation energy of the reaction
 - Increasing the delta G of the reaction
71. Which of the following enzymes will be busier on the lagging strand than it is on the leading strand?
- Single strand binding proteins
 - Helicase
 - DNA polymerase 1
 - Topoisomerase
 - All of the enzymes involved in DNA replication are busier on the lagging strand
72. Mismatch repair is the ability
- To seal Okazaki fragments with ligase into a continual DNA strand
 - Of primase to remove the RNA primer and replace it with the correct DNA
 - Of some enzymes to sense the insertion of an incorrect nucleotide, remove it, and use a DNA polymerase to insert the correct one
 - To correct mispaired chromosomes in prophase 1 of meiosis
 - To remove worn-out DNA by telomerase and replace it with newly synthesized nucleotides
73. Which of the following is true about recombination frequency?
- Genes that are further apart crossover more because they have more crossover points
 - Genes that are further apart crossover more because they are further from the centromere
 - Genes that are closer together cross over more because their proximity makes crossover easier
 - Genes that are closer together crossover more because they are often located on the tips of chromosomes
 - All genes recombine at a random frequency
74. Which of the following is true about crossing over in meiosis?
- Homologous chromosomes swap sections from different parts of each chromosome in order to enable variation
 - Sister chromatids exchange genetic information
 - It occurs most frequently close to the centromere
 - It involves switching a sister chromatid
 - Homologous chromosomes swap sections of the same segment

75. The f-factor codes for
- a) proteins that affect the immune system of bacteria
 - b) The R-plasmid
 - c) Proteins necessary to build the sex pilus and the cytoplasmic bridge
 - d) Phage DNA
 - e) It is a portion of non coding DNA
76. The speckled tortoiseshell coat present on some female cats is the result of
- a) epistasis
 - b) X-inactivation
 - c) Codominance
 - d) Incomplete Dominance
 - e) Polygenic Inheritance
77. Monosomy is usually lethal except in the case of
- a) Chromosome 21, in which case the individual has down syndrome
 - b) The sex chromosomes, in which case the individual has Turner Syndrome
 - c) The sex chromosomes in which case the individual is often normal
 - d) Polyploidy in plants
 - e) Stem Cells
78. The number of human chromosomes in a cell in prophase I of meiosis is _____ and in telophase II is _____
- a) 92; 46
 - b) 46; 23
 - c) 23; 23
 - d) 23; 16
 - e) 4; 2
79. Cytoplasmic inheritance is
- a) The separation of the cytoplasm in the final step of mitosis
 - b) The inheritance of RNA from the father
 - c) The inheritance of mitochondria and chloroplasts from the mother
 - d) The equal division of mitochondria and chloroplasts following meiosis
 - e) The inheritance of mitochondria and chloroplasts from the father

80. In the fruit fly, the dominant and recessive traits for body colour and wing size are as follows:

<u>Character</u>	<u>Wild Type / Dominant Trait</u>	<u>Mutant / Recessive Trait</u>
Body Colour	Grey (b ⁺)	Black (b)
Wing Size	Normal (vg ⁺)	Vestigial (vg)

The genes encoding body colour and wing size are linked.

A wild-type fruit fly (heterozygous for grey body colour and normal wings) was mated with a black fruit fly with vestigial wings. The distribution of the offspring is as follows:

802 – Wild Type

798 – Black with vestigial wings

206 – grey with vestigial wings

194 – black with normal wings

What is the recombination frequency between the genes for body colour and wing size?

- 10%
- 25%
- 50%
- 80%
- There is no recombination