Solutions – BIOL 110 Final Exam (Old Material) – Practice Test

Problem #1: B

Cholesterol is a type of lipoprotein (lipid combined with protein)

Problem #2: C

In RNA, **Thymine** is replaced with Uracil.

Problem #3: D

Dendrochronology is the process of counting the concentric rings of a tree's cross-section to determine its approximate age: each ring represents one year.

Problem #4: B

Rings that are closer together signify less growth during that time period, which is typical of a relatively cold/dry climate.

Problem #5: C

Prokaryotes in domain Archaea do not have peptidoglycan in their cell walls, only those in domain Bacteria do.

Problem #6: B

Bacteria that use sunlight for energy and use organic molecules for carbon are photoheterotrophs.

Problem #7: B

A threatening factor is one way in which natural selection can occur, but certainly NOT THE ONLY WAY. For example, a mutation that resulted in a heightened sense of smell could increase its chances of finding nourishment, thus improving its chances of living long enough to produce more offspring and pass on this variation without there being a threat to the species' survival.

Problem #8: A

TRUE: Sexual reproduction helps bring about variation, the key to natural selection, as a means of maximizing the species' opportunity to adapt to the unstable and severe environment. Asexual reproduction is performed under stable and unchanging conditions, as there is less need for variation when one's survival is not at risk.

Problem #9: B

As the name would suggest, Eukarya belong to eukaryotes, and not to prokaryotes.

Problem #10: B

Unlike eukaryotes, prokaryotes cannot be multicellular, they can only be single-celled.

Problem #11: A

Asexual reproduction is performed under stable and unchanging conditions.

Problem #12: A

Mitosis gives rise to 2 daughter cells with the same ploidy number. A 2N cell would produce 2 identical 2 N cells.

Problem #13: A

When a cell undergoes replication, sister chromatids form. During meiosis I, non sister chromatids separate, and during meiosis II, sister chromatids separate.

Problem #14: C.

During prophase I, the physical crossing over of genetic material occurs. In metaphase I, homologous chromosomes line up on the metaphase plate independently of one another.

Problem #15: C

The number of different combinations for independent assortment is 2^n where n = # of homologous pairs.

Problem #16: D

The sporophyte produces haploid spores via meiosis and the gametophyte produces haploid gametes via mitosis. Remember, sporophyte is 2N, so it must undergo meiosis to produce N spores. The gametophyte is N, so it can only undergo mitosis to produce N gametes. The only time diploid products are formed is during fertilization.

Problem #17: B

A heterosporous life cycle is one in which either a male or a female gametophyte is produced. A homosporous life cycle is where one type of gamete is produced.

Problem #18: D

Mycorrhizae is mutualistic association between plant roots and fungal hyphae. Lichen is between a fungus and a photosynthetic partner such as green algae or cyanobacteria.

Problem #19: C

Plasmogamy is the fusion of the cytoplasm of two or more cells, producing a dikaryon (N + N, a mycelium with two genetically distinct nuclei in the same cytoplasm). Remember, this is NOT diploid.

Problem #20: A

Chytridiomycota have flagellated spores, they are the only motile cells in the kingdom.

Problem #21: C

A chitin exoskeleton, true body segmentation, and jointed appendages are all characteristic of arthropods.

Problem #22: C

All chordates have an internal skeleton, it cannot be external.

Problem #23: C

Although in the phylum Chordata, tunicates and lancelets do not have a vertebral column (axial endoskeleton), whereas vertebrates do.

Problem #24: D

A frog is an amphibian, and they do NOT lay eggs. Reptiles, birds, and monotremes lay eggs.

Problem #25: C

Cellular Respiration is the process of breaking down glucose for energy, this process is exergonic (-ΔG) since it releases energy which can then be used by the cell to do work. Photosynthesis is the process in which plants create sugars from CO_2 and water, this process is endergonic (+ΔG) since it requires energy from the sun.

Problem #26: A

Chlorophyll is the pigment found in plants, which are green, meaning they absorb every wavelength but green, and reflect green light.

Problem #27: B

During the light reactions of photosynthesis, water is required and broken to release the oxygens and hydrogens used in the reaction.

Problem #28: C

The light reactions produce ATP and NADPH, which are then used in the dark reactions.

Problem #29: B

NADP+ is the oxidized form, meaning it has no electrons, while NADPH is the reduced form, meaning it's full of electrons. In photosynthesis, NADP+ is reduced (gain of electrons) to NADPH. This happens during photosystem I. Remember that photosystem I occurs after photosystem II.

Problem #30: D

The dark reactions of photosynthesis are located in the stroma. It requires ATP and NADPH (products of light reactions), and CO_2 (from the atmosphere), and generates sugars.

Problem #31: C

A pine tree with cones is an example of a conifer, a non flowering seed plant (gymnosperm).

Problem #32: A

Double fertilization forms a 2N embryo and a 3N endosperm.

Problem #33: B

Gametophyte = N = 70% = .70

Sporophyte = 2N = (N x N) = (.70 x .70) = .49 = 49%

Problem #34: D

The phloem is located in the inner bark, so if you cut through the bark of a tree the whole way around, eventually, the tree is going to die, Because you have disrupted the flow of sugars through the phloem.

Problem #35: B

You must do a quick punnett square for each gene. There is a ½ chance that AA can be made from AA and Aa, a ½ chance that Bb can be made from Bb and bb, and ½ chance that Cc can be made from cc and Cc, and a ½ chance that DD can be made from Dd and DD. By the rule of multiplication, (1/2)(1/2)(1/2)(1/2) = 1/16.

Problem #36: A

There are 3 different ways to get a boy and 2 girls: B,G,G or G,B,G or G,G,B. The probability of getting one of these combinations is [(1/2)(1/2)(1/2)] = 1/8. By the rule of addition, (1/8) + (1/8) + (1/8) = 3/8.

Problem #37: C

Treat this as a regular punnett square: from I^AI^A x I^Bi, you can only get I^AI^B or I^Ai, AB or A.

Problem #38: C

In codominance, both alleles are displayed.

Problem #39: B

This is a 4 x 4 punnett square, but it's actually much simpler if you pay attention: from BbEE, we get BE or bE. From bbee, we only get be. It's now a 2 x 1 punnett square, which gives you BbEe and bbEe, ½ black and ½ brown.

Problem #40: C

Sickle Cell Anemia has a selective advantage of patients becoming less susceptible to malaria.