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

Problem #1: D

We're looking for the frequency of the dominant allele = p
q^2 = the frequency of the homozygous recessive individuals = 70/200 = .35
q = the frequency of the recessive allele = $\sqrt{q^2}$ = √.35 = .59
So now we have q, and we know that p + q = 1 So:
P + .59 = 1
P = .41

Problem #2: A

We're looking for the frequency of heterozygotes = 2pq
q^2 = the frequency of the homozygous recessive individuals = 23% = .23
q = the frequency of the recessive allele = $\sqrt{q^2}$ = √.23 = .48
So now we have q, and we know that p + q = 1 So:
P + .48 = 1
P = .52
2pq = (2)(.48)(.52) = .5

Problem #3: B

Probability = $(p^2)(q^2)(2pq)$
Probability = $(.40)^2(.10)^2(2(.20)(.60))$ = .000384

Problem #4: C

We're solving this the same way we solved the last problem. The question is asking for the probability that someone in the population has the DNA fingerprint identical to the suspect, so we can ignore the other 2 fingerprints. A1 = .4, B1 = .6, C1 = .5, C2 = .2
Probability = $(p^2)(q^2)(2pq)$
Probability = $(.40)^2(.60)^2(2(.50)(.20))$ = .01152

Problem #5: B

False, the most fit organism is the one which produces the most offspring

Problem #6: B

Mutations contribute to help alter allele frequencies. Infinitely large populations, no migration, and random mating cause allele frequencies to remain unchanged.

Problem #7: C

The Founder Effect occurs when a few individuals of a population become geographically separated from the rest of the population.

Problem #8: B

False, a population in the Hardy Weinberg Equilibrium is a non evolving population.

Problem #9: C

In Frequency dependent selection, the more common phenotype is selected against.

Problem #10: A

Stabilizing Selection favors intermediate phenotype by acting against extreme phenotypes.

Problem #11: C

Intersexual selection is when males compete to be CHOSEN by females, males doing something to attract the females

Problem #12: D

No 1 concept can be used to describe all types of organisms.

Problem #13: C

Offspring forming and not developing correctly, Reduced hybrid viability, and Hybrid infertility are all types of post-zygotic isolation.

Problem #14: B

Sympatric Speciation happens when populations become genetically isolated, however they still live in the same location.

Problem #15: 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 #16: A

The Seed is composed of an embryo (from zygote) packaged with food supply.

Problem #17: A

The xylem transports water throughout the plant. The phloem transports sugars.

Problem #18: A

True. Modern plants descended from Charophytes, an ancestral aquatic green algae.

Problem #19: A

Non vascular plants are the only plants with a dominant gametophyte (N) life stage. All other plants have a dominant sporophyte (2N) life stage.

Problem #20: C

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

Problem #21: A

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

Problem #22: B

Gametophyte = N = 70% = .70

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

Problem #23: 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 #24: B

Cyads and Ginkos reproduce with flagellated sperm.

Problem #25: C

Fruit is a mechanism through which angiosperms protect their seeds while simultaneously attracting other animals, in the hopes that the seeds will be consumed and then deposited elsewhere after passing through the digestive tract.

Problem #26: A

In the HW equation, q is the frequency of the recessive allele, and so q^2 is the frequency of individuals that are homozygous recessive.

Problem #27: B

After formation of a (2N) zygote (via embryo), the sporophyte (2N) stage follows, then meiosis produces spores, which ultimately return to the zygote after fertilization.

Problem #28: D

Mosses are examples of bryophytes, which prefer moist environments, like the arctic.

Problem #29: B

These are examples of Bryophytes, which typically have rhizoids to help keep them anchored to the surface.

Problem #30: B

Heterosporous life cycles produce with male or female gametophytes, but not both.

Problem #31: B

The endosperm is indeed 3N, however it consists of 1 sperm and 2 polar nuclei (not 2 eggs)

Problem #32: A

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

Problem #33: B

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

Problem #34: C

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

Problem #35: 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 #36: 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.