SLS 12 Midterm 1

Juliana Lamy

TOTAL POINTS

61.5 / 75

QUESTION 1

1 Eugenics 5 / 5

✓ **- 0 pts** **Correct**

QUESTION 2

2 Geology 5 / 5

✓ **- 0 pts** **Correct**

QUESTION 3

3 The Darwins 5 / 5

✓ **- 0 pts** **Correct**

QUESTION 4

4 Acquired characters 5 / 5

✓ **- 0 pts** **Correct**

QUESTION 5

Who said 5 pts

5.1 A 1 / 1

✓ **- 0 pts** **Correct - as long as the last name, Huxley, is there**

- 0.5 pts a. T.H. Huxley - a correct description of who he was without his name

- 1 pts a. T.H. Huxley - the wrong name

5.2 B 1 / 1

✓ **- 0 pts** **b. Oliver Wendall Holmes - Correct - as long as last name "Holmes" is written**

- 0.5 pts b. Oliver Wendall Holmes - a description of the person or the context without the name or with the wrong name; identify Buck vs. Bell trial

- 1 pts b. Oliver Wendall Holmes - the wrong name

5.3 C 0 / 1

- 0 pts c. Theodosius Dobzhansky - Correct - if last name is present and spelled recognizably (even if not spelled completely correctly)

- 0.5 pts c. Theodosius Dobzhansky - half credit for a correct description of the person even if the name is incorrect, or if name is minimally recognizable from the spelling. Half credit for first name without last name.

✓ **- 1 pts** **c. Theodosius Dobzhansky - incorrect if wrong name is given**

5.4 D 1 / 1

✓ **- 0 pts** **d. Charles Darwin - Correct as long as last name is there**

- 0.5 pts d. Charles Darwin - Half credit for correct description of the person or correct context given

- 1 pts d. Charles Darwin - wrong name

5.5 E 1 / 1

✓ **- 0 pts** **e. Alfred Russel Wallace - Correct last name**

- 0.5 pts e. Alfred Russel Wallace - Half credit for correct description of person or correct context given.

- 1 pts e. Alfred Russel Wallace - wrong name

QUESTION 6

6 Natural Selection 5 / 5

✓ **- 0 pts** **Correct - Darwin liked the term because of its analogy to artificial selection and Wallace disliked the term due to the problem of agency implied by the analogy - artificial selection requires a selector.**

- 0.5 pts missing the term "artificial selection"

- 1 pts mostly correct explanation, but lacking or incorrect use of key terms.

- 2.5 pts Half credit if the correct reason is given for either Darwin or Wallace, but not for both.

- 3 pts Rubric categories 3 and 4 apply

- 4 pts Partially accurate but not the reasoning we were looking for

- 5 pts Incorrect if neither reason given is correct.

QUESTION 7

Dating the Earth 5 pts

7.1 A 2.5 / 2.5

✓ **- 0 pts Correct**

- 1.5 pts Added up ages in biblical chronology

- 1 pts Calculation: added up ages in biblical chronology

- 0.5 pts Added up ages in biblical chronology

- 1 pts Be more specific. Added up ages in biblical chronology

- 2 pts Added up ages in biblical chronology

- 2.5 pts Added up ages in biblical chronology

- 0.5 pts Completely independent of Leclerc

- 2.5 pts Added up ages in biblical chronology

- 2 pts Added up ages in chronology of Old Testament

7.2 B 2.5 / 2.5

✓ **- 0 pts Correct**

- 0.5 pts Iron

- 1.5 pts Measured the cooling rate of hot iron balls

- 1 pts Measured cooling rate

- 0.5 pts Heated, not melted

- 0.5 pts Earth was not a liquid

- 0.5 pts Measured cooling rate

QUESTION 8

8 Mono v. Polygenism 3 / 5

- 0 pts Correct

- 1 pts Polygenism applies specifically to the creation by God of multiple human species.

- 2 pts Mono and polygenism descriptions are reversed

- 2 pts Polygenism is a creationist, not evolutionary, belief. Separate species of humans created by God.

- 0.5 pts Human races created as separate species by God (polygenism)

- 1 pts Polygenism states that multiple human species were created separately by God.

✓ **- 1 pts Connect abolitionism/slavery more specifically to these theories.**

- 1 pts Connect imperialism more specifically to these theories.

- 2 pts Slavery/colonialism justified using polygenic theories

- 1 pts Monogenism states that all humans have one common ancestor, not necessarily that the human species descended from Adam and Eve.

- 1 pts Slavery/colonialism justified using polygenic theories

- 2 pts Mono and polygenism apply specifically to the creation by God of one or multiple human races.

- 1 pts Slavery/colonialism justified using polygenic theories

- 1 pts Polygenism is a creationist, not evolutionary, belief. Separate species of humans created by God.

- 1 Point adjustment

Monogenism is the belief that there is one human species descended from one common ancestor. Genetic mutations were not understood at the time and many monogenists were creationists, not evolutionists.

QUESTION 9

9 Malthus 4.5 / 5

✓ **- 0 pts Correct.**

✓ **- 1 pts need to mention: exponential/ very rapid growth of population if unchecked.**

- 1 pts need to mention: very limited resource

- 1 pts need to mention: competition/ survival of the fittest as a result of 2 and 3.

- 5 pts Incorrect

+ 0.5 Point adjustment

Exponential growth of population if unchecked.

QUESTION 10

Paley 5 pts

10.1 A 1 / 2.5

✓ **- 2.5 pts No answer given or to get points right**

+ 2.5 pts Design in nature means designer

+ 1 pts Explanation of watch metaphor

✓ **+ 1 pts Divine creator**

- 0.25 pts Flipping logic

+ 1 pts Perfection or complexity of natural world

- **0.5 pts** no explanation of complexity/perfection as evidence of design.

True, but what about animals showed proof of the existence of the divine? What was the logic of Paley's argument?

10.2 B **1.5 / 2.5**

- **0 pts** Correct
- **2.5 pts** No answer given

✓ **- 0.5 pts** **Get the main point, but just describe evolution**

✓ **- 0.5 pts** **Suggest Paley accepting evolution/change!**

- **0.25 pts** No speciation
- **1.25 pts** No Paley, no rapid evolution
- **1 pts** No Paley answer or wrong answer
- **1 pts** Adaptive radiation incorrect

This is mostly correct, but didn't quite get how adaptive radiation is different than evolution in general and confusingly suggest Paley could see evolutionary change as a mechanism. Also doesn't describe how Paley would explain the similarities among species in an adaptive radiation (remember, this isn't seen in every ecosystem!).

QUESTION 11

11 Eureka! 2.5 / 5

✓ **+ 2.5 pts** **The formulation of Darwin's theory in the Origin of Species was the culmination of careful thought and the meticulous acquisition of evidence over a prolonged period of time, rather than the expression of a single moment of inspiration.**

+ **2.5 pts** There were many factors that influenced Darwin's thinking both during his voyage on HMS Beagle (his geological interest guided by Lyell's work, his interaction with fossils, etc.) and after his return (collaboration with other scientists, e.g. John Gould, reading of Malthus, etc.), not just the Galapagos finches.

+ **2.5 pts** Darwin recognized the importance of his theory and overcame barriers to articulate his ideas in a cultural environment where natural theology was the accepted standard.

+ **0 pts** Incorrect

QUESTION 12

12 Vestiges 4 / 5

- **0 pts** Correct
- **2 pts** Darwin was not pre-empted by Vestiges since the basic idea was somewhat different. Rather, it gave him a picture of how unreceptive the scientific community was to transmutationist ideas, at least those without much scientific support.
- **5 pts** Left blank.
- **2 pts** Darwin was not inspired by Vestiges, instead the negative scientific reaction to it was part of his hesitation to publish. It caused him to step back and gather more data instead.
- **1 pts** Wallace was not just supportive of Vestiges, he was inspired to name himself a transmutationist from the minute of reading it. This work turned his thought to theoretical aspects of the natural world.
- **1 pts** Wallace was did not yet have a theory to compare Vestiges to. Instead, it was the very start of his theoretical thought about the natural world, and marks the origin of his transmutationist perspective.
- **1 pts** Vestiges not only inspired Wallace to explore, but it also opened him up to the idea of theorizing about the natural world in a transmutationist context.

- 1 Point adjustment

Wallace wasn't just inspired to get data, but to theorize about the natural world in a large sense. (Also note that his collecting was not focused on islands, the first five years took place on the continent of South America)

QUESTION 13

13 Sarawak 4 / 5

- **0 pts** Correct

✓ **- 1 pts** **Click here to replace this description.**

- **5 pts** Click here to replace this description.
- **2.5 pts** Wallace is stating that a new species will have arisen from an existing ancestor, and so will exist in a similar space and time as that recent ancestor. It is an argument against spontaneous creation.
- **2 pts** Click here to replace this description.
- **2 pts** Why do you find closely related species in the same time and space? Recent descent from a common ancestor
- **1 pts** He had not figured out the mechanism of evolution yet. He is suggesting here that because of common descent from an ancestor, you find closely related species in similar space and time.
- **1 pts** Wallace is referring to a genealogical tree of life where you find closely related species in a similar space and from similar times due to common descent from an ancestor
- **5 pts** Wallace is referring to a genealogical tree of life where you find closely related species in a similar space and from similar times due to common descent from an ancestor
- **5 pts** No answer provided
- **3 pts** Wallace is referring to a genealogical tree of life where you find closely related species in a similar space and from similar times due to common descent from an ancestor

1 Wallace is saying that you can find closely related species in similar geographic space and historical time due to evolution from a recent common ancestor.

QUESTION 14

14 Species and varieties 2 / 5

+ **2 pts** Relationship between species and varieties: Darwin argues that the line demarcating species and varieties is fuzzy.
+ **2 pts** Citation of experts: Darwin cites disagreement among experts about whether to classify organisms as species or mere varieties.
+ **1 pts** Evidence for descent with modification: Darwin argues that the poor demarcation between species and varieties exists because varieties are incipient species.

✓ **+ 0 pts Click here to replace this description.**

+ 2 Point adjustment

1/2 points- Answer discusses debate surrounding species/varieties. However, the answer doesn't address the general blurriness in the difference between the two classifications.

1/2 points- Answer discusses Darwin's use of experts, but doesn't discuss disagreement among experts as to the classification of species/varieties

0/1 point- Does not discuss implication for descent with modification

QUESTION 15

15 Struggle for survival 5 / 5

✓ **- 0 pts Correct**

- **1 pts** Click here to replace this description.
- **0.5 pts** Click here to replace this description.
- **2 pts** Click here to replace this description.
- **5 pts** Empty

Harvard ID #: 31238749 TF: Tues, 12-1:15 Name: Juliana Lamy

SLS 12 2018 Understanding Darwinism
Mid-term 1, 2 Oct 2108

*Please be sure to put your Harvard ID, Name, and Section Leader on **every** page. Answer all the questions. Answer **only** in the spaces provided. Each question is worth 5 points. Please make sure that your answers are legible and succinct (you will be penalized for adding to your answer irrelevant material that is not germane to the question). You have 75 minutes for the exam, and there is a total of 75 points available; pace yourself accordingly*

1. Distinguish between positive and negative eugenics.

Positive eugenics is the encouraging of those individuals with the most favorable heritable traits to reproduce, while negative eugenics is the discouraging of those individuals with the least favorable heritable traits from reproducing.

2. Compare and contrast catastrophism and uniformitarianism. For each perspective, give the name of the historical figure most closely associated with its development.

Catastrophism, proposed by French naturalist Georges Cuvier, theorizes that all great geological epochs end with sudden and spontaneous mass extinctions. Change in the natural world is abrupt. Uniformitarianism, championed by English naturalist Charles Lyell, theorizes that change in the natural world occurs gradually, that geological epochs do not often end in catastrophe, only slow shifts, much like the ones we experience contemporarily.

Do not write below line (for grading purposes)

Harvard ID #: 81238719 TF: Tues, 12-1:15 Name: Julianna Lanny

3. Charles Darwin's grandfather, Erasmus Darwin, wrote the following description of evolution:

Organic life beneath the shoreless waves
Was born and rais'd in Ocean's pearly caves
First forms minute, unseen by spheric glass,
Move on the mud, or pierce the watery mass;
These, as successive generations bloom,
New powers acquire, and larger limbs assume;
Whence countless groups of vegetation spring,
And breathing realms of fin, and feet and wing

a. What does he mean by "spheric glass"?
He is referring to the microscopes of his day.

b. Outline one key difference between the evolutionary theories of Erasmus and Charles Darwin.
Though both agreed that beings in the natural world undergo organic self-determination, Darwin discovered the mechanism by which this self-determination happened. What's more, Darwin included humans in his theory, while Erasmus didn't.

4. What is meant by "inheritance of acquired characters?" Give the name of the figure in the history of biology most closely associated with this idea.
This term refers to the propagation of the adaptive traits gained by a particular species. Whatever proved most useful in the lifetimes of members of a species will, often by way of the fact that these traits have allowed them to live longer to reproduce, be passed down to their offspring. This theory was closely associated with Lamarck.

Do not write below line (for grading purposes)

Harvard ID #: 81238719 TF: Tues, 12-1:15 Name: Julianna Lowry

5. Who said:

a. How extremely stupid not to have thought of that! T. H. Huxley

b. Three generations of imbeciles are enough Oliver Wendell Holmes

c. Nothing in biology makes sense except in the light of evolution T. H. Huxley

d. Seeing this gradation and diversity of structure in one small, intimately related group of birds, one might really fancy that from an original paucity of birds in this archipelago, one species had been taken and modified for different ends Charles Darwin

e. All the human inhabitants of any one country should have equal rights and liberties before the law; women are human beings; therefore they should have votes as well as men A. R. Wallace

6. Darwin and Wallace disagreed over the term "natural selection." Give **one** reason why Darwin favoured it, and **one** reason Wallace objected to it.

Darwin liked the term because of its basis — "natural" selection had been born of Darwin's theory of artificial selection, where humans selected and accumulated the animal and plant traits that they found most pleasing; Darwin thought that nature did much the same with the traits that it found most favourable. Wallace objected to the term because he thought that it implied the existence of a divine selector, a notion, he believed, at odds with organic self-determination.

Do not write below line (for grading purposes)

Harvard ID #: 81238749 TF: Tues, 12-1:15 Name: Julianna Lowney

7. a. Archbishop Ussher concluded that creation was completed in 4004BC. How did he come up with this figure?

He chronicled the events in the Christian Bible, attached dates to all of them, and, in addition to the Earth's specific age, surmised at the Earth's exact date of creation — Sunday, October 23rd.

b. Georges Leclerc, Comte de Buffon gauged the age of the planet to be 75,000 years. How did he come up with this figure?

He measured the rate of cooling of iron balls in the Earth's crust, because he thought that the Earth was originally one hot sphere.

8. Outline the differences between the monogenic and polygenic theories of human origins. Why was this debate so topical during the 19th century?

The monogenic theory of human origin states that all of the human races were created at the same time; that is, all of the races are descendants of Adam and Eve. Monogenists believed that sometime in human history, a genetic mutation occurred to produce the non-white races. Polygenism posits that all of the races were created separately, and the non-white races were created before Adam and Eve. Competing theories of human creation were made particularly germane by American slavery.

Do not write below line (for grading purposes)

Harvard ID #: 31238749 TF: Tues, 12:1:15 Name: Juliana Lowey

9. Both Darwin and Wallace report that T. R. Malthus was an important influence on their development of the theory of natural selection. Outline the key idea of Malthus that had such an impact.

In his Essay on the Principle of the Population, Malthus proposed the idea that the world's resources were finite, and that competition for their use will inevitably ensue. He thought that the most elite would attain them, and prevail, while the poorest classes, those without means, would be unable to. He also saw the lower class's lack of resources as a divine punishment for its non-virtuous behavior.

10. Darwin studied Paley at Cambridge.

a. Outline the essence of Paley's natural theology.

Paley believed that all beings in the natural world had been divinely ordained to be in their exact positions, relative to the other parts of the natural world.

b. What is an adaptive radiation? Using a Paleyan perspective, explain adaptive radiation.

Adaptive radiation is evolution - we may begin with one species, but due to speciation and specialization, as necessitated by changing environments, species diverge into different species. Paley might say that adaptive radiation might only occur if a divine power deems it necessary to separate species.

Do not write below line (for grading purposes)

Harvard ID #: 81238749 TF: Tuesday 12-1:15 Name: J. Lowney

11. An historian of Darwin's Galapagos visit, Frank Sulloway, has written that the chief offence of the Darwin-Galapagos Eureka! legend is that it "masks the complex nature of scientific discovery, and, thereby, the real nature of Darwin's genius." Use what you know about the development of Darwin's thinking to illuminate the "real nature of Darwin's genius."

The real nature of Darwin's genius is that after he had made all of his Galapagos observations, he theorized the mechanism that led to what he saw by collecting, time and again, even more evidence for his suppositions. By this time he had presented his theory to the world, he had massive amounts of data on which to call.

12. The anonymously published *Vestiges of the Natural History of Creation* affected Darwin and Wallace in very different ways. Describe the impacts on each of them.

It encouraged Darwin to collect more evidence for his evolutionary theory, and pushed him to hold off on publishing his findings. It encouraged Wallace to travel to various islands, amassing more data to substantiate his suspicions about evolution.

Do not write below line (for grading purposes)

Harvard ID #: 31238749 TF: Tues, 12:1:15 Name: J. Lowney

13. In his 1855 "Sarawak Law" paper, A. R. Wallace wrote, "Every species has come into existence coincident both in space and time with a pre-existing closely allied species." What does this mean?

Wallace theorizes, here, descent with modification. Darwin might call it adaptive radiation, but here Wallace notes the presence of common ancestors for species. As the demands of environments change, members of a species must adapt, which will lead to speciation. 1

14. Darwin frequently makes use of experts to support his arguments in the *Origin of Species*. How does he use various experts to support his arguments on defining species and varieties and the relationship between species and varieties?

When Darwin mentions these experts, how often does so briefly, without extensive citation. In addition to highlighting the fact that he was reaching to prove, this treatment of experts in this discussion of species and varieties allows him to fully cement his own distinctions between the terms, without having to engage substantially with potentially contesting claims.

Do not write below line (for grading purposes)

Harvard ID #: 31238749 TF: Thurs, 12-1:15 Name: J. Lowry

15. On the struggle for survival, Darwin states, "The struggle almost invariably will be the most severe between the individuals of the same species, for they frequent the same districts, require the same food, and are exposed to the same dangers." How might this support Darwin's ideas of divergence of character and how species come about?

Individuals of the same species who compete for the same resources will encounter one of two possibilities: (1) they diverge so that they are no longer in competition (divergence of character) or (2) one species, the less well-adapted to the environment, goes extinct (competitive exclusion)

Do not write below line (for grading purposes)