

## **Scientific Process – Final exam questions**

### **Research Day (20% of final exam grade)**

Summarize six research day projects (3 faculty, 3 student). Bring summaries to class on final exam day.

1. Include authors' names and title for each project
2. Your summary for each project (approximately 100 words per project)

### **You will be asked 5 to 8 questions from the list below (80% of your final exam grade).**

#### Pseudoscience

1. List characteristics and fully describe of science versus pseudoscience
2. Develop an example of science that becomes pseudoscience.
3. Identify a topic that is frequently considered pseudoscience. Describe a research design that could be used to investigate the pseudoscience scientifically.
4. What is the difference between science and pseudoscience?
5. What are the characteristics of science that distinguish it from pseudoscience?
6. Briefly describe pseudoscience and give three examples from our readings.
7. Why is pseudoscience more readily accepted than legitimate science?
8. According to Carl Sagan, what is the “most precious thing”?
9. What is the value of science? What are the disadvantages of science?

#### Peer Review

10. Provide three strategies that should be considered in a scientific peer review.
11. What ethical considerations should go into a peer review?
12. Peer review any one the following three following proposals (give student a section). You are presented with a research objective and method section. In the peer review, critique the methods in terms of the research objective.

#### Scientific Structure

13. Please list and fully describe the components of a research proposal.
14. Please list and fully describe the components of a primary literature article.
15. What is the peer review process in science? How does the peer review process relate to the funding panel and the publication primary literature article?
16. What is the role of IRB and IACUC in science? What is the legal and ethical roles of IRB and IACUC?

#### Ethics

17. Do scientific have an ethical obligation to explain the reason and significance of their science to society?
18. What are some ethical considerations that are unique to science?

19. Identify a potential ethical issue or dilemma associated with your research proposal. Explain why the issue or dilemma is an ethical issue. Explain how you would resolve it.
20. Describe your scientific ethical philosophy in terms of the different perspectives discussed this semester. How will the ethic stances affect your science?

#### Types of Science/ Philosophy

21. What is the difference between pure and applied science? Which type of science of would you pursue in your own career? Why?
22. Describe and compare Popperian and Bayesian statistical philosophies. Which statistical philosophy makes the most sense in your research?
23. Is historical science less scientific than falsificationist science? Why or why not?
24. Describe your scientific philosophy in terms of the different philosophical perspectives discussed this semester. How will this philosophy affect your science?
25. What is the definition of falsificationism? Why is it not always an accurate description of the scientific process?
26. Give two examples of statements that are falsifiable?
27. Define inductivism.
28. What scientific method would you choose as a scientist (falsificationism, inductivism, etc.) and explain why?
29. Why should historical science be considered a legitimate science?