A = True, B = False unless stated otherwise name (required) _____

You must turn in both this hard copy (with your name on it) and your scantron to receive credit for this exam. **One answer and only one answer per question.** Leaving a question blank or filling in 2+ answers will be incorrect no matter what.

Intrinsic Difficulties

1-12 (2.2 pts each). These questions ask for the intrinsic difficulty illustrated by the given statement. Do not assume any more than what is explicitly given in the question – address only the difficulty or phenomena specifically described. Also, a paragraph may describe NO intrinsic difficulty (option F). Note that the terms used in (A)-(E) below may not be the full description given in class, but the terms are sufficient for you to identify them.

(A)	(B)	(C)	(D)	(E)	(F)
Intrinsically limited replication	**Small effects**	**Time lags**	**Interactions**	**Humans are difficult subjects**	**None**

1 Our ability to understand the genetics of both human and animal diseases has improved greatly in the last 2 decades with technical improvements in DNA sequencing. Prior to this technical advance, it was difficult to identify actual mutations responsible for diseases. Now, with easy DNA sequencing, it is possible to find whether specific changes in the DNA are associated with, and thus possibly cause, disease. Which intrinsic difficulty underlies the reason we could not previously identify the mutational bases of disease?

(A) (B) (C) (D) (E) (F)

2. FDA approval of new drugs requires clinical trials. When the last trials are complete, no more than 3,000 humans will have been tested. Consequently, serious harmful effects at a rate of 1 per 5,000 or less will go undetected until the drug is marketed and exposed to millions of people. Which intrinsic difficulty underlies this problem with clinical trials – that serious harmful effects can be missed but show up after marketing?

(A) (B) (C) (D) (E) (F)

3. FDA approval of new drugs requires clinical trials. Trials commonly restrict the types of other medications that patients can take. Thus, if a new drug is safe when taken alone but is unsafe when taken with another medication, the trials will miss this effect. But the effect will show up when the drug hits market and no such restrictions operate with the people taking the drug. Which intrinsic difficulty underlies this problem with clinical trials – that a drug can be declared safe when used alone but not when used with some other drugs?

(A) (B) (C) (D) (E) (F)

4. Disease outbreaks with a common cause are easiest to discover when they occur in the same location at approximately the same time. If the same number of affected individuals is spread over multiple locations, it is far more difficult to discover that they are connected to a single cause. Which intrinsic difficulty underlies this type of problem?

(A) (B) (C) (D) (E) (F)

5. A company markets a product that becomes widely used throughout the US in water purification. Over 200 million people are exposed to it. It is safe for and causes no obvious symptoms for nearly everyone, but it exacerbates health problems for some elderly and for some already sick, killing about 750 people across the US each year. However, with over 2.5 million Americans dying each year from all causes, the 750 does not stand out enough from the myriad of other causes of death to allow a statistical demonstration that the product is a cause of death. Which intrinsic difficulty underlies the difficulty in recognizing the deaths caused by this product?

(A) (B) (C) (D) (E) (F)

6. A student wishes to measure the average weight of an apple seed, but her scale weighs only to the nearest 0.1 gram. She first weighs each of 100 seeds separately and arrives at an average weight of 0.700 grams. The true average is instead 0.763. What type of intrinsic difficulty underlies this inaccurate calculation?

(A) (B) (C) (D) (E) (F)

7. A newspaper hires a firm to see if the responses of Republicans differ from those of Democrats to editorials published in the newsaper. The firm takes 3 surveys. Each survey uses 100 randomly chosen Democrats and 100 randomly chosen Republicans. Results of the 3 surveys are that 73%, 70% and 74% of Republicans approve of the editorials, but the corresponding numbers for Democrats is 46%, 45% and 50%. Thus there is a consistently large difference in the response between the two parties. What type of intrinsic difficulty underlies the inability to get the same average response between the two parties?

(A) (B) (C) (D) (E) (F)

(A)	(B)	(C)	(D)	(E)	(F)
Intrinsically limited replication	**Small effects**	**Time lags**	**Interactions**	**Humans are difficult subjects**	**None**

8. A new homeowner wants to buy a display cabinet for the living room. She visits a furniture store and finds an attractive cabinet that is displayed in the store as part of a set that includes a couch, several chairs, dark walls, and some tall lamps. She buys only the cabinet, but when she gets it home and sets it up in an otherwise empty room with light-colored walls, finds that it is not nearly as appealing as it was at the store. What type of intrinsic difficulty plausibly underlies the fact that the cabinet looked attractive in the store but not in her house?

(A) (B) (C) (D) (E) (F)

9. The theory of continental drift was proposed in 1915 but was not accepted for nearly half a century. The problem when the theory was first proposed was that geologists did not have the ability to measure movements of the continents nor an understanding of how the ocean floors expand in their centers. In essence, there was no conceivable mechanism for continental drift for the first half of the 20th century. Which difficulty explains why the theory of continental drift took so long to be accepted?

(A) (B) (C) (D) (E) (F)

10. Most merchants face a major challenge in anticipating consumer demands. Even when they know what consumers want at present, they cannot usually provide those goods in a timely fashion -- they must order the goods many months in advance, pay to have it stocked on the shelves, and then hope that consumers will still want the product. In the time from ordering goods until those goods are sold, consumer preferences may change profoundly, and the goods may not sell. The problem would be solved if the goods could be made available at the time consumer preferences were known. Which difficulties underlie this problem of matching consumer preferences with the goods being sold?

(A) (B) (C) (D) (E) (F)

11. New drugs must pass several hurdles before they are approved for people. The most expensive of these hurdles are clinical trials, in which up to thousands of participants are carefully monitored for the effects of the drug. The many safeguards assure minimum risk to the participants but raise the cost of drug approval substantially. Which difficulty underlies the high cost of new drugs?

(A) (B) (C) (D) (E) (F)

12. The second Facilitated Communication video showed several parents who were unwilling to accept the evidence suggesting that Facilitated Communication was bogus. Which intrinsic difficulty can be argued to underlie the reason they reject the evidence?

(A) (B) (C) (D) (E) (F)

Biological Determinism

13-19. (14 pts) Which of the following are true about Biological Determinism, as covered in class? **A=true, B = false**

13. (A)(B) The use of Facilitated Communication with autistic children is an example that falls within the realm of biological determinism.

14. (A)(B) The existence of an anatomical difference among individuals implies that a genetic basis underlies the difference (as with a mother who drinks alcohol during pregnancy and causes changes in the baby's facial development).

15. (A)(B) The difficulty of doing research on humans is the main impediment to resolving biological determinism questions.

16. (A)(B) The U.S. has a history of completely avoiding legislation addressing matters of biological determinism.

17. (A)(B) The case of 'The Boy raised as a Girl,' was a story of an inadvertent experiment on the biological basis of sexual preference.

18. (A)(B) The inheritance of characteristics such as IQ and biological determinism could not be studied before we could read DNA sequences.

19. (A)(B) One of the more established correlations with sexual preference is that the probability of same-sex preference for a man increases with the number of older brothers he has (by the same mother).

Conflict and Bias

20-22. Videos (6 pts) **(A) = TRUE (B) = FALSE**

20.(A)(B) In the video on the fired Fox News reporters, the (appeals) court claimed that the media was under no obligation to report the truth.

21.(A)(B) The Facilitated Communication video showed that, in the final analysis, the scientific evidence convinced the many different parties with an interest in FC.

22.(A)(B) The Facilitated Communication video illustrated several cases of deliberate bias, including use of anecdotes to defend FC and Biklen's refusal to admit that his defense of FC might be wrong.

23-26 (10 pts) Which of the following paragraphs describe a tragedy of the commons (ToC) conflict or outcome?

A = is a ToC conflict, B = is not

23. (A)(B) A majority of the voters in a thriving city elect a charismatic mayor who later proves to be corrupt. This mayor's corruption ultimately pushes the city's finances into decline and bankruptcy. Indicate whether this financial collapse of the city stems from a ToC.

24. (A)(B) In challenging incumbent politicians, group protests are often effective ways of forcing the government to adopt the will of the people. There is some chance of political recriminations against the protesters. Larger protests are more effective than small ones, and people are more likely to join public protests when there are already several people in the crowd, since the risk to an individual in joining the crowd goes down with the number of people. Indicate whether this benefit of protesting in large groups stems from a ToC.

25. (A)(B) There is increasing emphasis on group activities in university classes, whereby the instructor assigns every student to a group with 5-10 other students. Each group must complete a project that is graded, and the grade given to each student within a group is the same as for all other students in the group. So a student who contributes nothing to the group project gets the same grade as a student who did most of the work for that group. No student feels motivated to do work that will largely benefit others, and no one student can do most of the work required by a project. The quality of projects thus suffers. Indicate whether this poor quality of group projects is a ToC outcome.

26. (A)(B) In trying to maximize profits, a rancher carefully distributes cattle to different pastures to avoid overgrazing. However, the calculation of cattle per acre is based on a year with good rainfall. A drought ensues, hence all pastures are overgrazed, and the soil quality deteriorates. Indicate whether this deterioration of pasture quality is a ToC outcome.

27-30. (8 pts) Each of the following options describes a property of a vaccine, disease, or population. Indicate which of them works in favor of (allows or enables) a tragedy of the commons (ToC) conflict for humans.

A = enables a ToC, B = does not

27. (A)(B) The disease is acquired by people only from wild mice.

28. (A)(B) The vaccine prevents someone from transmitting the disease but not from getting it (known as an altruistic vaccine)

29. (A)(B) The more people vaccinated, the lower the rate at which an unvaccinated person gets the disease.

30. (A)(B) The disease is genetic instead of infectious.

31-37 (2.2 pts each). Identify the bias in the following questions using options (A)-(I). Only one answer per question, but an answer may be used once, never, or used on several questions. Options (A)-(G) are arguments/statements indicative of bias. H is confirmation bias. (I) is none of the others.

(A) character assassination of opponent	(D) build causation from correlation	(G) refusal to admit error
(B) use 'either-or' arguments	(E) require refutation of all alternatives	(H) confirmation bias
(C) appeal to authority	(F) use anecdotes as evidence of generality	(I) None of A-H

31. A student in a class subjected to a bogus horoscope claims that he still believes in horoscopes because the study has not shown 'there is nothing' to horoscopes.

(A) (B) (C) (D) (E) (F) (G) (H) (I)

32. Scientists supporting the possible benefits of fluoridated water for dental health read only those reports and publications whose titles indicate a positive benefit from fluoridation.

(A) (B) (C) (D) (E) (F) (G) (H) (I)

33. A politician justifies an increase in beer taxes as a public health benefit from the fact that STD rates have gone down when beer taxes went up.

(A) (B) (C) (D) (E) (F) (G) (H) (I)

34. Creationists argue that their view of the origin of life must be correct because the theory of evolution is not clear on many points.

(A) (B) (C) (D) (E) (F) (G) (H) (I)

35. A company uses questionable statistical methods in evaluating data from a study of one of their products.

(A) (B) (C) (D) (E) (F) (G) (H) (I)

36. A politician claims that mandatory vaccination is unnecessary because the film star John Travolta has the same view.

(A) (B) (C) (D) (E) (F) (G) (H) (I)

37. An expert witness in a criminal trial claims that his company does not and cannot possibly make lab errors

(A) (B) (C) (D) (E) (F) (G) (H) (I)

Trustworthy sources

"Magnetic water has several very beneficial properties: it aids absorption of nutrients from our food, it aids digestion, it de-toxifies the blood, it regulates hormone levels particularly insulin, serotonin, melatonin and endorphin, it lowers high blood pressure and it increases the strength of the magnetic field at the point of pain, plus it also speeds up the healing process by increasing the absorption rate of the magnetic field by up to an amazing 6-10 times."

38-41. (8 pts) The preceding paragraph, taken from a website promoting the benefits of 'magnetic water,' exhibits which of the following indicators of trustworthiness?

A = is present B = absent

38. (A)(B) Modest claims.

39. (A)(B) Original references are provided

40. (A)(B) Details of data obtained from controlled studies

41. (A)(B) Balanced presentation of alternative explanations

42-48. (2.2 pts each) Identify the appropriate type (or stage) of bias in the following questions. If the question gives a way to reduce or avoid bias, choose (E). If a question does not satisfy any of (A)-(E), choose 'None' (option F).

(A) Before the design and conduct	(B) In the design and/or conduct	(C) In evaluation and description of results	(D) Arguments indicative of bias, instead of ways to bias	(E) Ways to avoid or anticipate deliberate bias	(F) None

42. (A)(B)(C)(D)(E)(F) A drug company chooses healthy subjects for its clinical trial to minimize deleterious side effects of the drug

43. (A)(B)(C)(D)(E)(F) Publishing the raw data

44. (A)(B)(C)(D)(E)(F) A pesticide company 'pads' a government regulatory committee with its shareholders to set favorable rules for approval of its products.

45. (A)(B)(C)(D)(E)(F) Doug Biklen's claim that it does not matter how many times a method fails a test, the method should be based only on successes.

46. (A)(B)(C)(D)(E)(F) Group different categories of data to obscure certain kinds of results

47. (A)(B)(C)(D)(E)(F) A bogus study on the health benefits of eating chocolate uses small sample sizes to increase the possibility of a statistically significant result by chance.

48. (A)(B)(C)(D)(E)(F) Anticipate vested interests of those conducting the study.

49. (2 pts) (A) Fill in **bubble A** on 49 to indicate your key. **Likewise make sure your name and EID are correctly bubbled in.**