Cors 236 Exam 2 (2024) : 41 questions, 4 pages **Put your answers on Canvas (Test 2_2024)**

Answer every question (1-41) with a single letter. Answers with no letter or two letters will get 0 pts.

If not specified otherwise, assume A = True/yes B =False/no

If any part of a question/option is wrong, treat the entire question as wrong. Note that an answer statement might be correct but the statement not answer the question (hence the answer would be false).

Models (general)

1-4. (4 pts) Each of the following options compares two models for a particular goal. Choose (A) for options in which the *first model* (*in italics*) IS MORE ACCURATE than the **second model (bold)** for the goal (underlined). Use model 'accuracy' as we have defined it in class.

(A) the *first model* is the more accurate (B) the **second model** is the more accurate

1. (A)(B) *The size of shoes indicated on the shoebox* versus **how the shoes feel on your feet** for deciding how well the shoes fit your feet.

2. (A)(B) Measurement of the BAC over time in subjects who have *rapidly consumed a single glass of alcohol on an empty stomach* versus in subjects **who have consumed alcohol in different social settings** to decide whether it is possible to accurately back calculate a BAC for people who have consumed alcohol under normal circumstances.

3. (A)(B) *Your day-to-day performance where you work* versus **your exact score from an online compliance module** for evaluating your ability to operate safely in the workplace.

4. (A)(B) The longevity of a dog breed *measured when cared for by adoptive families* versus **measured in hundreds of dogs in the sanitized conditions of kennel cages** to determine how long the dog is likely to live as a family pet.

5-7 (4 pts) You develop a new model of driving experience that can be used to assess driver impairment from alcohol intoxication. Using a virtual reality helmet and 3-dimensional video imaging, the simulator depicts a driving experience as if the subject is behind inside the steering wheel of a car, with a brake pedal and accelerator. The subject must anticipate and respond to 20 different virtual incidents, each of which could result in a (simulated) traffic accident. Legislation is passed so that all drivers must pass this simulated test yearly to maintain their license. Upon being stopped, suspected impaired drivers are required to be tested with this simulator to evaluate possible impairment. Which are true? (A) True (B) False

5. (A)(B) Performance in the simulator would be considered a more accurate model of driving performance than is a blood alcohol concentration (BAC).

6. (A)(B) As also true of the standardized field sobriety test, there would be no baseline data with the simulator for the performance of individual drivers when sober.

7. (A)(B) A poor correlation between driver performance with the simulator and driver BAC would mean that the simulator was at fault – that the simulator was poorly measuring the ability to drive.

8-10 (4 pts) How might the favorable advertisement you see for an anti-wrinkle cream be a seriously flawed model of how the cream will perform on you? The advertisement consists of testimony from 5 individuals who used the cream on themselves and were highly satisfied.

(A) True – the ad would be seriously flawed if the statement in the question is accurate

8. (A)(B) The advertisement was based on tests using people.

9. (A)(B) The advertisement omitted testimonials from many people who were not satisfied.

10. (A)(B) The testimonials were from much younger people with less skin damage than you.

11-13 (4 pts) In attempting to get elected by appealing to voters, a politician delivers somewhat different speeches to audiences across different towns during the first 6 months of the campaign. Shortly after each speech, her staff monitors social media platforms in attempting to measure the local community response to the speech. They realize that most voters may not be commenting on social media, but it's the best they can do. When the social media response is somewhat unenthusiastic, the politician changes future speeches to see if she can improve the response.

What are true about models in this example? A = True, B = False

11. (A)(B) The responses on social media are used as models of the community's reception to her speech.
12. (A)(B) Differences between her speeches are used as models of what causes the differences in responses on social media.
13. (A)(B) The responses measured on social media would have only small and inconsequential limitations as models representing most of the potential voters in the community.

The purpose of the next two question sets is to get you think about how you would identify/expose limitations of a model that is being presented to you by someone else.

14-17 (5 pts) You are told by a company that its new vaccine is safe and effective, based on trials they conducted with people. Which of the following questions that might be asked of this claim would address the scientific models used in reaching the company's claim about the vaccine?

(A) would address the scientific models, (B) would not

14. (A)(B) How many people were tested?
15. (A)(B) How long were the participants monitored for adverse effects?
16. (A)(B) What kinds of possible harmful effects were measured in the trials?
17. (A)(B) What local community officials endorse the vaccine?

18-21 (5 pts) You serve on a public health task force and are told by a paid group of consultants that its disease prediction model is forecasting a major measles outbreak (epidemic) in your community unless public schools are shut down in the next month. Which of the following questions that might be asked of this claim would address the scientific models used in reaching the group's claim about the impending measles outbreak?

(A) would address the scientific models, (B) would not

18 (A)(B) Have you considered the disruption to the community by closing schools?
19. (A)(B) How is your group funded?
20. (A)(B) Has the model been shown to successfully predict past outbreaks? That is, is there a precedent for us to trust this model?
21. (A)(B) How strong are the predictions of an outbreak – does the model allow for outcomes in which no outbreak will occur?

Generalities of models across DUI and Condom Testing

22-24 (4 pts) Which of the following points apply both to the DUI and condom testing topics? (A) = TRUE

22. (A)(B). Model convenience – instead of accuracy -- greatly influences which models are actually used by society.

23. (A)(B). We commented both for condom testing and DUI testing that, in the long term, we expect society to abandon convenient models in favor of accurate models.

24. (A)(B). The models used for both DUI and also those used for condom testing have several easily recognized limitations for their respective goals.

Models in DUI (BAC = blood alcohol concentration, SFST = Standardized Field Sobriety Test)

25-27. (4 pts) Class included a demonstration with a breathalyzer. Which of the following are points that the demo was used to illustrate? NOTE: a statement must both be correct AND address a point of the demo for the question to be considered TRUE. **(A) =** True

25. (A) (B) The demo was used to show that, because a BAC measured in breath shortly after mouthwash use inflates the true blood alcohol concentration, there are no reasonable circumstances in which breath can be trusted to correctly determine the blood BAC.

26. (A) (B) Although use of mouthwash inflated the BAC level measured in our volunteers, the BAC was never elevated above the 0.08% threshold that would be considered legal evidence of impairment in Idaho (for someone of legal drinking age).

27. (A) (B) The demo revealed the main reason that back calculations of BAC are flawed (back calculations use a Widmark plot).

28-30. (3pts) For each of the statements below (all apply to the SFST), indicate which model property (ACU) is indicated. Consider each statement to be true; you are to decide which property it describes.

(A) Accuracy (B) Convenience (C) Uniformity

28. (A)(B)(C) The SFST measures behaviors pertinent to driving performance.

29. (A)(B)(C) The SFST can be administered almost anywhere and without any equipment.

30. (A)(B)(C) With a certified officer, the SFST can be administered and scored the same way to each subject.

Condom testing (ABT = airburst test)

31-33. (3 pts) General points about condom testing. (A) = True (B) = False

31. (A)(B) No single model of condom testing is adequate for all goals. Our understanding of and confidence in condom quality and efficacy comes from a patchwork of overlapping models that have compensating strengths and limitations.

32. (A)(B) The ABT is considered an accurate model because we can know almost exactly how much air a condom holds before breaking

33. (A)(B) The ABT used for quality control (to identify bad batches) is a case in which one condom from a batch is considered a model of all condoms in that batch.

34-36. (3 pts) For studies in which volunteers were used to test condom efficacy in blocking HIV transmission, which are true? A = true, B = false

34. (A)(B) Some HIV- participants who were scored as 'consistently using condoms' converted to HIV+, but these conversions could not necessarily be attributed to condom failure. This inability to identify the role of condom failure in transmission is a limitation of the model used in those studies.
35. (A)(B) The lack of uniformity, which generally applies to volunteer studies, prevented meaningful conclusions about condom efficacy in blocking HIV transmission.
36. (A)(B) The studies used single, HIV- men and observed the rate of conversion to HIV+. A limitation of this study is therefore that it may not apply to couples, because single men may have different exposures than men with a partner.

Extrapolations (1.5 pts each)

37. In attempting to deal with its financial shortfalls, a university forces a furlough program in which its employees are forced to avoid work for one week during the year, unpaid. The university saves $2 M instituting this furlough. The university then proposes to institute a three-week furlough during the next year so that it can hopefully save $4M; the university calculates that the expected gains in savings will not be as great per year as with the short furlough. What relationship of extrapolation, if any, is assumed in the proposed financial gain of the 3-week furlough relative to the gain of the 1-week furlough?

A) linear B) threshold or accelerating C) decelerating D) Animal/species E) None

38. A student carefully monitors how much time they study for each calculus exam and compares that to each exam score. For the first two exams, 40 hours of study time yields exam scores around 80. They then boosted their study time to 60 hours and got 95 on the third test. What type of extrapolation, if any, applies to the observed relationship between study time and exam scores?

A) linear B) threshold or accelerating C) decelerating D) Animal/species E) None

39. A fruit rancher is trying to control both coddling moths (which attack apples) and spotted wing *Drosophila* (a fly which attacks cherries). They determine that spraying 2 liters per acre of an organic pesticide on apple trees will kill 99% of coddling moths. Without testing, they apply the same amount of the pesticide on cherries and expect it to kill 99% of spotted wing *Drosophila*. What extrapolation model underlies this untested use on *Drosophlia*?

A) linear B) threshold or accelerating C) decelerating D) Animal/species E) None

40. In early days of widespread tobacco use, it was clear that lung cancer rates were higher in heavy smokers than in nonsmokers, but it was not clear if low levels of exposure constituted a risk because levels of exposure could not be determined. Given the lack of evidence, it was widely considered that second-hand smoke was not harmful because exposures were so low. What model underlies this assumption?

A) linear B) threshold or accelerating C) decelerating D) Animal/species E) None

41. In flight, a passenger notes that the rivets on the wing of an airplane are popping out at one per 15 minutes. 4 are missing when the crew is alerted. The plane should land in 75 minutes, and the crew calculates that only 5 more rivets will be lost before the plane lands. What extrapolation model underlies this calculation?

A) linear B) threshold or accelerating C) decelerating D) Animal/species E) None