



“Investing in Africa’s future”
COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

NCSC 408: SIMULATIONS AND MODELLING

END OF FIRST SEMESTER EXAMINATIONS

NOVEMBER 2022

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DURATION: 3 HOURS

INSTRUCTIONS

Answer **all** questions in the paper

Start **each** question on a new page on your answer sheet.

The marks allocated to **each** question are shown at the end of the section.

First Part: Multiple Choice Questions

1. What makes a successful simulation model? (1 mark)

- I. Easy to understand
- II. Meets the target
- III. Nearly the real system
- IV. Produce results fast
- V. Cannot be updated
- VI. Complicated

- a) VI
- b) I, II, III, IV, V
- c) None of the above
- d) V, VI

2. An entity is

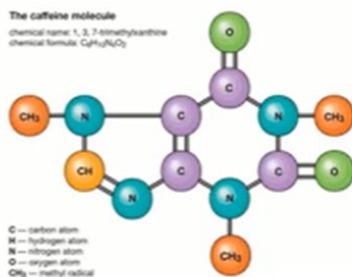
- A. Object of interest of the system
 - B. Attribute
 - C. Time period of specified length
 - D. None of these
- (1 mark)

3. TRUE OR FALSE

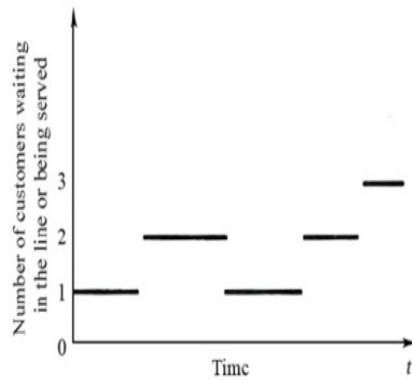
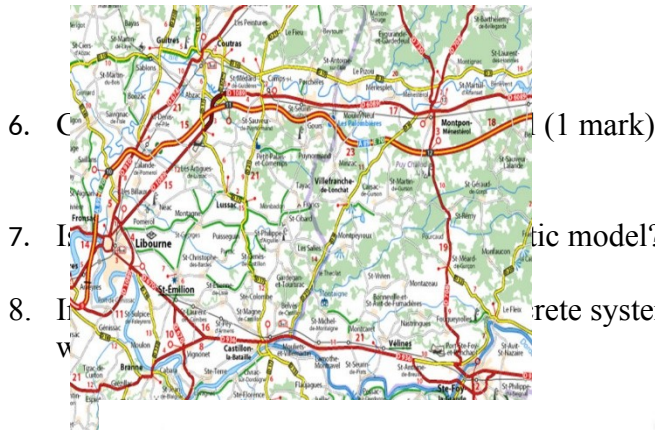
Static physical model is the physical model which describes relationships that do not change with respect to time. (1 mark)

Second Part: Objective Questions

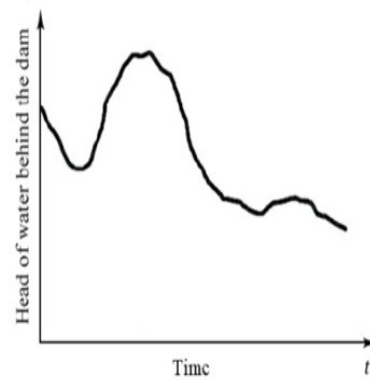
4. Describe this model and what it is used for. (4 marks)



5. How do maps act as models? (2 marks)



A



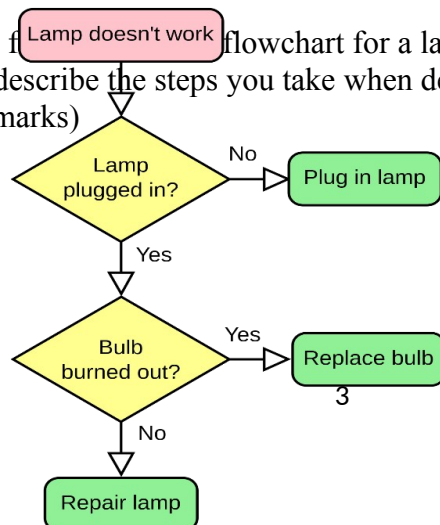
B

9. Give the definition with examples of
- Simulation What is the purpose of a Simulation? (5 marks)
 - Model What is the purpose of a model? (5 marks)

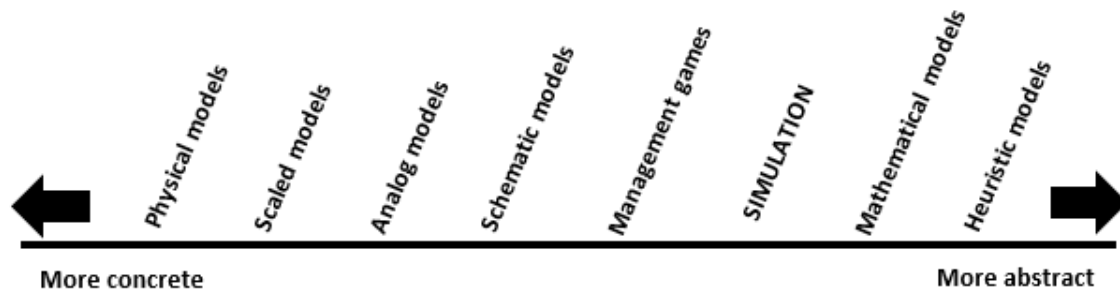
3. State 4 advantages of Simulation (8 marks)

4. Give an example of a Simulation you know and describe how it is simulated and the tools that are used. (10 marks)

5. The following is a flowchart for a lamp which does not work. Design your own flowchart to describe the steps you take when designing or testing a device or system of your choice. (10 marks)



10. Give an example of each model from the concrete to the more abstract scale. (16 marks)



11. Using animals in research and experiment has been a topic of heated debate for decades. Each year, more than 100 million animals such as mice, rats, frogs, dogs, cats, rabbits, hamsters, guinea pigs, monkeys, fish, and birds are cruelty killed in laboratories for biology lessons, medical training, curiosity-driven experimentation, and chemical, drug, food, and cosmetics testing worldwide. These kinds of experiments cause pain and suffering to the experimental animals and are also illegal. The pain and suffering that experimental animals are subject to is not worth any possible benefits to humans. Researchers are thinking about alternative solutions to stop experiments on animals because it violates animals' rights. In *Against Animal Experimentation*, do you think simulation and modeling can be the solution to this problem? Why and why not? Explain in your own words. (10 marks)

12. What is a random variable? (2 marks)

13. Describe the difference between model verification and validation. (4 marks)

14. Put the following simulation steps in the correct order: (7 marks)

- Perform simulation and collect the results.
- Build the model.
- Perform an appropriate data collection.
- Determine the goals. Setting the goal is the first step to be taken.
- Validate the built model.
- Analyze the results.
- Make the final documentation.

15. Describe the difference between model verification and validation. (4 marks)

16. What does simulating using a spreadsheet involve? (2 marks)

END OF PAPER