

Question 1

List five reasons why a process is better studied in a model than in the real world.

(2 points per correct answer)

- 1) faster
- 2) less costly
- 3) easier to measure
- 4) easier to manipulate
- 5) ethically less objectionable

Question 2

Name five concepts that can play a role in a cognitive model.

(2 points per correct answer)

Some examples:

observations, actions, communications, beliefs, desires, intentions, sensitivities, and trust states.

Question 3

Which factor is adjusted in neural learning and when does this adjustment take place?

(5 points per correct partial answer)

☒ The strength of the synapse between neuron A and neuron B is the factor that becomes stronger when neuron A is simultaneously activated with neuron B.

Question 4

For each of the four steps of the modeling cycle, explain exactly what actions the modeler must perform.

(2.5 points per correct answer)

☒ Conceptualization: identifying the most important concepts and relationships from the process to be studied.

☒ Formalization: capturing these concepts and relationships in a formal representation.

☒ Simulation: conducting experiments with the model to produce behaviors of the process over time.

☒ Evaluation: checking whether the model works as expected, and possibly determining what can be improved

Question 5

Name the main similarity and the main difference between stimulus-response behavior and delayed response behavior.

(5 points for each sub-question)

Similarity: Both are forms of reactive behavior.

Difference: in stimulus-response behavior the organism reacts immediately to the stimulus, while in delayed response behavior this happens after some delay.

Question 6

Fill in the missing word:

"A neural model is an example of a ... model".

- A. **physiological** B. cognitive
C. behavioral
D. social

Question 7

What form of growth does this graph describe?

- A. linear
- B. exponential
- C. **logistic**
- D. none of them

Question 8

Which of these models do not fall under social models?

- A. epidemic models
- B. **BDI models**
- C. trust and reputation models
- D. crime models

Question 9

What form of representation do most recent cognitive models use?

- A. qualitative representation
- B. quantitative representation
- C. **hybrid representation**

Question 10

What is the bee colony model a good example of?

- A. **a model of decentralised decision-making**
- B. a model of altruism
- C. a model of the emergence of an epidemic
- D. a model of crime

11. Fill in the missing word: "The model of the Aplysia sea slug is an example of a ... model."

a) physiological

b) cognitive c) behavioral

d) social

12. What does the growth rate of an exponential growth process depend on, in order to be higher than the growth rate of a linear growth process?

a) the increase per unit of time and the growth factor

b) the increase per unit of time, the growth factor, and the time

c) the growth factor and the amount

d) the increase per unit of time and the time

13. Which concept is particularly useful for modeling "delayed response" behavior?

a) belief

b) desire

c) intention

d) sensory representation

14. Which of these concepts does not play an explicit role in a model for food intake of the E. coli bacterium?

a) glucose

b) CRPcAMP import enzyme

c) lactose indicator

d) mass

15. The eating behavior of a person with Bulimia Nervosa can be modeled as a form of...?

a) stimulus-response behavior

b) delayed response behavior

c) motivation-based behavior

d) adaptive behavior

16. When do the resources decrease in the physiological model for controlling effort?

a) when the "generated power" is higher than the "stable power" point

b) when the "generated power" is higher than the "provided power"

c) when the "generated power" is lower than the "stable power" point

d) when the "generated power" is lower than the "provided power"

17. Which of these properties does not apply to "extended mind in world behavior"?

a) the environment plays a role in behavior

b) the individual is more dependent on the world

c) more complex mental processes are required

d) there is increased interaction between the individual and the world

18. What assumption do proponents of "realism" make in philosophy?

a) internal states should not be used in modeling

b) internal states can be used in modeling and can be related to existing physical states

c) internal states can be used in modeling and do not need to be related to existing physical states; they are just tools for describing behavior

d) internal states can be used in modeling if they lead to realistic behavior of the model

19. What is the model of altruism a good example of?

a) a model of decentralized decision making

b) a model of inter-temporal decision making

c) a model of the origin of epidemics

d) a model of social behavior

20. What concepts do you need to create a model at the "cognitive" level?

a) beliefs, desires, and intentions

b) observations and actions

c) individuals and groups

d) neurons and connections between neurons