Formal model specifications can be done in which of the following (mark all that apply):

[X] Predicate calculus
[X] Z
[ ] C
[X] Object Behavior Specification
[ ] Unified Modeling Language

In pure Object Orientation, a class must have (mark all that apply):
[X] state
[X] behavior
[ ] macro
[X] identity
[ ] wrapper

A system with a known, complete state space description has a unique input/output behavior
[X] true
[ ] false

What type of simulation is often based on differential equations?
A. Discrete event simulation
B. Continuous simulation
C. Monte Carlo simulation
D. Cellular automata simulation
Answer: B

In the context of simulation, what is benchmarking?
A. A comparison between a model's output and the outputs of other models or simulations
B. An event tagging mechanism used in discrete event simulation languages
C. An output analysis technique based on specialized time series metrics
D. The execution of a simulation with test input to confirm correctness
Answer: A.

Conceptual models are commonly expressed as (a) Petri Nets, (b) event-controlled animations, (c) equations, (d) concept graphs.
Answer: (d)

Which of the following is not considered a benefit of human performance modeling?

A. It can help determine how long it will take for humans to perform certain activities.
B. It can be used to eliminate sources of human error.
C. It can be used to determine how humans might perform under adverse conditions.
D. It can help determine how to allocate tasks between humans and systems.

Answer: B

A system uses Euler's method to approximate the solution of a differential equation. The underlying function is convex and decreasing. When will the approximation meet the zero-line compared to the exact function?

a) The approximation will pass the zero-line first.
b) Both lines cross the zero-line at the same point.
c) The underlying function will cross the zero-line first.

Answer:
c) For convex and decreasing functions, the estimated next step always lies over the underlying function.

Which of the following choices is true about queuing models?

A. The arrive process can be represented by a Poisson distribution
B. A queuing model is most often implemented with a discrete event simulation
C. The queue processing time can be a stochastic process
D. All of the above

Answer: D

What is the characteristic of Monte-Carlo simulation?

a) The timely distance between two events is estimated using statistical sampling techniques.
b) Random statistical sampling techniques are employed to estimate unknown values.
c) The state variables of the simulation are processed starting from randomly initialized values.

Answer:
b) A Monte Carlo simulation is a simulation in which random statistical sampling techniques are employed such that the result determines estimates for unknown values.

You are developing a simulation that must model the ideal path of a projectile over time. What parameters must you include to accurately model this path?

A. Initial velocity of the projectile, force of gravity, elevation angle of the gun
B. Projectile terminal velocity, height of the target
C. Initial projectile velocity, height of target, distance to target
D. Projectile terminal velocity, force of gravity

Answer: A

Scientific visualization can be used to
A) View multidimensional data sets
B) Browse through large data sets
C) Interactively change the appearance of the view
D) All of the above
Answer: D

What are the six degrees of freedom relative to a flight simulator?
A) Vertical, inverted, pitch, roll, yaw and longitudinal.
B) Vertical, lateral, longitudinal, pitch, roll and yaw.
C) Lateral, inverted, pitch, yaw, horizontal and roll.
D) One through six.
E) Depends on the flight simulator.
Answer: B

What is a research and statistical methodology to obtain statistically significant results from empirical research in the most efficient manner?
A) Empirical Design
B) Experimental Design
C) Correlated T Design
D) ANOVA
E) Hypothesis Testing
Answer: B

Discrete event simulation may be used to model:
a. Inventory levels of perishable products.
b. Arrivals of ambulances to a trauma center.
c. Incoming calls to an airline reservation center.
d. Manufacturing of integrated circuits.
e. All of the examples above.
Answer: e

What operations research concept is used to help identify optimal decision making strategies under risk?
a. Simplex method.
b. Geometric programming.
c. Linear programming.
d. Karush-Kuhn-Tucker conditions.
e. Decision trees.
Answer: e

Most closely predict the underlying probability distribution for the population from which the following random sample was extracted (select one answer):

1, 1.5, 2, 2.1, 2.3, 2.4, 2.8, 2.9, 3, 3, 3.2, 3.3, 3.4, 3.8, 4, 4.2, 4.5, 4.8, 5

a. Uniform.
b. Normal.
c. Standard Normal.
d. Chi-squared.

Answer: b