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Register Number:……………………..

B.E DEGREE EXAMINATIONS: APRIL 2015

(Regulation 2009)

Seventh Semester

MECHATRONICS ENGINEERING

MCT142 : Modeling and Simulation
(Use of discrete event system simulation tables allowed)

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. All of the following are advantages of simulation except

    a) Finding the optimal solution   b) Time compression.

    c) Random number   d) low cost

2. An instantaneous occurrence that changes the state of a system

    a) Attributes   b) Entity

    c) Event   d) Model

3. Which is not matched with a modelling principle.

    a) Synthesis   b) Simulation

    c) Iteration   d) Scaling

4. _____ is the iterative process of comparing the model to the real systems.

    a) Model Verification   b) Model Calibration

    c) Model Validation   d) Model Building

5. _____ is a highly structured, special-purpose simulation programming language based on the process-interaction approach and oriented toward queuing systems.
    a) General Purpose Simulation System   b) Scalable Simulation Framework

    c) SIMSCRIPT   d) Arena

6. The number of independent events that occur in a fixed amount of time or space is called as_____
    a) Exponential   Distribution   b) Erlang Distribution

    c) Poisson Distribution   d) Weibull Distribution

7. Which of the following is not a simulation Packages?

    a) AutoMod   b) WITNESS

    c) Flexsim   d) AUTOCAD

8. _____ tool is useful for evaluating distribution fit.

a) Histogram
b) Binomial

c) Quantile-Quantile
d) Empirical

9. The probability distribution of a sum of two or more independent random variables is called _____

a) Convolution
b) Normal

c) Lognormal
d) Uniform

10. _____ is applicable to determine the significance of the interval between the recurrences of the same digit.

a) Gap Test
b) Runs Test

c) Frequency Test
d) Poker Test

PART B (10 x 2 = 20 Marks)

11. What are the various types of simulation models?

12. Draw the flow diagram for unit-entering system.

13. What are the methods for testing the random numbers?

14. Mention the methods for identifying the data's distributions.

15. What are the considerations for generating pseudo-random numbers?

16. Write the significance of inverse transform technique.

17. What are the advantages and disadvantages of Goodness-of-Fit test?

18. How to evaluate and select the simulation software?

19. What are the important steps of acceptance-rejection technique?

20. What are the popular simulation software packages?

PART C (5 x 14 = 70 Marks)

21. a) (i) Where the simulation is not appropriate. Why? (4)

(ii) Write the advantages, disadvantages & applications of simulation. (10)

(OR)

b) (i) Explain the discrete and continuous systems with an example. (4)

(ii) Summarize the characteristics of queuing systems. (10)

22. a) (i) Explain the procedure of Kolmogorov-Smirnov test. (7)

(ii) Explain the important criteria for generating Pseudo Numbers (7)

(OR)

b) Using the following sequence of numbers, can the hypothesis that the numbers

are independent be rejected on the basis of length of runs up and down at level of Significance '$a = 0.05$'?

0.30	0.48	0.36	0.01	0.54	0.34	0.96	0.06	0.61	0.85
0.48	0.86	0.14	0.86	0.89	0.37	0.49	0.60	0.04	0.83
0.42	0.83	0.37	0.21	0.90	0.89	0.91	0.79	0.57	0.99
0.95	0.27	0.41	0.81	0.96	0.31	0.09	0.06	0.23	0.77
0.73	0.47	0.13	0.55	0.11	0.75	0.36	0.25	0.23	0.72
0.60	0.84	0.70	0.30	0.26	0.38	0.05	0.19	0.73	0.44

23. a) (i) Explain the following : (7)
Chi-Square Goodness-of-Fit Test
(ii) Kolmogorov - Smirnov Goodness-of-Fit Test (7)

(OR)

b) Explain the following terms with flow chart. (3)

(i) Model Building

(ii) Model Verification (6)

(iii) Model Validation (5)

24. a) (i) Explain inverse transform technique for Exponential Distribution (7)

(ii) Triangular Distribution (7)

(OR)

b) Explain the acceptance – rejection technique for

(i) Poisson distribution (7)

(ii) Gamma distribution (7)

25. a) List the simulation software packages. Explain any four simulation software packages and list their merits and demerits.

(OR)

b) Construct and describe the block diagram for Single-Server Queue using Arena simulation software.

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