Assignment Questions

1. Define simulation and explain the importance of simulation contrasting its application.
2. Define the term system, model and simulation. Discuss about different types of model.
3. Define model. What are various steps of simulation study? Explain.
4. What is the nature of computation of monte carlo method? Find the value of I using monte carlo method

   $I = \int_2^5 x^3 dx$

5. What do you mean by monte carlo method estimate the value of $\int_2^6 (3x)dx$ using monte carlo method. Also mention the application of monte carlo method.
6. Derive the value of π using monte carlo method. What are the areas of application of monte carlo method.

7. Draw a Cobweb model for the following market:

   $D = 12.4 – 1.2\ P$
   $S = 9.0 – 0.5\ P_{-1}$
   $P_0 = 1.0$ (Assume market is clear.)
8. Write the consequences of properties of pseudo random number. Explain different types of test of random number.
9. Explain Kolmogorov-smirnov test and step carried out for the test.
10. Using the Mixed Multiplicative congruential method, find the set 15 of random numbers for a=13 and b=17 with the seed value $R_0 = 14$
11. Test the following sequence of random number for uniformity.
    0.59, 0.44, 0.27, 0.83, 0.17, 0.05, 0.73, 0.92, 0.77, 0.35, 0.57
12. Consider the following sequence of random numbers and test the auto correlation of random numbers using significance level of 95%.
    0.12,0.23,0.01,0.31,0.28,0.93,0.89,0.64,0.99,0.33,0.27,0.35,0.28,0.15,0.93,0.41,0.87,0.69,0.36, 0.19,0.58,0.95,0.05,0.68,0.43,0.75,0.60
13. Explain the different steps involved in the verification and validation of model.
14. What is run-test? How to test random numbers for randomness using run test explain with example.
15. What is analog computer? Explain it's Components in detail. Draw a block diagram using analog method for solving the following model.

    $MX'' + DX' + KX = KF(t)$
16. Explain the representation of time in discrete system simulation. Describe event oriented simulation.
17. Explain the SIMSCRIPT execution cycle in detail with diagram.
18. What is Lost Call? Explain the simulation of telephone system and show how lost calls and delayed calls are handled in detail.
19. Explain Event and interval oriented time advance mechanism with suitable example of each.
20. How can you use replication of run in an analysis of simulation output? Explain
21. What are the desirable features of simulation software? Differentiate facilities and stores in detail.
22. "Replication of run will refine simulation output" Explain the statement with necessary example.

23. Explain the types of simulation on the basis of output. Define and explain estimation method used in analysis of simulation output.
24. What are various techniques of elimination of initial bias?
25. What is simulation language? What is difference between simulation language and general purpose programming language. Write down the merits of simulation language.
26. What are different types of simulation tools. Explain.
27. Why gathering of statistics in necessary in simulation? What are 6 commonly needed statistics? Explain how measurement of utilization and occupancy is done
28. What is GPSS? Draw the blocks used in GPSS and Describe any eight of it with example.
29. What are the merits of GPSS? Explain GPSS statements: SIMULATE , START , END.
30. Discuss Briefly about GPSS. Give the GPSS block diagram for the following program.
    A machine tool in a manufacturing shop is turning out parts at the rate of one every five minutes. As they are finished, the parts go to an inspector, who takes 4±3 minutes to examine each one and rejects about 10% of parts. Each part will be represented by one transaction, and the time unit selected for the problem will be 1 minute.

31. Write down the merits of GPSS? Draw the block diagram for the following program.
    Worker come to a supply store at the rate of one every minute. Their requisitions are processed by one of the two clerks who take 8±4 minutes for each requisition are then passed single store keeper who face them one at time taking 4±3 minutes for each request.
32. What is simulation language? Explain. Differentiate between simulation language and simulators.
33. Explain following simulation languages in detail. SIMSCRIPT, SLAM and SIMAN.
34. Explain different type of validation techniques with example.
35. Write short note on followings:
    a. Queuing system
    b. Real time simulation
    c. Distributed lag model
    d. Cob web model
    e. Predator-Pray model
    f. Properties of random number
    g. Pseudo random numbers
    h. Hybrid simulation
    i. Verification and validation of model
    j. Feedback system
    k. System environment
    l. Queue discipline