



**Tribhuvan University
Institute of Science and Technology
2072**

Bachelor Level/ Third Year/ Fifth Semester/ Science
Computer Science and Information Technology (CSc. 302)
(Simulation and Modeling)
Full Marks: 60 | Pass Marks: 24 | Time: 3 hours.

Candidates are required to give their answer in their own words as far as practicable.
The figures in the margin indicate full marks.

**Group A
Long Answer Questions:
Attempt any two questions. (2×10=20)**

- 1.) What do you mean by analog method of system simulation? Explain it with suitable example. (3+7)
- 2.) Define physical model. Explain the dynamic physical model with the help of suitable diagram and expressions. (2+8)
- 3.) Define frequency test for random numbers. Develop the Poker test for four digit numbers, and use it to test whether a sequence of following 1000-four digit numbers are independent. (2+4+4)
(Use $\alpha = 0.05$ and $N = 4$ is 9. 49)

Combination i	Observed frequency O_i
Four different digits	565
One pair	392
Two pairs	17
Three like digits	24
Four like digits	2
	1000

**Group B
Short Answer Questions:
Attempt any eight questions. (8×5=40)**

- 4.) Verification is concerned with building the "model right" and validation is concerned with building the "right model". Justify it with suitable reasons. (5)
- 5.) How do you use estimation method in the analysis of simulation output? Explain in brief. (5)
- 6.) Explain any four program control statements that are used in GPSS. (5)
- 7.) Describe the rejection method of generating the random numbers. (5)
- 8.) Define queuing discipline. Describe different types of queuing disciplines with example. (5)
- 9.) How do you eliminate the effect of transient and initial bias in simulation output? (5)
- 10.) Differentiate between clock time and simulation time used in system simulation. (5)
- 11.) Describe the distributed lag model with the help of any practical example (5)
- 12.) Identify, with reasons, four different problems from your own experience that you think should be solved using digital simulation rather than analytically. (5)
- 13.) Write short notes on :
 - a.) Markov Chain
 - b.) Feedback systems