

Tribhuvan University  
Institute of Science and Technology  
2079  
☆

Bachelor Level / Third Year /Fifth Semester/Science  
**Computer Science and Information Technology (CSC317)**  
(Simulation and Modelling)  
**(NEW COURSE)**

Full Marks: 60  
Pass Marks: 24  
Time: 3 hours.

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

### Section A

**Attempt any TWO questions.**

**(2×10 = 20)**

1. What is transaction in GPSS? Explain about facility in GPSS. Customers arrive at Joey's Barbershop one every  $15 \pm 3$  minutes and it takes Joey  $18 \pm 2$  minutes to cut hair of a customer. Create a GPSS model with block diagram for the Barbershop using the concept of facility and run the simulation for 9 hours.  
(2+2+6)
- ✓ 2. Why accuracy of analog computer is low? Explain analog computer with suitable example. Differentiate between analog and digital computer.  
(2+5+3)
3. Define and develop a Poker test for four-digit random numbers. A sequence of 1,000 random numbers, each of four digits has been generated. The analysis of the numbers reveals that in 525 numbers all four digits are different, 419 contain exactly one pair of like digits, 47 contain two pairs, 9 have three digits of a kind and 7 contain all like digits. Use Poker test to determine whether these numbers are independent. (Critical value of chi-square for  $\alpha = 0.05$  and  $N = 4$  is 9.49).  
(10)

### Section B

**Attempt any EIGHT questions.**

**(8×5 = 40)**

- ✓ 4. Why Confidence interval is needed in the analysis of simulation output. How can we establish a confidence interval?  
(2+3)
- ✓ 5. Describe dynamic physical model in detail with the help of suitable example.  
(5)
- ✓ 6. Explain the Monte Carlo simulation method with example.  
(5)
7. Generate ten 3 digit random integers and corresponding random variables using Multiplicative Congruential method where  $a = 7$ , and  $X_0 = 22$ .  
(5)
8. "Building a model right" and "Building a right model". Are both statement same? Discuss the importance of V&V.  
(2+3)
- ✓ 9. Differentiate between discrete and continuous system.  
(5)
- ✓ 10. What is markov chain? Explain with example.  
(5)
- ✓ 11. Explain basic characteristics of Queueing System.  
(5)
12. Write short notes:  
a. Hypothesis testing  
b. Stationary Poisson Process  
(2×2.5 = 5)