

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
EXAMINATION CONTROL DIVISION
 Model Question

Examination	Regular(New Course)		
Level	Bachelor	Full Marks	60
Programme	BCT	Pass Marks	24
Year/Part	III/ II	Time	3 Hrs

Subject :Simulation and Modeling

Course Code: (ENCT 353)

Candidates are required to give their answers in their own words as far as practicable.

Attempt **All** questions.

The figures in the margin indicate **Full marks** Necessary figures are/is attached herewith.

1	a	Calculate the value of A using Monte Carlo method using 15 sample points and find the error difference. $A = \int_0^{\pi/2} \sin x \cos x dx$	Marks: 5	Unit-1,2
	b	Differentiate advantages and disadvantages of using simulation. Explain static and dynamic physical model with real world example.	2+3	1,2
2	a	What is Hybrid simulation? Define the components and Draw analog computer model of given equation: $A \frac{d^3 x}{dt^3} + 0.2 \frac{d^2 x}{dt^2} - 0.5 \frac{dx}{dt} + Qx = P.F(t)$	2+3	3
	b	Explain Replication of runs for output analysis.	5	8
3	a	Define the disciplines of Queuing system? The clients arrive at government office at a rate of 12 clients/hour and the server serves at 20 clients/hour. Now find average number of customer in the system, average waiting time in queue, server utilization and average time in the system.	1+4	4
	b	Explain the Kendall's notation in queuing system. What are the measures of system performance of Queuing system.	5	4
4	a	What are the applications of Markov chain? Consider a town with two weather patterns: sunny(State-1) and Rainy(state-2). If it is sunny today, the probability it is sunny tomorrow is 0.8, and rainy is 0.2. If it is rainy today, the probability it is sunny tomorrow is 0.4, and rainy is 0.6. Find: a) The transition probability matrix P. b) The probability that it is sunny two days from now, given today is sunny.	1+4	5
	b	Explain verification, validation and Calibration of models. Define Naylor and finger validation process.	3+2	7

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5	a	Generate 10 random numbers using Multiplicative congruential method? Write the steps of K-S uniformity testing method for generated random numbers?	2+3	6
	b	From the below given Random numbers check its uniformity and Independence using chi-square method for 95% accuracy. (Use standard table for appropriate value.) 1045 1011 1023 1046 1026 1026 1013 1023 1031 1044 1047 1004 1018 1045 1006 1000 1025 1018 1033 1027 1044 1044 1021 1025 1003 1042 1024 1033 1010 1044 1047 1027 1034 1027 1026 1029 1011 1003 1028 1029 1037 1048 1021 1007 1041 1029 1000 1001 1028 1016	5	6
6	a	How do we perform simulation of computer networks and simulation of Memory?	2+3	9,10
	b	A barber shop has one barber and a waiting area with capacity of 7 customers. Customers arrive with a mean inter-arrival time of 10 minutes. The barber takes service time of 8(+/-) 2 minutes per customer to cut the hair. If the waiting area is full an arriving customer leaves without receiving service. Draw GPSS block diagram and write GPSS code (Program) for the given scenario. OR Explain, how do you perform simulation in Java with example.	5	9,10