JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2024

B.Tech-~~I~~ IV Semester (CSE/IT/~~ECE/CE~~)

COURSE CODE(CREDITS): 18B11CI413 (2) MAX. MARKS: 15

COURSE NAME: Modeling and Simulation Techniques

COURSE INSTRUCTORS: RKI,SGL,VSG,SWT MAX. TIME: 1 Hour

Note: *(a)All questions are compulsory.*

(b)Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

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1. (i) What is the role of followings in System and Modeling? [2+2][CO1]
   a. System
   b. Entity
   c. Attribute
   d. Activity

   (ii) Write the examples of them in the context of Supermarket system.

2. (i) Explain the difference of followings in Discrete-Event Simulation [1+2][CO3]
   a. Next Event Time Advance Mechanism
   b. Fixed Time-Step Model

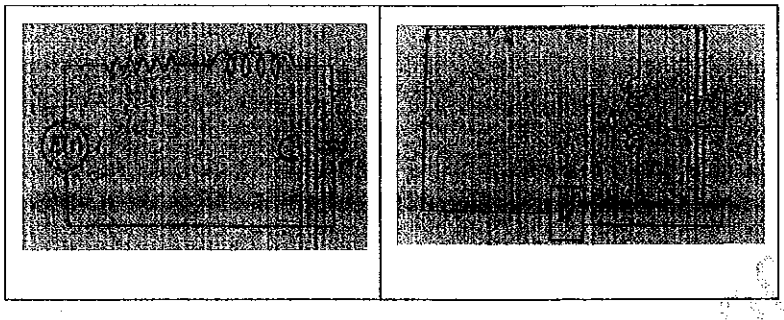
   (ii) Simulate the following code with Next Event Time Advance Mechanism.

```
def car(env):
        while True:
        print('Start parking at %d' % env.now)
        parking_duration = 3
        yield env.timeout(parking_duration)

        print('Start driving at %d' % env.now)
        trip_duration = 2
        yield env.timeout(trip_duration)

import  simpy
env = simpy.Environment()
env.process(car(env))
env.run(until=10)
```

3. Give the analogical equivalence between following electrical system and mechanical system. How does it help in modeling? [2+1][CO1]



R, L, C and E are resistance, inductance, capacitance and voltage respectively and K,D and M are spring stiffness, damping factor and mass respectively.

4. Answer the following questions for tossing a fair coin 4 time: [3][CO2]

a.

X=Head	0	1	2	3
P(X)				

b. E(X)
c. $E(X^2)$
d. Var(X)

5. Prove that Poisson Distribution can be obtained as a limiting form from Binomial distribution. If in a Binomial distribution, if the number of trials n tends to infinity and the probability of success p tends to zero such that their product np tends to a finite quantity, say, λ, then the Binomial distribution tends to Poisson distribution with parameter λ. [2][CO2]