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## Eighth Semester B.E. Degree Examination, Dec.2023/Jan.2024 Internet of Things Technology

Time: 3 hrs.

Max. Marks : 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. What is IOT? Explain in detail on Genesis of IOT. (08 Marks)
- b. What does IOT and digitalization mean? Elaborate on this concept. (04 Marks)
- c. Write a short note on "IOT impact in Real World". (04 Marks)

OR

- 2 a. Discuss IOT challenges. (08 Marks)
- b. With a neat diagram, explain architecture of IOT. (04 Marks)
- c. Explain Core IOT functional stack. (04 Marks)

### Module-2

- 3 a. Mention any six sensor types are measuring physical phenomenon and summarize each of them with suitable example. (06 Marks)
- b. Identify the characteristics of smart objects and illustrate them. (06 Marks)
- c. What are trends in smart object impacting IOT? Classify those. (04 Marks)

OR

- 4 a. Explain the physical layer, MAC layer, topology and security aspects of IEEE 802.15.4. (08 Marks)
- b. Dramatize LoRaWAN Architecture. (05 Marks)
- c. What NB-IOT deployment options and explain them. (03 Marks)

### Module-3

- 5 a. Explain working of IP as the IOT network layer. (08 Marks)
- b. Write note on Business case for IP. (04 Marks)
- c. Discuss need for optimization. (04 Marks)

OR

- 6 a. Describe application protocols for IOT. (08 Marks)
- b. Discuss the various methods used in IOT application transport. (08 Marks)

### Module-4

- 7 a. Explain the elements of Hadoop with a neat diagram. (07 Marks)
- b. Explain neural network in machine learning with a detailed example. (05 Marks)
- c. Describe the components of FNF. (04 Marks)

OR

- 8 a. Explain Formal Risk Analysis Structures. (08 Marks)
- b. Explain the Purdue model for control hierarchy and OT network characteristics. (08 Marks)

**Module-5**

- 9 a. Give a brief note on Arduino UNO. (04 Marks)  
b. With a neat diagram, explain Raspberry Pi board. (04 Marks)  
c. With a neat diagram, explain wireless temperature monitoring system using Raspberry Pi. (08 Marks)

**OR**

- 10 a. Explain in detail smart city IOT architecture. (08 Marks)  
b. With the case study explain smart and connected cities using Raspberry Pi. (08 Marks)

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## Eighth Semester B.E. Degree Examination, Dec.2023/Jan.2024 System Modelling and Simulation

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. List circumstances when simulation is appropriate tool and when it is not appropriate tool. (08 Marks)
- b. Write the different areas of application of simulation. (03 Marks)
- c. Explain different types of models. (05 Marks)

**OR**

- 2 a. Explain event-scheduling / time advance algorithm. (06 Marks)
- b. Consider a single server queuing system with interarrival time and service time details are

Inter arrival time	1	1	6	3	7	5	2	4	1
Service time	4	2	5	4	1	5	4	1	4

Prepare simulation table for the given data using event scheduling approach and stop simulation when clock reaches 18. Also write the server utilization time and maximum queue length. (10 Marks)

### Module-2

- 3 a. Explain characteristics of queuing system. (08 Marks)
- b. Write a note on:
  - i) Queuing notation for queuing system.
  - ii) Steady state behavior of M/G/1 queue. (08 Marks)

**OR**

- 4 a. Explain :
  - i) Bernoulli trials and Bernoulli distribution
  - ii) Binomial distribution. (08 Marks)
- b. Explain :
  - i) Uniform distribution
  - ii) Exponential distribution. (08 Marks)

### Module-3

- 5 a. Write the properties of random numbers and mention important consideration for generating random numbers. (08 Marks)
- b. Explain linear congruential method and generate three random numbers for  $X_0 = 27$ ,  $a = 17$ ,  $c = 43$  and  $m = 100$ . (08 Marks)

**OR**

- 6 a. What do you mean by Acceptance Rejection Technique? Generate 3 poisson variates with mean  $\alpha = 0.2$ . The random numbers are 0.4357, 0.4146, 0.8353, 0.9952, 0.8004, 0.7945. (08 Marks)
- b. Develop a step by step procedure to generate random variate using inverse transform technique for exponential distribution. (08 Marks)

**Module-4**

- 7 a. Explain four steps in the development of a useful model. (08 Marks)  
b. Explain goodness of fit tests. (08 Marks)

**OR**

- 8 a. Explain types of simulation with respect to output analysis. Give examples. (08 Marks)  
b. Briefly explain different ways of selecting data when data is not available. (08 Marks)

**Module-5**

- 9 a. Explain output analysis for steady state simulation. (08 Marks)  
b. Explain output analysis for terminating simulation. (08 Marks)

**OR**

- 10 a. With a neat diagram, explain model building verification and validation. (08 Marks)  
b. Discuss 3 steps approach for validation process as formulated by Naylor and Finger. (08 Marks)

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