CBCS SCHEME

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15CS81

Eighth Semester B.E. Degree Examination, November 2020
Internet of Things

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions irrespective of modules.

Module-1

1 a. Define IoT. Explain the different evolutionary phases of internet. (06 Marks)
b. Explain the concept of Intersection Movement Assist (IMA) with graphical representation. (05 Marks)
c. What are the different challenges of IoT? (05 Marks)

2 a. Explain with diagram the one M2M IoT standardized architecture. (08 Marks)
b. Explain IoT Data Management and compute stack. (08 Marks)

Module-2

3 a. Define sensors and actuators. Explain how they interact with the physical world. (05 Marks)
b. Define smart objects. Explain its characteristics. (05 Marks)
c. Explain briefly the Wireless Sensor Networks (WSN). (06 Marks)

4 a. What are Constrained Devices and constrained node networks? Classify them. (06 Marks)
b. Explain Zigbee protocol stack using IEEE 802.15.4. (10 Marks)

Module-3

5 a. Explain in detail the 6LOWPAN. (10 Marks)
b. Explain the different schedule management and packet forwarding models of 6TiSCH. (06 Marks)

6 a. Explain the raw socket tunneling of SCADA using different scenarios. (06 Marks)
b. What is COAP? Draw COAP Message Format. Explain its fields. (06 Marks)
c. Compare between COAP and MQTT. (04 Marks)

Module-4

7 a. Explain in detail the core functions of edge analytics with necessary diagrams. (08 Marks)
b. Explain the different components of Flexible Net flow Architecture (FNF). (08 Marks)

8 a. Explain the different steps and phases of OCTAVE Allegro methodology. (08 Marks)
b. Explain Secured Network Infrastructure by using process control hierarchy model. (08 Marks)

Module-5

9 a. Explain the different pins/parts of Arduino Uno Board. (08 Marks)
b. Write a program to record the current room temperature using Raspberry pi. (08 Marks)

10 a. Explain the different layers of IoT Smart city layered architecture. (08 Marks)
b. Explain Smart parking architecture with advantages and disadvantages. (08 Marks)

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15CS82

Eighth Semester B.E. Degree Examination, November 2020
Big Data Analytics

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions irrespective of modules.

Module-1

1 a. With a neat diagram, explain the components of HDFS (Hadoop Distributed File System). **(08 Marks)**

b. Write and explain the mapper and reducer scripts for the MapReduce model. **(08 Marks)**

2 a. With a neat diagram, describe the steps of MapReduce parallel data flow. **(08 Marks)**

b. Explain the following roles in HDFS deployment with a diagram: (i) High availability (ii) Name Node Federation. **(08 Marks)**

Module-2

3 a. What is the significance of Apache pig in Hadoop context? Describe the main components and the working of Apache pig with a simple example. **(08 Marks)**

b. Explain the features and the benefits of Apache HIVE in Hadoop. **(08 Marks)**

4 a. With neat diagrams, explain the oozie DAG workflow and the types of nodes in the workflow. **(08 Marks)**

b. What is Apache Flume? Describe the features, components and the working of Apache Flume. **(08 Marks)**

Module-3

5 a. Draw the flow of BIDM cycle. Explain the strategic and operational decisions. **(08 Marks)**

b. Differentiate between datamart and datawarehouse based on the following with justifications:
(i) Scope (ii) Target organization (iii) Cost (iv) Approach
(v) Complexity (vi) Time **(08 Marks)**

6 a. Describe any 8 considerations for a data warehouse and explain the key elements with a diagrammatic representation. **(08 Marks)**

b. Explain the CRISP-DM cycle with a diagram. **(08 Marks)**

Module-4

7 a. Explain the steps and three differentiating criteria of a decision tree algorithm. Construct a decision tree for the following data set (table 1) and predict the outcome for the given question. **(10 Marks)**

Outlook	Temp	Humidity	Windy	Play
Sunny	Hot	High	False	No
Sunny	Hot	High	True	No
Overcast	Hot	High	False	Yes
Rainy	Mild	High	False	Yes
Rainy	Cool	Normal	False	Yes
Rainy	Cool	Normal	True	No
Overcast	Cool	Normal	True	Yes
Sunny	Mild	High	False	No

Sunny	Cool	Normal	False	Yes
Rainy	Mild	Normal	False	Yes
Sunny	Mild	Normal	True	Yes
Overcast	Mild	High	True	Yes
Overcast	Hot	Normal	False	Yes
Rainy	Mild	High	True	No
Outlook	Temp	Humidity	Windy	Play
Sunny	Hot	Normal	True	?

Table 1 : Data Set

b. Differentiate between C4.5, CART and CHAID decision tree algorithms. **(06 Marks)**

8 a. Explain the design principles of ANN by constructing a model representation for a single and multilayer ANN. Describe the steps to build an ANN (Artificial Neural Network). **(10 Marks)**

b. For the dataset in table 2, find the affinities of the product-product which sell together. Consider S = 33%, C = 50% and 3 item-set level only. **(06 Marks)**

Transactions List				
1	Milk	Egg	Bread	Butter
2	Milk	Butter	Egg	Ketchup
3	Bread	Butter	Ketchup	
4	Milk	Bread	Butter	
5	Bread	Butter	Cookies	
6	Milk	Bread	Butter	Cookies
7	Milk	Cookies		
8	Milk	Bread	Butter	
9	Bread	Butter	Egg	Cookies
10	Milk	Butter	Bread	
11	Milk	Bread	Butter	
12	Milk	Bread	Cookies	Ketchup

Table Q8 (b)

Module-5

9 a. Compare text mining and data mining. **(08 Marks)**

b. Explain the 3 types of web mining. Use appropriate flow diagrams to represent the same. **(08 Marks)**

10 a. Explain the text mining process and the architecture. **(08 Marks)**

b. Compute the rank values for the network in Fig. Q10 (b), when is the highest ranked node? **(08 Marks)**

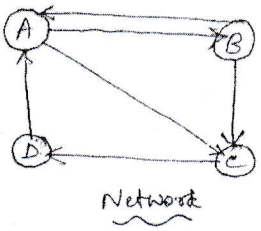

Fig. Q10 (b)

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15CS834

Eighth Semester B.E. Degree Examination, November 2020
System Modeling and Simulation

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions irrespective of modules.

Module-1

1 a. List any four circumstances, when the simulation is the appropriate tool and when it is not. **(08 Marks)**

b. Consider the grocery store with one check out counter. Prepare the simulation table for 8 customers and find out average waiting time of customer in queue, idle time of server and average service time. The inter arrival time and service time are given in minutes. **(08 Marks)**

Inter arrival time (IAT) :	3, 2, 6, 4, 4, 5, 8
Service time (ST) :	3, 5, 5, 8, 4, 6, 2, 3

2 a. Define : (i) System (ii) Event (iii) FEL (Future Event List) **(03 Marks)**

b. Explain different types of world views. **(06 Marks)**

c. Six dump trucks are used to haul coal from the entrance of a small mine to the rail road. Each truck is loaded by one of two loaders. After loading, truck immediately moves to the scale to be weighed. Loader and scale have First-Come-First-Serve (FCFS) queue. The travel time from loader to scale is negligible. After being weighed, a truck begins a travel time, afterwards unload the coal and returns to the loader queue. It is assumed that Five trucks are at the loader and one is at the scale at time = 0. Carryout simulation process till the completion of two weighing from the scale. The activities of loading, weighing and travel time are given in the following table:

Loading time	10	5	5	10	15	10	19
Weighing time	12	12	12	16	12	16	
Travel time	60	100	40	40	80		

Calculate : (i) The busy time of both the loaders and scale.
(ii) Average loader and scale utilization. **(07 Marks)**

Module-2

3 a. Explain (i) Exponential distribution (ii) Binomial distribution. **(06 Marks)**

b. With example explain the properties of Poisson process. **(06 Marks)**

c. The time to failure of a battery is Weibull-distributed with location parameter = 0, $\alpha = \frac{1}{2}$ years and $\beta = \frac{1}{4}$. What fraction of batteries are expected to last longer than the mean life? **(04 Marks)**

4 a. Explain the characteristics of Queuing System. List different queuing notations. **(10 Marks)**

b. What is network of queue? Mention the general assumption for a stable system with infinite calling population. **(06 Marks)**

Module-3

5 a. What are the problems that occur while generating pseudo-random numbers? Also list the important considerations during generation of random numbers. **(08 Marks)**

b. Consider the sequence of random numbers 0.12, 0.01, 0.23, 0.28, 0.89, 0.31, 0.64, 0.28, 0.83, 0.93, 0.99, 0.15, 0.33, 0.35, 0.91, 0.41, 0.60, 0.27, 0.75, 0.88, 0.68, 0.49, 0.05,0.43, 0.95, 0.58, 0.19, 0.36, 0.69, 0.87. Test whether 3^{rd}, 8^{th}, 13^{th} and so on numbers in the above sequence are auto-corrected. At significance level $\alpha = 0.05$, Normal critical table value is given as 1.96 **(08 Marks)**

6 a. Explain inverse transform technique for, (i) Exponential distribution (ii) Triangular distribution. **(08 Marks)**

b. What is Acceptance – Rejection technique? Generate 3 Poisson variates with mean $\alpha = 0.2$. Take the random numbers as : 0.4357, 0.4146, 0.8353, 0.9952, 0.8004, 0.7945 **(08 Marks)**

Module-4

7 a. Explain the steps involved in development of a useful model of input data. **(08 Marks)**

b. Apply chi-square goodness of fit test to Poisson assumption with mean $\alpha = 3.64$. Data size = 100 and observed frequency $O_i = 12, 10, 19, 17, 10, 8, 7, 5, 5, 3, 3, 1$ and $\chi^2_{0.05,5} = 11.1$ **(08 Marks)**

8 a. List and explain the different ways to obtain information about a process even if data are not available. **(06 Marks)**

b. Briefly explain the types of simulation with respect to output analysis. Give examples. **(06 Marks)**

c. Write a short note on point estimation. **(04 Marks)**

Module-5

9 a. Explain output analysis for steady state simulation. **(08 Marks)**

b. Explain the suggestions given for use in verification process. **(08 Marks)**

10 a. With neat diagram, explain the iterative process of calibrating a model. **(08 Marks)**

b. Explain 3-step approach for validation process as formulated by Naylor and Finger. **(08 Marks)**

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