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Vellore Institute of Technology

(Deemed to be University under section 3 of the UGC Act, 1956)

Reg. No. : 21BCE1515

Final Assessment Test (FAT) - May 2024

Programme	**B.Tech.**	Semester	**WINTER SEMESTER 2023 - 24**
Course Title	**INTERNET OF THINGS**	Course Code	**BCSE401L**
Faculty Name	**Prof. Chandramauleshwar Roy**	Slot	**E1+TE1**
		Class Nbr	**CH2023240501918**
Time	**3 Hours**	Max. Marks	**100**

General Instructions:

- Write only Register Number in the Question Paper where space is provided (right-side at the top) & do not write any other details.
- Read the questions carefully before answering.

Section - I

Answer all questions (5 X 5 Marks = 25 Marks)

01. An IoT network employs 32 bits to assign IP addresses to various sensors in the network. Identify how many device classes are available in this addressing scheme and give a brief description about each class. [5]

02. Suggest a suitable application protocol for implementing an IoT enabled weather monitoring dashboard that runs on constrained devices. Justify your answer with appropriate explanation. [5]

03. How can a data scientist distinguish between an under-fitted and over-fitted machine learning model? Justify your answer with a suitable diagram. [5]

04. The government is planning to implement a fair and transparent voting system for future elections. Can you suggest a suitable technology for the above scenario? List out at least 4 features of this technology that can enable citizens to cast secure votes. [5]

05. An IoT enabled fish breeding system utilizes data from multiple sensors to accurately monitor the environmental parameters. With necessary equations, explain any one algorithm to fuse the data from multiple sensors. [5]

Section - II

Answer all questions (6 X 10 Marks = 60 Marks)

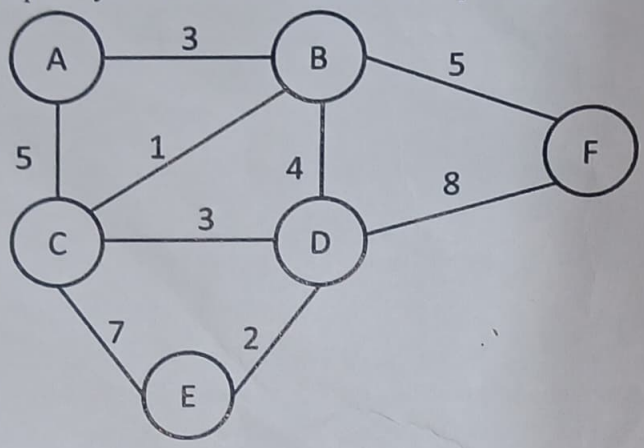
06. Tesla's IoT enabled connected car network extensively relies on cloud computing and fog nodes to make intelligent decisions for autonomous driving. Explain how fog computing can augment this network through virtualization, mobility and localization. Justify your answer with appropriate diagrams. [10]

07. The Central Government is inviting proposals from interested candidates for the Smart City project which will be implemented in the metropolitan cities. As an ardent student of Internet of Things, explain any two niche areas where IoT can aid the Smart City project. Describe your answer with necessary block diagrams and explanation. [10]

08. Various sensor nodes are distributed in an area of study. Their locations are as follows: X1(1,1), X2(3,2), X3(5,4), X4(6,7), X5(7,8), X6(8,7), X7(9,7) and X8(10,10). The following sensor nodes are chosen as initial cluster heads: CH1(1,2), CH2(5,7) and CH3(10,9). Using a suitable algorithm, estimate the new cluster heads at the end of second iteration. What is your observation about the new cluster heads? **[10]**

09. Explain the protocol stack and frame structure of a communication protocol suitable for sending IPv6 packets over an IEEE 802.15.4 network. **[10]**

10. For the given connected graph, estimate the shortest path from the source node A to all other nodes in the network. Explain your answer with detailed steps and tables. **[10]**



11. ABC Medical Centre has a huge digital record of all the patients who visited the hospital in the past 5 years. The hospital authorities have decided to anonymize the data related to the health condition of its patients, to prevent any leakage of sensitive information. Suggest any two methods to hide such sensitive information using simple tabular examples. **[10]**

Section - III

Answer all questions (1 X 15 Marks = 15 Marks)

12. Sumanth is a Data Scientist employed at FutureAI. He is trying to preprocess the following dataset which contains two features, namely X1 and X2. Can you help Sumanth to reduce this two-dimensional dataset to a single dimensional dataset using a suitable technique? Explain your answer with appropriate steps. **[15]**

X1	2.5	0.5	2.2	1.9	3.1	2.3	2.0	1.0	1.5	1.1
X2	2.4	0.7	2.9	2.2	3.0	2.7	1.6	1.1	1.6	0.9