Code No: 156DR **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, August/September - 2024
FUNDAMENTALS OF INTERNET OF THINGS
(Common to CE, EEE, ME, EIE, MCT, CSD)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a) What are the different network topologies used in IoT networks? [2]
b) How does the MQTT protocol ensure reliable and efficient data transmission in IoT systems? [3]
c) Define Machine-to-Machine (M2M) communication. [2]
d) Differentiate between MQ-2 and MQ-6 sensors. [3]
e) List the key features of Python. [2]
f) How can cloud services be integrated with Raspberry Pi for IoT applications? [3]
g) What is the purpose of the GPIO pins on a Raspberry Pi? [2]
h) How does SDN separate the network architecture? [3]
i) How does cloud computing support IoT applications? [2]
j) How does the integration of IoT technologies enhance the functionality and efficiency of the Smart Grid? [3]

PART – B

(50 Marks)

2.a) Discuss how scalability, interoperability, security, and connectivity are critical for the successful deployment and operation of IoT systems.
b) What are the different hardware components typically used in IoT devices? Explain. [5+5]

OR

3.a) Explain the various functional blocks of an IoT system.
b) What types of sensors are commonly used in IoT applications, and how do they work? [5+5]

4.a) Discuss the key components and architecture of an M2M communication system.
b) Describe the basic structure of an Arduino program (sketch), including setup and loop functions. [5+5]

OR

5.a) Discuss how IoT builds upon the foundations of M2M and extends its capabilities with examples to illustrate the differences.
b) Discuss the process of integrating sensors and actuators with an Arduino board. [5+5]

6.a) Discuss the process of interfacing Raspberry Pi with basic peripherals.
b) Discuss the libraries and frameworks available in Python for IoT, such as “RPi.GPIO”, “paho-mqtt”, and “Adafruit”. [5+5]

OR

7.a) Explain how Raspberry Pi can be used for IoT applications.
b) Describe the steps to set up a Raspberry Pi as an IoT hub. [5+5]

8.a) Discuss the benefits of SDN compared to traditional networking approaches.
b) What are the common security challenges in IoT, and how can SDN provide solutions to these challenges? [5+5]

OR

9.a) Discuss the application of SDN in the context of the IoT.
b) Explain the importance of data handling and analytics in IoT systems. [5+5]

10.a) Explain the advantages and disadvantages of cloud computing.
b) Discuss the architecture of a sensor-cloud system. [5+5]

OR

11.a) Explain the concept of connected vehicles and their role in the Internet of Things (IoT).
b) Define Industrial IoT (IIoT) and its impact on manufacturing and industrial processes. [5+5]

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