B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E   Semester: VI

Branch: Electronics and Telecommunication Engineering   Duration: 3 hrs.

Course Code: 19ET6PE3IT   Max Marks: 100

Course: IOT & Wireless Sensor Networks   Date: 22.09.2023

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1 a) Describe the block diagram of IOT device. **07**

   b) List the IOT communication models and briefly explain any two. **08**

   c) Describe the Web socket based communication APIs **05**

UNIT - II

2 a) Arrive at the equations for two models of conceptual framework for IoT. Clearly list all the steps involved in arriving at the equations. **10**

   b) Briefly describe the M2M architecture for IOT device **10**

UNIT - III

3 a) List the features of IPV4, IPV6 and RPL for lower power lossy network **10**

   b) Describe the IPV6 Over Low Power Wireless Personal Area Network **10**

OR

4 a) Suggest a protocol for dynamically configuring the IP address and the other networks. List all the steps involved. **05**

   b) Briefly list the features, advantages and concerns of cloud computing platforms. **08**

   c) Describe the TCP/IP suite four layers generating the data stack for the network and for physical layer during internet communication **07**

UNIT - IV

5 a) Design an Arduino controlled traffic lights at a road junction with the following assumptions: three traffic lights red, yellow and green needs to be controlled on each of four north, east, south and west clockwise pathways. Let twelve GPIO pins on Uno connect twelve number externally connected LEDs (four sets of three R, G, and Y LEDs each). The port LEDs represent the traffic lights during the prototype development and testing stage **10**

   b) Describe the five levels for software development for applications and services for IOT or M2M. **10**

<div align="center">**OR**</div>

6 a) Design an Arduino program for usage of analog sensor devices at SPI port with the following specifications: a temperature sensor analog input is given to an SPIAT Arduino through a 10-bit ADC and PISO. How will the data be read from an SPI input every hour into an Arduino board from the sensor? How will the one hour wait loop be programmed and how does the test performed by the LED on off-states using a blinking program blink at each 3s interval? **10**

   b) How do we prototype Embedded design software? How do we program an Arduino platform using IDE and how do we develop the codes? **10**

<div align="center">**UNIT - V**</div>

7 a) What are the challenges for WSNs? Describe the characteristic requirements and the mechanisms. **07**

   b) Arrive at the equations for the energy consumption of the sensor nodes considering the operation states with different power consumption. **06**

   c) Explain with diagram different mobility in WSN. **07**

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