KUMARAGURU
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B.E/B.TECH DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Fourth Semester

COMMON TO ALL BRANCHES

U18CSR4202 : IoT Protocols and Programming

COURSE OUTCOMES

CO1: Understand and Identify IoT protocols for real time application.

CO2: Design and develop IoT prototypes using Arduino /Raspberry Pi.

CO3: Identify the challenges and security issues in developing IoT applications.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	List out the essential characteristics of IoT communication technologies.	CO1	[K2]
2.	Depict the protocols stack of WiFi.	CO1	[K2]
3.	Discuss about IEEE 802.15.4 standard.	CO1	[K2]
4.	Why is HTTP not preferred for IoT applications?	CO1	[K2]
5.	Depict the architecture of DDS.	CO1	[K2]
6.	Identify the IoT communication protocol suitable for the following scenario.	CO1	[K3]

     i.   Data rate : 200 – 250 Kbps & Distance : 50 to 80 meters

     ii.   Data rate:100 bps & Distance: >10km

7.	Compare Arduino and Raspberry PI.	CO2	[K2]
8.	Explain the use of following functions:	CO2	[K2]

     i.   Serial.begin()

     ii.   pinMode()

9.	What are the major threats for security and privacy in IoT?	CO3	[K2]
10.	How blockchain can be used for IoT Security.	CO3	[K2]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Illustrate protocol stack and network architecture of LoRaWAN	10	CO1	[K2]
	b)	Explain the network architecture of Bluetooth	6	CO1	[K2]

12.	a)	Outline the network architecture stack of Zigbee.	8	CO1	[K$_2$]
	b)	Compare the characteristics of NB-IoT and Sigfox	8	CO1	[K$_2$]

13.	a)	Discuss the features of SCADA and mention its applications	6	CO1	[K$_2$]
	b)	Compare the features and architecture of MQTT and CoAP	10	CO1	[K$_2$]

14. a) Identify the appropriate sensors and actuators for the following scenario and design a circuit using Arduino microcontroller. Develop an Arduino program for the same.   10   CO2   [K$_3$]

The typical streetlights usually glow brightly and use a lot of electricity. Design a smart street light system which should glow brightly if there are any vehicles or people on the road. If not, the lights shall remain dim. Also, streetlights should be automatically turn on in the evening, and turn off at daytime (presence of sunlight).

b) Write an Arduino program to actuate the servo motor based on the value read from potentiometer.   6   CO2   [K$_2$]

15. a) Consider the following problem statement: 8   CO2   [K$_3$]

Irrigation is the most important part of agriculture to yield maximum profit from your investment in the field. Design a smart irrigation system to detect the moisture content in soil and turn on/off the motor pump automatically when required.

Identify the appropriate sensors, actuators, communication module for the above problem statement and design a circuit using Node MCU and write the code for the same.

b) Design a motion detection and alert system using appropriate sensor, actuator and Raspberry Pi. Write a Python program for the same.   8   CO2   [K$_3$]

16.	a)	Identify and elaborate on the technology challenges in IoT	8	CO3	[K$_2$]
	b)	Outline the various methods to overcome the privacy issues in IoT	8	CO3	[K$_2$]

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