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**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JUN 2023**

Semester : Semester VI - 2020

Course Code : ECE3075

Course Name : Sem VI - ECE3075 - IoT Architecture and Protocols

Program : ECE&COM

Date : 7-JUN-2023

Time : 9.30AM - 12.30PM

Max Marks : 100

Weightage : 50%

Instructions:

- (i) Read all questions carefully and answer accordingly.
 - (ii) Question paper consists of 3 parts.
 - (iii) Scientific and non-programmable calculator are permitted.
 - (iv) Do not write any information on the question paper other than Roll Number.
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PART A

ANSWER ALL THE QUESTIONS

(5 X 4 = 20M)

1. It is known that the Google Cloud has an end-to-end platform for Internet-of-Things solutions. Define Google Cloud and mentions its application in IoT.
(CO3) [Knowledge]
2. A strain guage pressure sensor has linear analog output with sensitivity of 3mV/MPa. It is connected to the analog pin of an Arduino UNO that has a 10 bit ADC and $V_{ref} = 5V$. The resolution of ADC is $V_{ref} / 210$ bits. Compute the resolution of the ADC and determine the digital value for pressure 1400MPa.
(CO1) [Knowledge]
3. A temperature monitoring and control system is to be designed for the Computer lab in the university. Illustrate the functional block diagram to implement the system.
(CO2) [Knowledge]
4. A Strain Guage Pressure Sensor has linear analog output with sensitivity of 3mV/MPa. It is connected to the analog pin of an Arduino UNO that has a 10 bit ADC and $V_{ref} = 5V$. The resolution of ADC is $V_{ref} / 210$ bits. Compute the resolution of the ADC and determine the digital value for pressure 1400MPa.
(CO4) [Knowledge]
5. Radio frequency Identification system (RFID) is an automatic system and aids machines and computers to identify objects, record metadata or control individual target through radio waves. What should be the operating radio frequency range for High data rate transmission in RFID system?
(CO3) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

(4 X 15 = 60M)

6. Memory devices which are as smaller, faster are costlier where the memory devices in which are larger, slower are cheaper. How the memory selection process is made for Embedded System or IoT system.? Explain the concept using suitable diagram.

(CO2) [Comprehension]

7. Secure communication, resulting in a secure exchange of data between Operational Technology (OT) and Information Technology (IT), is the backbone of digitalization. Industrial networks and office networks both use Ethernet-based communication, but they differ in several ways. Both networks have highly specific requirements in IOT ecosystems.

- Discuss the importance of IT and OT system in Internet of Things systems.
- Explain with architecture diagram

(CO3) [Comprehension]

8. A smart digital display system across the university campus is to be implemented. Describe with suitable diagram the request-response, publish –subscribe, push-pull and exclusive pair IoT communication models for such implementation.

(CO4) [Comprehension]

9. A major chunk of IoT applications involves sensing in one form or the other. Actuation forms the final step in the whole operation of IoT application deployment in a majority of scenarios. Discuss the outline of a simple sensing operation with a neat diagram. Explain on what parameters the sensors are classified? Give six examples for Sensors. Outline the basic terminological differences between Transducers, Sensors and Actuators.

(CO1) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

(2 X 10 = 20M)

10. A Biometric Attendance system is required to be implemented across the campus of the university using the star, mesh, and peer-to-peer topologies. Formulate briefly describing the suitable Topology for long range, medium range and short range.

(CO4) [Application]

11. The IoT based surveillance cameras system consist of several cameras, can change their modes from normal to infrared night mode based on weather and based on day or night. The camera can modify the resolution from lower to higher when they detect the motion and communicate with other cameras to modify themselves.

- Identify the characteristic in the above application which is making it more demandable for IoT based application.
- List 4 more characteristic of IoT Application Design.

(CO1) [Application]