



RAN-2211000609010001

M.Sc. (IT) (Sem.- IX) Examination November - 2025

Internet of Things

Time: 3 Hours]

[Total Marks: 70

સૂચના : / Instructions

(1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી.

Fill up strictly the above details on your answer book

Seat No.:

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Student's Signature

Q.1. Answer the following questions

(18)

A) Answer the following short questions in detail. (Any six)

(06)

- 1) Which IEEE protocol is use in 6Lowpan MAC layer and Physical layer?
- 2) Which pin carry data signal from one device to another device in I2C communication?
- 3) What is the usage of "KILL" command of Linux kernel based Raspbian Operating System
- 4) What is the role of a LoRaWAN Gateway?
- 5) What is the usage of Node Red open source tool of Raspberry pi in Internet of Things(IoT)?
- 6) What is the usage of SDcard in Raspberry Pi?
- 7) What is the usage of GPIO pins of Raspberry pi?

Q.1. B) Answer the following questions (Any two)

(12)

- 1) Explain LDR sensor and Ultrasonic sensor in detail.
- 2) Write short note on 6LowPAN
- 3) Describe client(), publish() and subscribe() functions /constructor of Paho library for Message Queuing Telemetry Transport (MQTT).

Q.2. Answer the following questions (Any Three)

(18)

- 1) a) Write short note on Arduino hardware. (03)
b) Explain SPI bus communication in detail. (03)
- 2) What are the advantages of Message Queuing Telemetry Transport (MQTT) in constrained environments? How does the publish/subscribe model work in MQTT?
- 3) Explain vulnerability issues and solution about insecure software/firmware, insecure cloud interface, insecure authentication and privacy concerns of IoT device in context of Internet of Things(IoT).
- 4) Explain confirmable(CON),Non- confirmable (N-CON) and Acknowledgement (ACK) message types of Constrained Application Protocol (COAP)in detail. Explain in IoT system how CoAP protocol is more beneficial in compare to HTTP protocol.

Q.3. Answer the following questions (Any six) (18)

- 1) What is Relation database? Explain how Relation database is useful in IoT application?
- 2) Explain direct exchange and topic Exchange of AMQP.
- 3) Explain how IoT implementation in agriculture is economically beneficial?
- 4) What is file handling? explain utility of “rb”, “w” and “ab+” basic file access modes when opening a file in python?
- 5) Write program in python to store at least five records one by one in database in SQLite on Raspberry pi. after storing five record on database LED connected on raspberry pi GPIO pin -05 must be “ON” for two second only. Consider input fields for database are “Sr. No.”, “area code” and “pin code”.
- 6) Explain following commands of linux “chmod”, “wget” and “more”
- 7) Describe LoRaWAN message delivery process and its advantages in detail.

Q.4. Answer the following questions in detail. (Any four) (16)

- 1) Draw 8051 microcontroller block diagram and explain usage of RAM.
- 2) How many wires are needed in SPI communication? Write program in Raspberry pi using python to establish UART bus communication. Explain each and every line by writing comments in code.
- 3) How CoAP methods GET, POST, PUT, DELETE are use to establish communication in IoT ?
- 4) What is the meaning of given syntaxes in terms of file handling concept?
 - a) “input_file1=open(“D:\\goods.csv”, “w+”) “
 - b) “input_file2=open(“D:\\employ.txt”, “rb+”) “
 - c) “input_file3=open(“D:\\company.csv”, “ab”) “
 - d) “input_file4=open(“D:\\customer.txt”, “a”) “
- 5) write program in python to find object using ultrasonic sensor and when object distance is less than 2 meter detected then “event. No. “ and time stamp should be store in SQLite database which is installed on Raspberry pi and display only last updated time stamp. Explain each and every line of program by writing comments in code