

IoT Applications (315341)

MSBTE Diploma · K-Scheme · Model Question Paper — Set C

Time: 3 Hours**Max. Marks: 70****Instructions:**

1. All questions are compulsory.
2. Answer each next main question on a new page.
3. Illustrate your answers with neat sketches wherever necessary.
4. Figures to the right indicate full marks.
5. Assume suitable data, if necessary.
6. Mobile phone, pager and any other electronic communication devices are not permissible in the examination hall.

Q.1 Attempt any FIVE of the following:**10**

- a) State any four enabling technologies of IoT.
- b) Compare UART and I2C communication. (Any two points)
- c) State the use of setup() and loop() functions in an Arduino sketch.
- d) State the use of MQ-4 sensor. Give any two applications.
- e) State the function of the IR LED and the photodiode in an IR sensor module.
- f) List any four advantages of HTTP-REST for IoT.
- g) State any two features and two applications of LoRa.

Q.2 Attempt any THREE of the following:**12**

- a) Explain the four-layer architecture of IoT with a neat diagram. How does it differ from the three-layer architecture?
- b) Explain the logical design of IoT: functional blocks and communication models.
- c) Describe the firmware used with NodeMCU and explain any two features of its Wi-Fi with example.
- d) Explain the working of DHT11 sensor with its internal block diagram and pin diagram.

Q.3 Attempt any THREE of the following:**12**

- a) Explain servo motor as an actuator. How is its angle controlled using PWM from NodeMCU? Write a short program.
- b) Explain LoRa wireless communication platform with a neat diagram.
- c) Explain MQTT topics and wildcards (+ and #) with suitable examples.
- d) Draw the block diagram of IoT based remote patient health monitoring system and explain it.

Q.4 Attempt any THREE of the following:**12**

- a) Write a program for NodeMCU to sound a buzzer (D2) and print “Motion detected” on the Serial Monitor when a PIR sensor connected to D5 detects motion. Draw the interfacing diagram.
- b) Explain the working principle of LDR. An LDR and a 10 k Ω resistor form a voltage divider (LDR to 3.3 V, resistor to ground, output to A0). The LDR resistance is 1 k Ω in bright light and 200 k Ω in darkness. Find the output voltage and ADC value in both cases.
- c) Explain IoT based smart waste (garbage bin) management system with a block diagram.
- d) Explain the features and use cases of AWS IoT and Microsoft Azure IoT cloud platforms.
- e) Explain the use of the following pins of NodeMCU: i) EN ii) Vin iii) D0 iv) RX

Q.5 Attempt any TWO of the following:

12

- a) Draw and explain Green House control system using IoT. Draw the flowchart of its control logic.
- b) Explain the hardware architecture of NodeMCU ESP8266 with a neat block diagram.
- c) Write a program for NodeMCU to publish DHT11 temperature and humidity to an MQTT cloud broker and to switch a relay on D2 ON/OFF from a subscribed topic.

Q.6 Attempt any TWO of the following:

12

- a) Explain EV battery management system using IoT with block diagram. State the parameters monitored and the protections provided.
- b) Explain the construction and operation of a relay. Draw a relay driver circuit for NodeMCU and state any two applications.
- c) List all the methods of HTTP protocol and explain any four in brief with REST examples. State the meaning of any two HTTP status codes.

Note: This is a **model question paper prepared by Ananda Technologies** only for practice and exam preparation, based on the pattern of previous MSBTE question papers and the K-scheme syllabus. It is **not an official MSBTE paper**, and it does **not** mean that these questions will come in the exam. Answers follow standard textbook points; marks shown are indicative. Free for students — anandatechnologies.in