IoT Applications (315341)

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

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) Define Internet of Things (IoT). State any two needs of IoT.

b) Draw the block diagram of I2C bus interface with one master and two slave devices.

c) List any four features of NodeMCU ESP8266.

d) Define actuator. Give any two examples of actuators used in IoT.

e) State the working principle of an IR obstacle sensor.

f) List any four methods (commands) of the HTTP protocol.

g) Define smart city. State any two IoT applications in a smart city.

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

a) Draw the four-layer architecture of IoT and explain the function of each layer.

b) Explain wireless sensor network (WSN) as an enabling technology of IoT with a neat diagram.

c) Explain the use of the following pins of NodeMCU: i) A0 ii) D4 (GPIO2) iii) 3V3 iv) RST

d) Explain the working principle of PIR motion sensor with a neat sketch.

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

a) Compare SPI and I2C communication protocols. (Any four points)

b) Explain the construction and working of MQ-4 gas sensor with a neat sketch.

c) Explain the MQTT publish–subscribe model with a neat diagram. Give one example of a topic.

d) Explain an automatic street light control system using NodeMCU and LDR with circuit diagram.

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

a) Write a program for NodeMCU to read temperature from LM35 connected to A0, display it on the Serial Monitor and switch ON a fan (relay on D1) when the temperature exceeds 35 °C.

b) Explain LoRaWAN network architecture with a diagram. State any two applications of LoRa.

c) Explain any four challenges in design and security of IoT systems.

d) Explain the construction and working of an electromechanical relay with a neat diagram.

e) Explain the role of an IoT cloud platform. Explain ThingSpeak as an example.

Q.5 Attempt any TWO of the following: **12**

a) Draw the block diagram of an IoT based greenhouse control system and explain the function of each block.

b) Explain the 40-bit data format of DHT11 with timing diagram. A DHT11 sends the bytes 0x3E, 0x00, 0x1D, 0x04, 0x5F. Find the humidity and temperature and check whether the data is received correctly.

c) Explain any six technical specifications of NodeMCU ESP8266 and draw its pin diagram.

Q.6 Attempt any TWO of the following: **12**

a) Draw the block diagram of an EV battery management system using IoT and explain each block.

b) Explain HTTP request–response communication with a diagram. Explain GET, POST, PUT and DELETE methods with examples.

c) Write a program for NodeMCU to turn ON the on-board LED when a push switch connected to D6 is pressed and turn it OFF when released. Explain the use of setup() and loop() functions.

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