

Serial No. 6663

[This Question Paper contains 3 pages]

Unique paper Code : 2513012004

Name of Course : B.Sc. (H) Electronics (GE)

Name of the Paper : Internet of Things

Semester : VIII

Duration : 3 Hr

Maximum Marks : 90 Marks

Instruction for Candidates

1. There are seven questions in all, out of which you have to attempt any five questions.
2. First Question is Compulsory.
3. All questions carry equal marks.

Q1. Attempt all questions. All questions carry equal marks. (3 × 6 = 18)

(a) Define IoT and mention any two characteristics of IoT systems.

(b) What is MQTT? Mention one application in IoT.

(c) Differentiate between sensors and actuators.

(d) What is the role of APIs in IoT?

(e) Define SDN in context of IoT.

(f) What is ThingSpeak API?

Q2.

(a) Explain the architectural overview of IoT with suitable diagram. (6)

(b) Discuss the IoT protocol stack with functions of each layer. (6)

(c) Explain Request-Response communication model with suitable IoT example. (6)

Q3.

(a) Explain IoT levels and deployment templates with examples. (6)

(b) Discuss Software Defined Networking (SDN) and Network Function Virtualization (NFV) in IoT. (6)

(c) Explain basics of IoT system management using SNMP and NETCONF-YANG. (6)

Q4.

- (a) Explain classification of sensors with suitable examples. (6)
- (b) Describe the working principle and applications of temperature and humidity sensors. (6)
- (c) Explain characteristics of transducers and actuators. (6)

Q5.

- (a) Explain the structure of an Arduino sketch. Describe setup() and loop() functions with example.

OR

- Explain GPIO pins of Raspberry Pi and interfacing using Python. (6)
- (b) Explain UART communication and use of Serial library in Arduino/Raspberry Pi. (6)
- (c) Write a program to interface DHT11 sensor with Arduino/Raspberry Pi for temperature and humidity measurement along with circuit diagram. (6)

Q6.

- (a) Explain cloud service models: SaaS, PaaS and IaaS with examples. (6)
- (b) Discuss RESTful Web APIs and their role in IoT applications. (6)
- (c) Explain symmetric and asymmetric encryption techniques used in IoT security. (6)

Q7.

- (a) A smart irrigation system is developed to monitor soil moisture and temperature using IoT sensors. The system automatically switches ON the water pump when soil moisture falls below a threshold. The user can also manually control the pump using a mobile application.

Requirements:

- Real-time monitoring of soil moisture and temperature
- Automatic pump control
- Manual override using mobile application
- Wireless communication between sensors and controller

Give the process model specification for Automatic Mode and Manual Mode of the smart irrigation system. (6)

(b) Explain any two of the following IoT applications:

(6) + (6)

(i) Smart Home Automation

(ii) Smart Healthcare

(iii) Smart Agriculture