

GUJARAT TECHNOLOGICAL UNIVERSITY

BE-7 SEMESTER – OLD PAPER – S22 TO S25 – QUESTION BANK

Subject Name & Code:

Internet of Things- 3171108

Unit 1: Introduction to Internet of Things

Repeated Questions:

1. **Define Internet of Things (IoT).**
 - Appeared in: S22 (Q1a, 03 marks), W22 (Q1a, 03 marks), S23 (Q1a, 03 marks)
2. **Describe/Explain/Draw the IoT Architecture in detail.**
 - Appeared in: S22 (Q1c, 07 marks), W22 (Q1c, 07 marks), S23 (Q1c, 07 marks)
3. **Describe/Discuss the characteristics of IoT.**
 - Appeared in: S22 (Q2b, 04 marks), W22 (Q2c, 07 marks), W23 (Q1a, 03 marks), S25 (Q1b, 04 marks)
4. **Differentiate between IoT and M2M.**
 - Appeared in: S23 (Q2 OR-b, 07 marks), W22 (Q3a, 03 marks), S24 (Q1a, 03 marks), W24 (Q2b, 04 marks)
5. **Draw and discuss the Physical Design of IoT.**
 - Appeared in: W23 (Q1c, 07 marks), S25 (Q1c, 07 marks)
6. **Draw and explain the logical design of IoT.**
 - Appeared in: S24 (Q1b, 04 marks)
7. **Discuss IoT Levels and Deployment Templates/Levels of Implementation.**
 - Appeared in: S23 (Q2c, 07 marks), S22 (Q4a, 03 marks), W24 (Q2 OR-c, 07 marks)
8. **Write the applications of IoT.**
 - Appeared in: S23 (Q1a, 03 marks), S22 (Q1b, 04 marks), W24 (Q1a, 03 marks)

Other Important Questions:

1. **Explain the vision of IoT.**
 - Appeared in: W22 (Q1a, 03 marks)
2. **What are the emerging trends in IoT?**
 - Appeared in: W22 (Q1b, 04 marks)
3. **Explain End to End IoT Architecture in detail.**
 - Appeared in: S23 (Q1c, 07 marks)
4. **Write about IoT Level – 3 and IoT Level – 4.**
 - Appeared in: S23 (Q2c, 07 marks)
5. **Discuss the IOTWF Reference Model.**
 - Appeared in: S24 (Q1c, 07 marks), S25 (Q1a, 03 marks)
6. **Explain the challenges for IoT.**
 - Appeared in: S22 (Q5b, 04 marks), W22 (Q5c, 07 marks)
7. **Explain the interdependencies of IoT and cloud computing.**
 - Appeared in: S22 (Q3b, 04 marks)

8. **List various components of an IoT system.**
 - Appeared in: W23 (Q1b, 04 marks)
9. **Draw and explain a generic block diagram of an IoT Device.**
 - Appeared in: W24 (Q1b, 04 marks)
10. **With a neat sketch, explain the request-response communication model of IoT.**
 - Appeared in: W24 (Q2a, 03 marks)
11. **Explain Fog, Edge and Cloud Computing using IoT terminologies and concepts.**
 - Appeared in: W24 (Q2c, 07 marks)

Unit 2: Embedded IoT Devices

Repeated Questions:

1. **Define Sensors, Actuators, and Transducers / Write a note on sensors/Classify sensors.**
 - Appeared in: S23 (Q4a, 03 marks), S22 (Q2a, 03 marks), W22 (Q3b, 04 marks), S24 (Q2c, 07 marks), S25 (Q3b, 04 marks), W24 (Q3c, 07 marks)
2. **Draw and explain the pin diagram of Arduino UNO.**
 - Appeared in: W23 (Q2c, 07 marks), S25 (Q2c, 07 marks)
3. **Draw and describe basic Raspberry-pi boards pins functionalities.**
 - Appeared in: S24 (Q3 OR-a, 03 marks), W23 (Q3a, 03 marks)
4. **What are IoT Gateways? Enlist their features and types.**
 - Appeared in: S23 (Q3b, 04 marks), S24 (Q3 OR-b, 04 marks), W23 (Q3b, 04 marks), S25 (Q3 OR-b, 04 marks), S22 (Q4b, 04 marks)
5. **Describe Cloud Computing.**
 - Appeared in: S23 (Q5a, 03 marks), S24 (Q2a, 03 marks), S25 (Q3a, 03 marks)

Other Important Questions:

1. **Write an Arduino sketch to blink an LED with a given delay.**
 - **Numerical/Code Type Question:**
 - Appeared in: S24 (Q2b, 04 marks) - *Decode-and evaluate the output of the given program.*
 - Appeared in: W23 (Q2 OR-c, 07 marks) - *Write a sketch to turn a LED ON for 5 secs and OFF for 15 secs.*
 - Appeared in: S25 (Q2b, 04 marks) - *Write a sketch to turn a LED ON for 5 secs and OFF for 15 secs.*
2. **Write a program to read data from a sensor (e.g., Current Sensor, DHT11) using Arduino.**
 - **Numerical/Code Type Question:**
 - Appeared in: S24 (Q2 OR-c, 07 marks) - **Program to detect current signal from a sensor (0-5V for 0-100A range).**
 - Appeared in: S24 (Q4c, 07 marks) - *Apply a single bus communication protocol for DHT11 sensor with Arduino.*
 - Appeared in: W23 (Q4c, 07 marks) - *Apply a single bus communication protocol for interfacing DHT11 sensor with Arduino.*
3. **Draw and describe Arduino boards system architecture and pins.**
 - Appeared in: S24 (Q3a, 03 marks)
4. **Enlist various methods of uploading data from on-field sensors to the cloud or on Mobile phones.**

- Appeared in: S24 (Q3b, 04 marks), W23 (Q3 OR-b, 04 marks)
- 5. **Explain the implementation of IoT with Edge devices.**
 - Appeared in: W22 (Q4c, 07 marks)
- 6. **Write a Python program for blinking LED on Raspberry Pi.**
 - **Numerical/Code Type Question:**
 - Appeared in: W22 (Q3a, 03 marks)
- 7. **Explain interfaces available on Raspberry Pi board.**
 - Appeared in: W22 (Q3c, 07 marks)
- 8. **Discuss SPI, I2C protocols used in Raspberry Pi Communication Interfacing.**
 - Appeared in: W23 (Q3c, 07 marks), S25 (Q4c, 07 marks)
- 9. **List the features of NodeMCU.**
 - Appeared in: W24 (Q3a, 03 marks)
- 10. **List steps involved in reading sensor data and transmitting it to the cloud.**
 - Appeared in: W24 (Q3b, 04 marks)
- 11. **List different Actuators used in implementation of IoT and explain any four.**
 - Appeared in: W24 (Q3 OR-c, 07 marks), W22 (Q5a, 03 marks)
- 12. **List the steps involved in controlling devices through cloud using mobile/web application.**
 - Appeared in: W24 (Q3 OR-b, 04 marks)
- 13. **What do you mean by smart objects?**
 - Appeared in: S25 (Q3 OR-a, 03 marks)
- 14. **Draw and describe Raspberry-pi B+ boards functionalities.**
 - Appeared in: S25 (Q2 OR-c, 07 marks)
- 15. **What is the MAC address of any embedded device?**
 - Appeared in: S25 (Q3 OR-c, 07 marks)

Unit 3: IoT Protocols

Repeated Questions:

1. **Explain the Message Queue Telemetry Transport (MQTT) Protocol.**
 - Appeared in: S23 (Q3c, 07 marks), S22 (Q5a, 03 marks), W24 (Q4c, 07 marks), S24 (Q4c, 07 marks)
2. **Explain the Constrained Application Protocol (CoAP) in detail.**
 - Appeared in: S23 (Q4c, 07 marks), S22 (Q3 OR-b, 04 marks), W24 (Q4 OR-c, 07 marks)
3. **Explain HTTP as an Application layer IoT Protocol.**
 - Appeared in: S24 (Q4 OR-b, 04 marks), W24 (Q4b, 04 marks), W23 (Q4 OR-b, 04 marks), S25 (Q4 OR-c, 07 marks)
4. **List and explain Link Layer and Network Layer Protocols.**
 - Appeared in: S23 (Q4b, 04 marks), S22 (Q4a, 03 marks), W22 (Q4a, 03 marks), W24 (Q1c, 07 marks), S25 (Q3c, 07 marks)
5. **Differentiate between CoAP and MQTT.**
 - Appeared in: W23 (Q4a, 03 marks)
6. **Compare REST-based and WebSocket-based APIs.**
 - Appeared in: W22 (Q4b, 04 marks), S24 (Q3 OR-c, 07 marks)

Other Important Questions:

1. **Explain IoT Protocols in detail.**
 - Appeared in: S23 (Q1b, 04 marks), S22 (Q3c, 07 marks)
2. **Describe Bluetooth and BLE.**
 - Appeared in: S23 (Q2a, 03 marks), S24 (Q4b, 04 marks)
3. **Write the functionality of XMPP.**
 - Appeared in: S23 (Q3a, 03 marks), W23 (Q4 OR-a, 03 marks), S24 (Q3c, 07 marks)
4. **What is REST? Write various methods of REST.**
 - Appeared in: S23 (Q3 OR-b, 04 marks)
5. **Explain SDN (Software Defined Networking).**
 - Appeared in: S23 (Q3 OR-c, 07 marks)
6. **Discuss the DDS protocol in Detail.**
 - Appeared in: S23 (Q4 OR-c, 07 marks)
7. **Explain 802.16 – WiMAX with respect to IoT protocol.**
 - Appeared in: W22 (Q4a, 03 marks)
8. **Explain MQTT, XMPP and AMQP protocols.**
 - Appeared in: W22 (Q3 OR-c, 07 marks)

9. Discuss the network layer IPv4 protocol / Discuss IP Protocol.

- Appeared in: S25 (Q3c, 07 marks), S24 (Q4 OR-a, 03 marks)

10. Discuss various classes of IP addressing in detail.

- Appeared in: W23 (Q4 OR-c, 07 marks)

11. Elaborate Light Fidelity (LiFi) protocol.

- Appeared in: S25 (Q5b, 04 marks), W23 (Q4b, 04 marks)

12. How IoT devices are addressed over the internet?

- Appeared in: W24 (Q4a, 03 marks)

13. Explain Systematic HTTP access methodology.

- Appeared in: W24 (Q4 OR-b, 04 marks)

14. Elaborate the functions of each Protocol layer of a networked system.

- Appeared in: S24 (Q4a, 03 marks)

15. Draw the OSI layers used for communication protocol and give an example of each layer.

- Appeared in: S25 (Q4b, 04 marks)

16. Discuss the Request/Response, Publish/Subscribe, Push-Pull Model and Exclusive pair models of communications.

- Appeared in: W23 (Q3 OR-c, 07 marks)

17. Discuss various communication Models which can be implemented for any IoT system.

- Appeared in: S25 (Q4a, 03 marks)

Unit 4: IoT Security and Challenges

Repeated Questions:

1. **Explain the Challenges in IoT Security.**
 - Appeared in: S23 (Q5c, 07 marks), S22 (Q5b, 04 marks), S25 (Q5b, 04 marks), S24 (Q5 OR-a, 03 marks)
2. **Describe Security Components in IoT / What are the goals of security components?**
 - Appeared in: S22 (Q5 OR-a, 03 marks), S25 (Q5 OR-a, 03 marks), S24 (Q5 OR-b, 04 marks)
3. **Discuss vulnerabilities in IoT.**
 - Appeared in: S22 (Q3b, 04 marks), W22 (Q5b, 04 marks)

Other Important Questions:

1. **Explain access control and message integrity of IoT.**
 - Appeared in: S22 (Q3 OR-c, 07 marks)
2. **Enlist good practices for securing IoT systems.**
 - Appeared in: W22 (Q5c, 07 marks)
3. **Write a note on IoT security issues and need.**
 - Appeared in: W23 (Q5a, 03 marks)
4. **Explain components of Information security.**
 - Appeared in: W23 (Q5 OR-a, 03 marks)
5. **How personal data theft can be prevented in personal IoT device implementation?**
 - Appeared in: W24 (Q5a, 03 marks)
6. **How firmware updates can be installed on IoT Devices?**
 - Appeared in: W24 (Q5b, 04 marks)
7. **How end-to-end message integrity is ensured in IoT implementation?**
 - Appeared in: W24 (Q4 OR-a, 03 marks)
8. **How wireless IoT device is secured at the physical layer?**
 - Appeared in: W24 (Q5 OR-a, 03 marks)
9. **Draw the Security Architecture implementation of an IoT System.**
 - Appeared in: S25 (Q5c, 07 marks), S24 (Q5a, 03 marks)

Unit 5: IoT Applications and Case Study

Repeated Questions:

1. **Classify the IoT systems based on their applications.**
 - Appeared in: S25 (Q5 OR-c, 07 marks), W23 (Q5b, 04 marks), S24 (Q5b, 04 marks)
2. **Explain the role of IoT in Health Care Monitoring.**
 - Appeared in: S22 (Q5 OR-b, 04 marks), W22 (Q5 OR-b, 04 marks), W23 (Q5c, 07 marks)
3. **Explain Commercial IoT with an example.**
 - Appeared in: S22 (Q5 OR-c, 07 marks)
4. **Explain Smart Home Automation.**
 - Appeared in: S22 (Q2c, 07 marks)
5. **Explain how Smart City and IoT are associated.**
 - Appeared in: S22 (Q2 OR-c, 07 marks)

Other Important Questions:

1. **Write applications of IoT for the Medical field.**
 - Appeared in: S22 (Q3a, 03 marks)
2. **Write applications of IoT for Smart Parking in a Smart City.**
 - Appeared in: S22 (Q3 OR-a, 03 marks)
3. **Describe recent developments and future aspects of IoT.**
 - Appeared in: S22 (Q5c, 07 marks)
4. **Write a short note on IoT devices for home automation.**
 - Appeared in: W22 (Q5 OR-a, 03 marks)
5. **Discuss one design and implementation of an Industrial IoT Application.**
 - Appeared in: W24 (Q5c, 07 marks)
6. **Discuss one design and implementation of a Consumer IoT Application.**
 - Appeared in: W24 (Q5 OR-c, 07 marks)
7. **Design an embedded system for a problem statement (e.g., Smart Street Lights, Military Application, Pollution Monitoring).**
 - **Design/Numerical Type Question:**
 - Appeared in: W23 (Q5 OR-b, 04 marks) - *Design an IoT solution for river water pollution monitoring.*
 - Appeared in: W23 (Q5 OR-c, 07 marks) - *Draw and design a smart city street light control and monitoring system.*
 - Appeared in: S24 (Q5c, 07 marks) - *Design an ultrasonic sensor-based system for the Military field.*
 - Appeared in: S24 (Q5 OR-c, 07 marks) - *Design a solar-powered smart street light system using a Photo Diode.*
