Mid-Term Examination

Course: Internet of Things (IoT)

Time Allowed: 2 Hours **Total Marks:** 50
Student Name: _____ **Roll No:** _____

Section A: Multiple Choice Questions (10 Marks)

Attempt all questions. Each question carries 1 mark.

Q1. Which of the following is NOT a standard IoT communication model?

(a) Request-Response
(b) Publish-Subscribe
(c) Push-Pull
(d) Store-Forward

Q2. What does MQTT stand for?

(a) Message Queue Telemetry Transport
(b) Message Queue Text Transfer
(c) Multi-Queue Telecommunication Transport
(d) Mobile Queue Telemetry Transfer

Q3. Which layer in the IoT architecture is responsible for data transmission?

(a) Perception Layer
(b) Network Layer
(c) Application Layer
(d) Processing Layer

Q4. Which of the following is a microcontroller often used in IoT prototyping?

(a) Intel i7
(b) Arduino Uno
(c) Nvidia RTX
(d) AMD Ryzen

Q5. What is the primary function of a sensor?

(a) To process data
(b) To detect changes in the environment
(c) To perform an action
(d) To store data in the cloud

Q6. Which protocol is commonly used for lightweight, machine-to-machine communication?

(a) HTTP
(b) CoAP
(c) FTP
(d) SMTP

Q7. In the context of IoT, what does 'Actuator' do?

(a) Converts physical signal to electrical signal
(b) Converts electrical signal to physical action
(c) Transmits wireless data
(d) Encrypts data packets

Q8. IPv6 addresses are how many bits long?

(a) 32 bits
(b) 64 bits
(c) 128 bits
(d) 256 bits

Q9. Which service model provides virtualized computing resources over the internet?

(a) SaaS
(b) PaaS
(c) IaaS
(d) DaaS

Q10. Zigbee is based on which IEEE standard?

(a) 802.11
(b) 802.3
(c) 802.15.4
(d) 802.16

Section B: Short Answer Questions (10 Marks)

Attempt all questions. Each question carries 2 marks.

Q11. Define the term "Internet of Things" and give two real-world examples.

Q12. Differentiate between a Microprocessor and a Microcontroller.

Q13. List four common communication protocols used in IoT.

Q14. Explain the function of GPIO pins on a Raspberry Pi.

Q15. Briefly define "Edge Computing" and its benefit in IoT.

Section C: Long Answer Questions (30 Marks)

Attempt any 6 questions. Each question carries 5 marks.

Q16. Draw and explain the 3-Layer and 5-Layer architectures of IoT. Describe the responsibility of each layer.

Q17. Compare and contrast MQTT and HTTP protocols. Why is MQTT preferred for IoT devices with limited battery power?

Q18. Explain the working principle of the following sensors:

- Ultrasonic Sensor (HC-SR04)
- Temperature and Humidity Sensor (DHT11)

Q19. Discuss the concept of Cloud Computing in IoT. Explain the differences between IaaS, PaaS, and SaaS with examples.

Q20. Describe a ”Smart Home Automation” system design. List the necessary sensors, actuators, and the communication flow required to control lights and fans remotely.

Q21. What are the major security and privacy challenges in IoT? How can they be mitigated?

Q22. Explain the concept of SDN (Software Defined Networking) and NFV (Network Function Virtualization) in the context of IoT.

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