**Model 2**

**CS605A – Internet of Things (IoT)**

**Full Marks: 100**

**Time: 3 Hours**  
**Instructions:** Answer all questions. Choices are provided where applicable.

**Part 1 – Multiple Choice Questions (12 × 1 = 12 Marks)**

Choose the correct option:

1. What is the main role of the Perception Layer in IoT architecture?  
   a) Data storage  
   b) Physical sensing and data collection  
   c) Network routing  
   d) Application execution
2. Which of the following is a primary function of actuators in IoT?  
   a) Data processing  
   b) Data collection  
   c) Performing physical actions  
   d) Managing cloud storage
3. Which technology is commonly used for contactless fund transfer in IoT?  
   a) Wi-Fi  
   b) ZigBee  
   c) NFC  
   d) LoRa
4. What distinguishes the CoAP protocol in IoT communication?  
   a) Uses TCP/IP  
   b) RESTful and runs over UDP  
   c) Proprietary protocol  
   d) Used only for video streaming
5. Which of the following is NOT a benefit of using IPv6 in IoT?  
   a) Larger address space  
   b) Improved security  
   c) Simpler packet structure  
   d) Backward compatibility with IPv4
6. What is the main purpose of MQTT in IoT applications?  
   a) Video streaming  
   b) Reliable message transmission with low bandwidth  
   c) Sensor hardware configuration  
   d) Encrypting media files
7. Which of the following is a hierarchical routing protocol in WSN?  
   a) SPIN  
   b) LEACH  
   c) Directed Diffusion  
   d) AODV
8. What kind of communication is typical in Machine-to-Machine (M2M)?  
   a) Human-to-Device  
   b) Device-to-Device  
   c) Social Media  
   d) High-level analytics
9. Which board is more suitable for general-purpose computing tasks?  
   a) Arduino UNO  
   b) Raspberry Pi  
   c) NodeMCU  
   d) ATmega328
10. Which of the following is a key challenge in IoT scalability?  
    a) Manual processing  
    b) Data redundancy  
    c) Hardware cost  
    d) Interoperability and standardization
11. What is the goal of Fog Computing in IoT architecture?  
    a) Remove cloud dependency entirely  
    b) Store all data in physical servers  
    c) Process data at the network edge  
    d) Connect Bluetooth devices
12. Which technology is commonly used for long-range, low-power IoT applications?  
    a) NFC  
    b) ZigBee  
    c) LoRa  
    d) Wi-Fi

**Part 2 – Short Answer Questions (5 × 5 = 25 Marks)**

Answer any **five**:

1. What is Interoperability in IoT, and why is it critical?
2. Explain the role of sensors and actuators with examples.
3. Write a short note on data aggregation and its benefits in WSN.
4. Compare deterministic vs. random sensor deployment techniques.
5. Describe the Smartie Approach for IoT security.
6. List the advantages and disadvantages of IoT in smart homes.
7. Explain how MAC design affects energy consumption in WSNs.

**Part 3 – Long Answer Questions (5 × 15 = 75 Marks)**

Answer any **five** in detail:

1. Discuss how Fog Computing improves IoT performance. Include architecture and use cases.
2. Explain MQTT and CoAP protocols in IoT. Compare their architecture, use cases, and performance.
3. Describe the IoT conceptual framework with an example of a smart parking system.
4. How can IoT help improve traditional waste management systems in smart cities? Propose a model.
5. Describe the full communication architecture of WSNs. Include layers and protocol types.
6. Explain how LEACH protocol works in WSN. Include phases and benefits.
7. Discuss privacy and security concerns in IoT and suggest solutions with real-world examples.