Atal Bihari Vajpayee Indian Institute of Information Technology & Management, Gwalior

IT406: IoT and Applications

Minor Examination (Session 2024–25)

Maximum Time: 1.5 Hours **Max Marks: 25**

Note: Attempt all questions. Show calculations for numerical parts and mention any assumptions.

1. **Multiple Choice (1 mark each)**:
   (a) Which protocol uses a broker and topic-based publish/subscribe?
   (i) HTTP (ii) CoAP (iii) MQTT (iv) TCP
   (b) Which addressing scheme is designed to support a very large number of IoT devices on the Internet?
   (i) IPv4 (ii) IPv6 (iii) MAC-only (iv) Link-local
   (c) Low-Power Wide-Area Network (LPWAN) technology typically prioritizes:
   (i) High throughput (ii) Low latency (iii) Long range and low power (iv) Rich QoS
   (3 Marks)

2. **True / False (with brief justification) — 2 marks each:**
   (a) Edge computing always eliminates the need for cloud processing.
   (b) OTA firmware updates should be signed to prevent tampering.
   (4 Marks)

3. Explain the MQTT QoS levels (0, 1, 2). For each level give one advantage and one drawback. (4 Marks)

4. **Numerical / Data Calculation:**
   A temperature sensor sends a 40-byte payload every 15 seconds. Radio header and link-layer add 20 bytes per packet. Calculate total MB transmitted by a single sensor in 24 hours. (1 MB = $10^6 bytes$).$Showsteps.$ $(4Marks)$

5. Short answer (choose any two — 3 marks each):
   (a) List three common IoT sensors and a typical application for each.
   (b) What is a digital twin? Give one practical use-case.
   (c) Explain briefly what LoRaWAN is and one use-case where it is preferred. (6 Marks)

6. Write a concise checklist (four items) for securing a resource-constrained IoT device before deployment. (Only bullet points required.) (4 Marks)