विश्वजीवनामृतं ज्ञानम्

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

IT406: IoT and Applications

Minor Examination (Session 2023–24)

Maximum Time: 1.5 Hours   Max Marks: 25

Note: Attempt all questions. Short, precise answers are preferred; show calculations where required.

1. **Multiple Choice (1 mark each)**: (a) Which protocol is lightweight and commonly used for constrained IoT devices?
   (i) HTTP   (ii) MQTT   (iii) FTP   (iv) SMTP

   (b) Which addressing scheme is essential for large-scale IoT on the internet?
   (i) IPv4   (ii) MAC addressing only   (iii) IPv6   (iv) Link-local only   (2 Marks)

2. **True/False with brief justification (2 marks each):**
   (a) Edge computing reduces latency by processing data closer to the source.
   (b) Firmware Over-the-Air (FOTA/OTA) updates eliminate all device security concerns.   (4 Marks)

3. Explain the MQTT publish–subscribe model. Include roles of broker, publisher, and subscriber, and one advantage of the model in IoT applications.   (4 Marks)

4. A sensor node samples temperature every 10 seconds and sends a 32-byte payload each time. If the radio transmission overhead per packet is 16 bytes and the device transmits continuously for 8 hours, compute the total bytes transmitted. Show steps.   (4 Marks)

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

6. Write a short note on **security best practices** for resource-constrained IoT devices (suggest at least four measures).   (5 Marks)