

**INTRODUCTION TO INTERNET OF THINGS  
(INFO 4131)**

**Time Allotted : 2½ hrs**

**Full Marks : 60**

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and  
any 4 (four) from Group B to E, taking one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group – A**

1. Answer any twelve:

**12 × 1 = 12**

*Choose the correct alternative for the following*

- (i) Which of the following is not an IoT platform?  
(a) Amazon Web Services (b) Microsoft Azure  
(c) Salesforce (d) Flipkart
- (ii) What is the primary function of IoT in an interconnected system?  
(a) To store large amounts of data  
(b) To create a closed network for local devices  
(c) To collect and exchange data between devices over the internet  
(d) To provide entertainment through connected devices
- (iii) The oneM2M architecture divides IoT functions into  
(a) Application layer (b) Service layer  
(c) Network layer (d) All of these
- (iv) In the IoT framework, what does the application layer do?  
(a) It ensures security of data being transferred  
(b) It handles data storage and analysis  
(c) It translates raw data into actionable insights for end-users  
(d) It connects devices to the network
- (v) MQTT is mainly used for \_\_\_\_\_  
(a) M2M communication (b) Cellular communication  
(c) Internet communication (d) Wireless communication
- (vi) Which interface does the fingerprint sensor use?  
(a) UART interface (b) CoAP interface  
(c) SP interface (d) I2P interface
- (vii) Which feature is a significant advantage of IPv6 over IPv4 in IoT communication?  
(a) Larger address space (b) Smaller header size  
(c) Basic security features (d) Limited scalability

- (viii) Which IEEE standard is specifically designed for short-range communication within 10 meters in IoT applications?  
 (a) IEEE 802.15.4e (b) IEEE 802.11ah  
 (c) IEEE 802.15.4 (d) IEEE 802.11
- (ix) Which protocol is most commonly used for lightweight, efficient messaging between IoT devices?  
 (a) HTTP (b) TCP (c) MQTT (d) FTP
- (x) Which of the following is a key challenge in IoT communication and networking?  
 (a) Security and privacy issues (b) High cost of devices  
 (c) Slow data transfer speed (d) Lack of interoperability

*Fill in the blanks with the correct word*

- (xi) When the computation takes place at the edge of a device's network, it is called \_\_\_\_\_.
- (xii) \_\_\_\_\_ is a layer in between the edge and the cloud.
- (xiii) ZigBee is based on IEEE \_\_\_\_\_ standard.
- (xiv) \_\_\_\_\_ protocol is based upon publish-subscribe architecture.
- (xv) In IoT, \_\_\_\_\_ communication protocol is most suitable for real-time video and audio streaming.

### **Group - B**

2. (a) Differentiate between IT and OT networks and discuss various challenges envisioned with the integration of IT and OT networks. [[CO1](Analyse/IOCQ)]  
 (b) Illustrate the characteristics of a smart object. [[CO2](Understand/LOCQ)]  
**6 + 6 = 12**
3. (a) Discuss the benefit of edge and fog computing in the context of storage and processing of data in IoT. [[CO1](Analyse/IOCQ)]  
 (b) Discuss real life examples of M2M and IoT based applications. [[CO2](Understand/LOCQ)]  
**(3 + 3) + (3 + 3) = 12**

### **Group - C**

4. (a) With a neat block diagram illustrate the IoT standardized architecture proposed by IoT World Forum (IoTWF) and explain the functionality of each layer. [[CO4](Understand/LOCQ)]  
 (b) What is the importance of REST API in the IoT Solutions? [[CO3](Remember/LOCQ)]  
**10 + 2 = 12**
5. (a) What do you mean by IoT Gateway? Describe the role of a gateway in IoT? [[CO3](Remember/LOCQ)]

- (b) Explain the role of MQTT in IoT and how MQTT works with the help of a diagram. [[CO4](Understand/LOCQ)]  
**(2 + 4) + 6 = 12**

### Group - D

6. (a) Explain the use of GPIO pins in Raspberry Pi platforms. [[CO5](Remember/LOCQ)]  
 (b) Compare between BlueTooth and BlueTooth LE. Discuss impact could IPv6 have on IoT? [[CO5](Analyse/IOCQ)]  
**4 + (6 + 2) = 12**
7. (a) Edge computing can benefit IoT in a number of ways – criticise with example. [[CO5](Analyse/IOCQ)]  
 (b) Differentiate between IoT and IIoT. [[CO5](Remember/LOCQ)]  
**8 + 4 = 12**

### Group - E

8. (a) Discuss four services in smart mine that may use IoT solutions. [[CO6](Remember/LOCQ)]  
 (b) Why LoRAWAN is considered as a suitable network technology compared to WI-FI for smart city? [[CO6] (Remember/LOCQ)]  
**8 + 4 = 12**
9. (a) Discuss in details the privacy issues in IoT in the context of healthcare sector. [[CO6](Analyse/HOCQ)]  
 (b) Explain the use of IoT and its advantage in Supply chain optimization. [[CO6](Remember/LOCQ)]  
**8 + 4 = 12**

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	62.5	29.1	8.3

