

**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 one of the following is not concern about Internet of Things?
(a) Data storage (b) Privacy
(c) Security (d) Throughput.
- (ii) Which of the following is used to capture data from the physical world in IoT devices?
(a) Sensors (b) Actuators
(c) Microprocessors (d) Microcontrollers.
- (iii) IoT gateway must provide _____
(a) Protocol abstraction (b) Data storage
(c) Security with hardware (d) Simple and fast installation.
- (iv) IoTWF architecture consists of _____.
(a) 3 layers (b) 4 layers (c) 5 layers (d) 7 layers
- (v) Internet protocol generally corresponds to which OSI layer?
(a) Network (b) Transport
(c) Data link (d) Session.
- (vi) Which of the following allow data processing close to the devices?
(a) Edge computing (b) Fog Computing
(c) Cloud computing (d) Grid computing.
- (vii) Arrange the following IoT technologies in ascending order of their wireless range
I. near-field communication
II. Wi-Fi
III. Bluetooth low energy
IV. Cellular Networks
(a) I, II, III, IV (b) I, III, II, IV
(c) II, III, IV I (d) IV, II, III, I

- (viii) What is the primary purpose of IEEE802.15.4 protocol in IoT?
 (a) Data Encryption (b) Wireless Sensor Networking
 (c) Device Authentication (d) Cloud Computing.
- (ix) Which of the following is/are an IoT-enabling technology?
 (a) Cloud Computing (b) Communication Protocols
 (c) Machine Learning (d) All of the above.
- (x) Which of the following IoT Data Link communication protocols operates at the longest range in a suburban environment?
 (a) Bluetooth (b) Z-Wave
 (c) ZigBee (d) LoRaWAN.

Fill in the blanks with the correct word

- (xi) A synonym of Ubiquitous computing is _____.
- (xii) Perception layer of an IoT system architecture consists of multiple elements, like, _____.
- (xiii) _____ is one of the major concern in IoT implementation
- (xiv) Arduino UNO is _____ device.
- (xv) The primary purpose of using protocols like CoAP and _____ is to enable efficient data exchange.

Group - B

- 2. (a) Discuss the benefits envisaged due to the convergence of IT and OT.
[[CO1](Understand/LOCQ)]
 (b) “Ubiquitous computing falls under H-M interaction but IoT falls under M-M interaction” – Justify with example.
[[CO2](Analyse/IOCQ)]
6 + 6 = 12
- 3. (a) Analyse the problems / challenges faced in the context of storage and processing of data in Cloud for an application like IoT based automated self-driving car.
[[CO1](Analyse/IOCQ)]
 (b) How the above challenges can be resolved?
[[CO2](Remember/LOCQ)]
4 + 8 = 12

Group - C

- 4. (a) “One of the greatest challenges in designing an IoT architecture is dealing with the heterogeneity of devices, software, and access methods” – Criticize with example.
[[CO3](Analyse/IOCQ)]
 (b) Describe the role of common service layer in oneM2M based IoT solution.
[[CO4](Remember/LOCQ)]
6 + 6 = 12
- 5. (a) Explain the responsibilities of Edge computing layer in IoTWF architecture.
[[CO3](Remember/LOCQ)]

(b) Describe the functions of the following layers in IoTWF architecture.

- (i) Data accumulation layer
- (ii) Data abstraction layer
- (iii) Application layer
- (iv) Collaboration and process layer.

[[C04](Understand/LOCQ)]

4 + 8 = 12

Group - D

6. (a) List four examples of sensors that can be used in agriculture in the context of IoT based smart farming.

[[C05](Remember/LOCQ)]

(b) Identify the main differences between Arduino and Raspberry Pi.

[[C05](Analyse/IOCQ)]

6 + 6 = 12

7. (a) List five most suitable databases for IoT. What are the various wireless communications boards available in Raspberry Pi?

[[C05](Analyse/IOCQ)]

(b) Justify why BLE has become a preferred and ideal choice for IoT.

[[C05](Analyse/IOCQ)]

(5 + 2) + 5 = 12

Group - E

8. (a) List four services in smart cities that may use IoT solutions.

[[C06](Remember/LOCQ)]

(b) Discuss the network infrastructure requirements for Smart City.

[[C06](Understand/LOCQ)]

4 + 8 = 12

9. (a) "Remote monitoring is the most important feature unleashed by IoT in the healthcare sector" - Analyse with example.

[[C06](Analyse/HOCQ)]

(b) Discuss the challenges that may arise from the integration of IoT with healthcare services.

[[C06](Remember/LOCQ)]

8 + 4 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	56.25	35.41	8.33

