

**INTERNET OF THINGS (IOT) AND APPLICATIONS
(ECEN 6132)**

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 the way in which an IoT device is associated with data?
(a) Internet (b) Cloud (c) Automata (d) Network.
- (ii) Which layer is called a port layer in OSI model?
(a) Session (b) Application (c) Presentation (d) Transport.
- (iii) Which of the following topology is used for ZigBee Smart Energy?
(a) Bus Topology (b) Ring Topology
(c) Star Topology (d) Any Topology.
- (iv) Which of the following computing emphasizes proximity to end user?
(a) Mist computing (b) Cloud computing
(c) Edge computing (d) Fog computing.
- (v) WPA is a security mechanism in
(a) WiFi (b) Cloud (c) Bluetooth (d) Ethernet.
- (vi) 6LoWPAN Adaption layer contains
(a) Header compression (b) Fragmentation
(c) Layer 2 forwarding (d) All of these.
- (vii) The Bluetooth technology operates in the ISM band at _____
(a) 2.4 to 2.485 GHz (b) 1.4 to 2.485 GHz
(c) 2.4 to 2.485 MHz (d) None of the above
- (viii) Which of the following devices is used to measure the gases or liquid?
(a) Smoke Sensor (b) Pressure sensor
(c) Optical Sensor (d) Gas Sensor.
- (ix) Process of digitally signing software's on an IOT device is called
(a) Secure code (b) Code signing
(c) Digital signature (d) None of the above.

- (x) For EV charging, Level 2 using J1772 defines the following:
 (a) 240V, single phase, up to 40A (b) 240V, single phase, up to 80A
 (c) 420V, single phase. up to 80A (d) 240v, two phases, up to 80A

Fill in the blanks with the correct word

- (xi) The storage is _____ in IoT.
 (xii) _____ computing is the extension of cloud computing.
 (xiii) The bit length of the IPV6 is _____.
 (xiv) OSI stands for _____.
 (xv) _____ is a security mechanism used in WiFi.

Group - B

2. (a) Write the main four components that empower IoT. List the main function of each component. *[[CO1](Remember/LOCQ)]*
 (b) Elaborate IoT's promise and ultimate goal. *[[CO1, CO2] (Analyse/IOCQ)]*
 (c) List the top three challenges for IoT. Why are these challenges also considered as opportunities? *[[CO1, CO2](Evaluate/HOCQ)]*
4 + 4 + 4 = 12
3. (a) Design conceptual IoT system for a home automation using standard IoT design flow. Explain the steps. *[[CO2](Design/HOCQ)]*
 (b) How do you identify the requirement for a problem and convert it to technical specification? *[[CO2](Analyse/HOCQ)]*
 (c) Illustrate the need to comply to standards for IoT system. Name some applicable standards you know. *[[CO2](Apply/IOCQ)]*
4 + 4 + 4 = 12

Group - C

4. (a) Define sensor in IoT. List the top Sensor Characteristics and explain their uses in IoT. *[[CO4](Remember/LOCQ)]*
 (b) Why are actuators required in IoT networks? Highlight the key differences between sensors and actuators. *[[CO4] (Remember/LOCQ)]*
 (c) Describe how RFID works and list major component of RFID. *[[CO4](Evaluate/HOCQ)]*
(1 + 4) + (2 + 2) + 3 = 12
5. (a) What is IoT Reference Model? Draw the block diagram and explain the functions of the models. *[[CO3,CO5](Remember/LOCQ)]*
 (b) Highlight the main design principles of IoT. *[[CO3,CO5](Analyse/IOCQ)]*
(1 + 7) + 4 = 12

Group - D

6. (a) Define interoperability. Explain Technical, Syntactical and Semantic interoperability. [[CO5](Remember/LOCQ)]
(b) Mention and explain at least 5 security challenges faced in IoT networks. [[CO5](Remember/LOCQ)]]
6 + 6 = 12
7. (a) Explain the Identifiers, Keywords, Statements, Expressions, and Variables in Python programming language with examples. [[CO5](Evaluate/HOCQ)]
(b) Illustrate the different types of control flow statements available in Python with flowcharts. [[CO5](Evaluate/HOCQ)]
6 + 6 = 12

Group - E

8. (a) IoT evolution calls for protocol testing and characteristics of various aspects. Explain briefly the importance of (i) Linked-Data (ii) Scalability (iii) Performance and (iv) Extensibility. [[CO6](Understand/IOCQ)]
(b) Show how IoT can help immensely to make health sector smart. [[CO6](Evaluate/HOCQ)]
6 + 6 = 12
9. (a) Explain how IoT is overcoming challenges to convert things to smart ones. [[CO6](Analyse/IOCQ)]
(b) How can IoT make transport and mobility sector smart? [[CO6](Analys/IOCQ)]
6 + 6 = 12
-

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	34.37	31.25	34.37

