

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

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

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

**Group – A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**

- (i) 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.
- (ii) Which of the following layers provides end-to-end communication in IoT?
(a) Logical layer (b) Session layer
(c) Transport layer (d) Data link layer.
- (iii) 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.
- (iv) Which is not an IoT communication model?
(a) Request-Response (b) Push-Producer
(c) Publish-Subscribe (d) Exclusive Pair.
- (v) Which of the following touch sensors is used in a cell phone?
(a) Follow sensor (b) Resistive touch sensors
(c) Capacitive touch sensor (d) Human sensor.
- (vi) Which of the following layers provides end-to-end communication in IoT?
(a) Logical layer (b) Session layer
(c) Transport layer (d) Data link layer.
- (vii) Which one of the following is not an IoT device?
(a) Amazon echo voice controller (b) Google Home
(c) Nest Smoke Alarm (d) None of these.
- (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) M-BUS can address up to
(a) 79 slaves (b) 1000 slaves (c) 250 slaves (d) none of these.

- (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. |

Group- B

2. (a) The development of IoT is seeing the rapid convergence of information and operations technology- explain this statement. [(CO1)(Understand/IOCQ)]
(b) What are the factors which have helped M2M to upgrade to IoT? Describe them briefly. [(CO1)(Remember/LOCQ)]
(c) What are the elements of a typical M2M system? Explain with a block diagram. [(CO1, CO2)(Understand/IOCQ)]
4 + 4 + 4 = 12
3. (a) What are the various types of deployment challenges associated with the IoT system? Explain briefly. [(CO1, CO2)(Analyse/IOCQ)]
(b) Why collected data filtering and optimization of power consumption is necessary for IoT based sensors? [(CO1, CO4)(Evaluate/HOCQ)]
(c) What is the signification of IoT actuators? [(CO4)(Apply/IOCQ)]
5 + 5 + 2 = 12

Group - C

4. (a) IoT is a new revolution of the internet- explain this statement. What are the three enabling technologies for IoT? What is meant by contextual information? [(CO1, CO3)(Understand/LOCQ)]
(b) Describe the fundamental characteristics of IoT and explain each of them. What is energy harvesting? How can energy be harvested for IoT devices from RF? [(CO3)(Analyze/HOCQ)]
6 + 6 = 12
5. (a) What is the function of iCore architecture? Draw a block diagram. [(CO2)(Understand/LOCQ)]
(b) What are the functions of the Service Level and VO level? [(CO3)(Apply/IOCQ)]
(2 + 4) + 6 = 12

Group - D

6. (a) What are the differences between active churn, passive churn and expected churn? Where is this concept of churn used? [(CO1)(Apply/IOCQ)]
(b) Describe at least three IoT semantic interoperability challenges and their rationale. [(CO1, CO3)(Synthesize/HOCQ)]
6 + 6 = 12
7. (a) What is REST? What are the constraints of “RESTful” architecture? Explain them. [(CO2, CO5)(Analyze/IOCQ)]

- (b) What are the functions of “Registration” and “Authorization Server” in ZigBee SE 2.0?
 (CO5)(Remember/LOCQ)]
(2 + 4) + 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 solutions.
 [(CO5)(Apply/IOCQ)]
(3 + 3 + 3 + 3) = 12
9. (a) Electric Vehicle (EV) charging have to address a number of challenges. Mention three of them and explain the challenges and possible solutions.
 [(CO5, CO6)(Remember/LOCQ)]
- (b) What are the different charging modes prescribed by IEC? Explain modes 1 and 3.
 [(CO5, CO6)(Analyse/HOCQ)]
- (c) Explain how the pilot wire circuit as per IEC 61851 works. Explain with the help of a circuit diagram.
 [(CO6)(Analyse/HOCQ)]
3 + 4 + 5 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	26.04	46.87	27.08

Course Outcomes (CO):

1. Understand different protocols.
2. Analyze IoT architecture.
3. Design applications based on IoT.
4. Create sensor based applications.
5. Develop new applications.
6. Compare different IoT uses.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question

