# IoT FOR COMMUNICATION
# (ECEN 3232)

**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) A sensor becomes 'smart' if
(a) it can sense data (b) it can process data
(c) it can transmit relevant data (d) it can perform all three.

(ii) IoT has helped to converge
(a) OT and M2M (b) IT and Zigbee
(c) IT and OT (d) both (a) and (c).

(iii) Uber tracks the behaviour of the drivers using
(a) wireless camera (b) hidden microphone
(c) smartphones with sensors (d) none of these.

(iv) Wide bandwidth of a good sensor is desired because of the requirement of
(a) linearity over the full range (b) quick response in measurements
(c) low noise (d) more noise

(v) RFID tags provide
(a) Non-line-of-sight communication (b) simultaneous multiple reads
(c) durability (d) all three.

(vi) The IoT-A reference model consists of
(a) 4 other models (b) 5 other models
(c) 3 other models (d) 6 other models

(vii) In the I-core architecture, the sensors are represented by
(a) the CVO level (b) the service level
(c) the VO level (d) either (a) or (b).

(viii) In 'ModBus' addresses, the target devices can number between
(a) 0 and 247 (b) 1 and 247
(c) 1 and 127 (d) 0 and 127.

(ix) 802.15.4 standard is targeted for
(a) Zigbee and 6LowPAN (b) Bluetooth
(c) WiMAX (d) All of these.

(x) 6LowPAN is an adaptation layer for IPv6 when running over
(a) 802.15.4 networks
(b) 802.15.4 low power networks
(c) 802.15.4 lossy networks
(d) 802.15.4 low power and lossy networks.

## Group – B

2. (a) Which are the most important generic enabling components for success of IoT? Explain the importance of at least three.

(b) Show with help of a Venn diagram the classic concept of IoT. Why has it been modified? Show the Venn diagram for the new concept.

**(3 + 4) + 5 = 12**

3. (a) Why is a reference model so important for IoT? What are the models which constitute the reference model? Describe the functions of the information and the communication models.

(b) Draw the block diagram for I-core architecture. Explain the function of the CVO level.

**(2 + 2 + 3) + (4 + 1) = 12**

## Group – C

4. (a) Show with a block diagram how a generic M2M system provides need based solution. What are the system components? Explain briefly the functions.

(b) Compare the main features of M2M and IoT.

**(3 + 5) + 4 = 12**

5. (a) Define a sensor with respect to IoT applications. Explain the architecture of a smart sensor with a block diagram.

(b) Why is activator required in IoT applications? Describe and explain the operations of the 3 following types of sensors:
(i) temperature; (ii) pressure and (iii) flow.

**4 + (2 + 6) = 12**

## Group – D

6. (a) Many fieldbus technologies had to be developed for IoT automation. Name the two prominent fieldbus layers.
Why is 802.15.4 allocated the ISM band?

(b) What are the different device types used in 802.15.4?

Describe the workings of (i) PAN coordinator; (ii) Full function devices and (iii) Reduced function ones.

**4 + (2 + 6) = 12**

7. (a) What is MODBUS in IoT? What are the two transmission modes supported in MODBUS? Describe them.
Explain the MODBUS address types and their functions.

(b) Show with a suitable schematic diagram, message framing in ASCII mode. Indicate Master and Slave.

**(1 + 3 + 3) + 5 = 12**

## Group – E

8. (a) Why was 6LowPAN standard required for IoT? Give an overview of the 6LowPAN adaptation layers. What are the 4 main issues to be considered?

(b) 6LowPAN defines several headers. Describe any two of them.

**(2 + 6) + 4 = 12**

9. Why is EV charging standardization important?
What are the IEC standards related to EV charging?
IEC documents three cases for physical connection. Describe them.
Explain the 4 modes of EV charging.

**(1 + 2 + 4 + 5) = 12**

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| ECE | https://classroom.google.com/w/Mjk0OTk2MDk5Mzg1/tc/MzY0MzczODY2MDAw |