



## CBCS SCHEME

18EC741

### Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 IoT and Wireless Sensor Networks

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

#### Module-1

- 1 a. Define IoT. Write an equation representing actions and communication of data at various levels in IoT and explain. (05 Marks)
- b. Draw a neat diagram showing various blocks, and subsystems of an IoT framework suggested by IBM and explain in brief. (10 Marks)
- c. What is the significance of MQTT protocol in IoT? Explain the functionalities of MQTT Broker. (05 Marks)

#### OR

- 2 a. With a neat diagram, explain IoT reference model suggested by CISCO. (08 Marks)
- b. Explain the following functionalities of gateway at data adaption layer.
  - i) Transcoding
  - ii) Privacy
  - iii) Security
  - iv) Data enrichment and consolidation. (06 Marks)
- c. What is Constrained Application Protocol (COAP) in IoT? Briefly discuss features of COAP. (06 Marks)

#### Module-2

- 3 a. Write a neat diagram, showing how the four layers of TCP/IP suite generates data for the network and physical layer during internet communication. List various actions that occur during transmission of data. (08 Marks)
- b. Explain various classes of IP addresses with an example for each and also specify total number of bits required for Net ID and Host ID. (06 Marks)
- c. Briefly explain different types of cloud deployment models with suitable examples. (06 Marks)

#### OR

- 4 a. Draw a neat diagram showing various fields of IPv4 header and explain them in detail. (08 Marks)
- b. Draw an DODAG data flow graph for RPL network assuming routing nodes at Four ranks (levels) 0, 1, 2 and 3 consisting of 3, 6, 3 and 6 nodes respectively. Also list the characteristics of DODAG. (Destination oriented directed Acyclic Graph). (06 Marks)
- c. What are various cloud service models explain each of them with examples. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

**Module-3**

- 5 a. Explain how to program an embedded devices on Arduino platform using IDE? (05 Marks)  
 b. Write a program for Arduino controlled traffic lights at a road junction with three traffic lights RED, YELLOW and GREEN to be controlled on each side of the four sides North, East, West and South clock wise path ways. (10 Marks)  
 c. Explain how data is read from sensors and devices using :  
 i) ADC analog input  
 ii) The timers  
 iii) Operating system  
 iv) Software serial library  
 v) The libraries. (05 Marks)

OR

- 6 a. List out the vulnerabilities identified by Open Web Application Security Project (OWASP) for IoT Applications/Services. (05 Marks)  
 b. What are the five functional components required to secure an IoT architecture. Explain then in brief. (05 Marks)  
 c. Explain layered attacker model with possible attacks and suggest the solutions for mitigating the attacks on the layers. (10 Marks)

**Module-4**

- 7 a. Describe the characteristics of wireless sensor networks. (08 Marks)  
 b. What are sensor networks? With a neat diagram explain various hardware components of sensor node. (06 Marks)  
 c. Write a neat diagram showing the structure of transceiver and also explain various operational states of transceiver. (06 Marks)

OR

- 8 a. Explain following programming paradigms.  
 i) Concurrent programming  
 ii) Process based programming  
 iii) Event based programming. (06 Marks)  
 b. What are the three types of mobility in wireless sensor networks? Explain. (06 Marks)  
 c. Explain various optimization goals and figure of merits in WSN's. (08 Marks)

**Module-5**

- 9 a. Explain low duty cycle and wakeup concepts in WSN's. (06 Marks)  
 b. With a neat diagram, explain working principle of CSMA protocol. (08 Marks)  
 c. Explain basic working principle of S – MAC protocol. (06 Marks)

OR

- 10 a. What are the factors that influences the design of physical layer in WSN's? (04 Marks)  
 b. Explain in detail working principle of LEACH Routing protocol in WSN. (08 Marks)  
 c. Write short notes on :  
 i) Energy Efficient Routing  
 ii) Geographical Routing. (08 Marks)

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