B.Tech. DEGREE EXAMINATION, NOVEMBER 2023
Fourth Semester

18ECE231J – IOT SYSTEM DESIGN
(For the candidates admitted from the academic year 2020-2021 to 2021-2022)

Note:
(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40ᵗʰ minute.
(ii) **Part - B & Part - C** should be answered in answer booklet.

Time: 3 hours

Max. Marks: 100

PART – A (20 × 1 = 20 Marks)
Answer ALL Questions

	Marks	BL	CO	PO
1. A passive infrared ray sensor is used for	1	1	1	1

1. A passive infrared ray sensor is used for
   - (A) Humidity Detection
   - (B) Obstacle Detection
   - (C) Tilt Detection
   - (D) Smoke Detection

   (Marks 1, BL 1, CO 1, PO 1)

2. A relay switch is an example of
   - (A) A sensor
   - (B) An actuator
   - (C) A controller
   - (D) A transducer

   (Marks 1, BL 1, CO 1, PO 1)

3. Which of the following functions as the network bridge in IEEE 802.15.4 Network?
   - (A) PAN Coordinator
   - (B) Router
   - (C) End Device
   - (D) Device

   (Marks 1, BL 2, CO 1, PO 1)

4. Which part of the smart objects consumes more Power?
   - (A) Microcontroller in Active Mode
   - (B) Microcontroller in Sleep Mode
   - (C) Radio Transmit Mode
   - (D) Radio Receive Mode

   (Marks 1, BL 2, CO 1, PO 1)

5. In IEEE 802.15.11 the expected bitrate for channel II and above is
   - (A) 20KBPS
   - (B) 64KBPS
   - (C) 100KBPS
   - (D) 250KBPS

   (Marks 1, BL 1, CO 2, PO 1)

6. _____ provides an address self – configuration mechanism.
   - (A) IP
   - (B) IPV4
   - (C) IPV6
   - (D) VOIP

   (Marks 1, BL 1, CO 2, PO 1)

7. Which of the following layer is to do end to end acknowledgements and to filter out duplicate packets?
   - (A) Physical
   - (B) Mediam Access Control
   - (C) Application Framework
   - (D) Application Support

   (Marks 1, BL 2, CO 2, PO 1)

8. Which of the following scheme requires that each station first listen to the medium before sending?
   - (A) TDMA
   - (B) CDMA
   - (C) CSMA
   - (D) FDMA

   (Marks 1, BL 1, CO 2, PO 1)

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9. Functions of Smart Grid Networks include   1   1   3   3
   (A) Substation Monitoring
   (B) Substation Control and Home Energy Management
   (C) Home Energy Management
   (D) Substation Monitoring and Control, Smart Metering, Home Energy Management

10. Home are network uses _____ protocol in smart home applications   1   2   3   3
   (A) PLC, IEEE 802.15.4, IEEE 802.11
   (B) IEEE 802.11 only
   (C) IEEE 802.15.4 only
   (D) PLC only

11. The Range of Z - wave is   1   1   3   3
   (A) 30 – 100m
   (B) 300 – 1000m
   (C) <10m
   (D) 100 – 1000m

12. Which of the following protocol is designed especially for smart home & smart business domains?   1   2   3   3
   (A) RFID
   (B) Blue Tooth
   (C) Z – Wave
   (D) Zig Bee

13. In an routing protocol for lossy network, each node acts as a Router & becomes part of a mesh network. Routing is performed at the ____ layer.   1   2   4   1
   (A) Physical
   (B) Data Link
   (C) Internet Protocol
   (D) Medium Access Control

14. Which of the following layer provides end to end communication in IoT?   1   2   4   1
   (A) Logical Layer
   (B) Data Link Layer
   (C) Session Layer
   (D) Transport Layer

15. The Control in "SCADA" is _____   1   1   4   1
   (A) Online Control
   (B) Direct Control
   (C) Supervisory Control
   (D) Automatic Control

16. Gateway provides the connection between _____   1   2   4   1
   (A) Cloud & Controller
   (B) Network & Cloud
   (C) Network & Controller
   (D) Controller & Device

17. Which of the following data lacks a logical scheme for understanding and decoding the data?   1   2   5   4
   (A) Structured
   (B) Unstructured
   (C) BIG
   (D) CLOUD

18. At which layer, the Emphasis is on data reduction & converting network data flows into information   1   2   5   4
   (A) Physical Devices & Control
   (B) Connectivity
   (C) EDGE Computing
   (D) Application

19. Identify among the options below, which is general purpose computing model & runtime system for distributed data analytics?   1   2   5   4
    (A) HDFS   (B) Map Reduce
    (C) Oozie   (D) Heron

20. Big data analysis does the following except   1   1   5   4
    (A) Spreads Data   (B) Analyze Data
    (C) Organizes Data   (D) Collect Data

PART – B (5 × 4 = 20 Marks)
Answer ANY FIVE Questions

	Marks	BL	CO	PO
21. Describe any types of actuators for IoT applications.	4	1	1	1
22. Discuss the features for IPV6 for smart objects in IoT.	4	2	2	1
23. Explain the Non – IP smart object technologies.	4	3	3	1
24. Illustrate M2M – IoT standardized Architecture.	4	1	4	1
25. Explain the need for optimization of IP in IoT.	4	3	5	1
26. Discuss the structured and unstructured data.	4	3	5	1
27. Write the significance of Big data analytics in IoT.	4	3	5	4

PART – C (5 × 12 = 60 Marks)
Answer ALL Questions

	Marks	BL	CO	PO

28. a. Explain the following IoT access technologies in details.
   i. IEEE 802.15.4g
   ii. IEEE 802.15.4e
	12	3	1	1

(OR)

	Marks	BL	CO	PO
b. i. Describe the characteristics of IoT.	6	3	1	1
ii. Explain the need for energy management of nodes in IoT application.	6	3	1	1
29. a. Illustrate and explain the blocks of routing for low power lossy networks in detail.	12	3	2	1

(OR)

	Marks	BL	CO	PO
b. With neat sketch, explain the principle of operation of lightweight IP stack for IoT communication.	12	3	2	1
30. a. Describe the implementation of IoT technology into distributed energy systems to optimize the efficiency of energy infrastructure and reduce wastage in the renewable energy systems.	12	4	3	3

(OR)

	Marks	BL	CO	PO
b. Determine IoT levels for designing home automation system including smart lightening & intrusion detection.	12	4	3	3

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31. a. Illustrate and explain the IoT application transport protocols in detail.   12   3   4   3

(OR)

  b. Explain in detail about the layers of IoT architecture with neat diagram.   12   3   4   1

32. a. Describe the Lambda Architecture for Big Data Analytics.   12   3   5   1

(OR)

  b. Illustrate and explain the Hadoop Eco System for Big Data Analytics IoT Technology.   12   3   5   1

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