Introduction to Internet of Things (ETC143)

Unit1

1. Define IOT. List out the characteristics and explain each of them in brief.

2. Unique identity and self-configuration is required for IoT. Give reasons

3. Write in brief about any two IoT applications for smart home

4. Write in brief about any two IoT applications for Rural

5. Write in brief about any two IoT applications in health care

6. Write in brief about any two IoT applications in agriculture.

7. Write in brief about any two IoT applications for smart City

8. List the classification of networks based on type of connection. Differentiate between them with suitable diagrams and explanation.

9. List out the characteristics , advantages and disadvantages of most popularly used physical topology by end customers.

10. Star topology is the most popular topology. Justify.

11. Differentiate between star and Mesh physical topology.

12. List out the different Physical topologies and explain each of them with suitable diagrams.

13. List out the classification of networks based on reach of the network / area of coverage.

14. What is OSI reference model? List out the seven layers of OSI and explain their main functionalities in brief.

15. What is TCP/IP reference model? List out its four layers and explain their main functionalities in brief.

16. Explain the functionalities of network layer and transport layer in detail

17. Summarize the different layers of OSI w.r.t location, Data unit and functionality.

18. With a a suitable diagram explains the process followed for communication between sender and receiver who are not directly connected .

19. With suitable diagram explain the encapsulation and decapsulation process involved in transmission of information between source and destination.

20. With a suitable diagram explain in brief about the Sequence of Technological Developments that has led to the shaping of the modern- day IoT.

21. M2M is a subset of IoT. Justify the same

22. Write in brief about

   - ✔ M2M
   - ✔ IOP
   - ✔ IOE

- ✔ CPS
- ✔ Industry 4.0

23. **Web of Things** (WoT) paradigm enables access and control over IoT resources and applications. justify

24. With a suitable diagram explain the IoT planes, various enablers of IoT, and their complex interdependencies.

25. Differentiate between a router, switch and gateway.

26. With a suitable diagram explain the concept of scaling LANS to span the entire Globe.

27. With a suitable diagram explain the concept of scaling LANS to WAN.

28. Explain in brief about IoT gateway and IOT Proxy.

29. Explain in brief about the different IoT components.

Unit2

1. Differentiate between transducer, sensor, and actuator.

2. Differentiate between active and Passive sensors.

3. List out the Classification of sensors based on power requirement and explain them in brief.

4. List out the Classification of sensors based on sensor output and explain them in brief.

5. List out the Classification of sensors based on property being measured and explain them in brief.

6. Identify the category to which motion sensors belongs to w.r.t power requirements, Sensor output and the property to be measured and justify the same.

7. Identify the category to which Light sensors belongs to w.r.t power requirements, Sensor output and the property to be measured and justify the same.

8. Identify the category to which Gyroscope belongs to w.r.t power requirements, Sensor output and the property to be measured and justify the same.

9. With a suitable diagram explain the functional blocks of a Typical Sensor Node in IoT

10. List out and explain the three characteristics of the sensors which need to be considered for Selection of Sensors.

11. A sensor's accuracy does not depend upon its resolution. Justify the same with a suitable example.

12. The more the resolution of a sensor, the more accurate is the precision. Justify

13. List out the types of Sensor Deviations and explain them in brief.

14. Differentiate between offset error and drift.

15. Write in brief about the sensor deviation which is commonly observe in magnetic sensors.

16. Write in brief about the sensor deviation which is commonly observe in Analog sensors.

17. List out and explain the four types of Sensing commonly seen in IOT. Using suitable diagrams.

18. List out and explain the 5 parameters that ned to be considered while selecting a sensor.

19. List out the actuator types and explain any four in brief.

20. Discuss in detail about SMP and LAP

21. Identify the actuator type to which motors belong and explain the characteristics of this actuator type.

22. Explain the actuator type to which modern-day robotics belongs to as well as senor which respond to PH changes

23. Explain the actuator types which do not convert electrical signals to other forms of energy.

24. Explain in brief about the different characteristics of actuators which need to be considered during their selection with suitable Justification.

Unit 3

1. List and mention with examples the different data formats found in IoT network traffic streams.

2. Analyse the urgency of data processing, and explain how are IoT data classified?

3. Illustrate the pros and cons of on-site and off-site processing.

4. Differentiate between structured and unstructured data.

5. List the differences between collaborative processing and remote processing?

6. What are the critical factors to be considered during the design of IoT devices?

7. What are the typical data offload locations available in the context of IoT?

8. What are the various decision-making approaches chosen for offloading data in IoT?

9. What factors are to be considered while deciding on the data offload location?

10. Mention the various data generating sources and storage sources connected to the internet with suitable examples.

11. Explain event detection using a collaborative processing technology with example.

12. With a suitable example illustrate event detection using an off- site processing topology

13. With a suitable example illustrate event detection using an on- site processing topology using suitable example.

14. Describe importance of processing in IoT.

15. List the common data types in IoT applications.

16. Determine the importance of choosing the right processing topologies and associated considerations while designing IoT applications.

17. Determine the requirements that are associated with IoT-based processing of sensed and communicated data.

Unit 4

1. What is virtualization. Explain the advantages of of virtualization for End user and Service Provider--8

2. List out the different types of Virtualization and explain them in brief?—6

3. With a neat diagram and suitable explanation differentiate between different service models available in cloud platform. ---8

4. With a neat diagram and suitable explanation differentiate between different deployment models available in cloud platform.—8

5. What is SLA? Highlight its importance and briefly explain the different metrics that need to be considered for constructing an SLA—8

6. Elaborate on the different cloud simulation platforms with focus on their important features.--6

7. Write in brief about 1. Open stack 2. AWS--6

8. With a case study explain the concept of Sensors-as-a-Service--8

9. With a nest diagram explain the architecture of a sensor-cloud platform.--8

10. With an example, explain how software-as-a-service is different from platform-as-a-service? 6

11. Explain two use cases where drones can be used for agricultural IoT. 6

12. Design a scenario where we can use fog computing in agriculture.--6

13. How can agricultural IoT help in the efficient distribution of water in agricultural fields? --8

14. What are the roles of the various IoT components in an agri-chain?--6

15. Write in detail about the advantages of agricultural IoT?--6

16. With a suitable diagram explain the Components of an agricultural IoT.—8

17. With a suitable diagram explain the Use of IoT components in the agricultural chain.-8

18. With a suitable diagram explain the most suitable architecture for agriculture. --8

19. With a suitable diagram explain the Architecture for Smart irrigation management system--8

Unit 5

1. Explain the Architecture of Fog-FISVER in detail with a block diagram.

2. What is the major role of camera sensor in vehicular IoT system?

3. Mention the advantages of vehicular IoT?

4. Explain in detail about the components used in vehicular IoT.

5. Explain the Architecture of vehicular IoT system.

6. What are roadside units (RSUs)?

7. What is the role of cloud and fog computing in vehicular IoT?

8. What are the applications of IoT in transportation?

9. Explain the Architecture of healthcare IoT in detail according to each layer

10. What are the major Components used for healthcare IoT? Explain them in detail.

11. What is the difference between electrocardiogram (ECG) and electromyogram (EMG) sensors?

12. Why is Privacy and security is needed in healthcare IoT system?

13. What are different types of sensors used in healthcare IoT and mention their purposes?

14. What is a local processing unit (LPU)

15. Give the Advantages and risks associated with healthcare IoT systems.

16. What are the different hardware components used in AmbuSens system and mention the role?

17. Why is cloud computing important for a healthcare IoT system?

18. What is machine learning? what are its advantages?

19. What are the major challenges I that need to be handled while using Machine learning?

20. Differentiate between different types of Machine learning using suitable examples?