

## Subject: Physical computing and IoT programming

### Module 1: Introduction to microprocessors, microcontrollers, Embedded Systems

1. List the characteristics of microcontroller.
2. Describe the structure of system on chip (SoC) in detail.
3. List various SoC Products.
4. Differentiate between FPGA and GPU.
5. Differentiate between GPU and APU.
6. Explain compute units in detail.
7. Explain the ARM 8 architecture.
8. List the features of Raspberry Pi.
9. Describe the process of Raspberry Pi configuration.
10. List all Linux commands used for configuration of Raspberry Pi.
11. What is Node.js?
12. Describe various Raspberry Pi Interfaces.
13. Explain UART interface in detail.
14. What do you mean by GPIO?
15. Differentiate between I2c and SPI interfaces.
16. Discuss the cross compilation process in detail.
17. How to Implement Pulse Width modulation on Raspberry Pi?
18. Elaborate the SPI camera implementation process in Raspberry Pi.

### Module 2: IoT fundamentals, M2M to IoT

1. What is M2M communication?
2. List the key application areas of M2M communication.
3. What are the various trends in information and communication technologies?
4. List various market places for IOT.
5. Describe global value chain in detail.
6. Explain M2M value chains.
7. Explain IoT value chains.
8. What are the parameters considered in building M2M to IoT architecture?
9. What are the various communication devices?
10. Explain communication gateways.
11. Describe local and wide area networks.
12. Differentiate between local and wide area network.
13. Discuss the methods of data management.
14. Explain M2M to IoT analytics.
15. Discuss the knowledge management in M2mM to IoT technology.
16. Describe IoT reference model.
17. Explain IoT Information model.
18. Explain IoT communication model.
19. Describe how the safety, privacy and security is ensured while modelling IoT.

### Module 3: IoT Protocols, security and interoperability

1. What is IoT?
2. List any 5 examples of IoT.
3. Describe IoT UPnp protocol.

4. Explain CoAP protocol.
5. Discuss MQTT protocol.
6. Elaborate XMPP protocol.
7. Explain various IoT services as a platform.
8. Explain the risks of IoT technology.
9. What are the various modes of attack for IoT?
10. Explain tools available for IoT security and interoperability.