

(OR)

- b) Describe the actions at different levels in the CISCO IoT reference model. Why is it not possible for a single reference architecture to provide a blueprint for all suggested IoT implementations? 13 K2 CO1
12. a) Differentiate between the IoT protocol architecture and the traditional Internet Protocol Stack. Describe the MQTT protocol and illustrate its role and practical use cases in IoT applications. 13 K2 CO2

(OR)

- b) Explain the CoAP protocol and compare it with MQTT in the context of IoT communication. Discuss how the Internet Protocol (IP) is adapted for constrained IoT devices and networks, with reference to 6LoWPAN. 13 K2 CO2
13. a) Describe the method of building IOT using Raspberry Pi. What are the physical devices and endpoints used in it? 13 K1 CO3

(OR)

- b) Illustrate and explain the structure of a Raspberry Pi board with the help of a labeled diagram. Define System on Chip (SoC) in the context of IoT and outline its major building blocks. 13 K1 CO3
14. a) Explain how to handle the massive volumes of data generated by IoT devices? How do message queues and event-driven architectures support IoT analytics? 13 K2 CO4

(OR)

- b) List and explain the tools commonly used for IoT data visualization. Discuss the advantages and challenges of utilizing cloud platforms for IoT data analytics. 13 K2 CO4
15. a) Describe the role of MQTT and RESTful APIs in IoT communication. What scalability and interoperability challenges are encountered when expanding IoT systems to large-scale environments? 13 K3 CO5

(OR)

- b) Explain how IoT technologies are applied in environmental monitoring systems, particularly for air pollution and forest fire detection. Describe the major components involved and how these components are integrated within the IoT architecture. 13 K3 CO5

PART – C

(1 x 15 = 15 Marks)

| Q.No. | Questions | Marks | KL | CO |
|--------|--|-------|----|-----|
| 16. a) | Draw and explain the architectural framework of an IoT-based smart car application enabling autonomous routing and traffic management. What hardware components are needed, and which IoT communication protocols support its operation? | 15 | K1 | CO3 |
| | (OR) | | | |
| b) | Develop an IoT-enabled Smart City concept targeting a specific urban issue such as traffic, waste management, or safety monitoring. Explain the shortcomings of current approaches, describe the IoT technologies and integration strategies to be used, and evaluate the expected benefits along with associated challenges related to data security, privacy, and system interoperability. | 15 | K4 | CO5 |