



## GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY

Faculty of Engineering

Department of Electrical, Electronic and Telecommunication Engineering

BSc Engineering Degree

Semester 8 Examination – 2024 November/December

Intake 38 – ET

### INTERNET OF THINGS (ET4242)

Time allowed: 2 hours

29<sup>th</sup> November 2024

#### ADDITIONAL MATERIAL PROVIDED

Nil

#### INSTRUCTIONS TO CANDIDATES

This paper contains 4 questions on 4 pages

Answer **ALL** questions.

This is a closed book examination

This examination accounts for 40% of the module assessment. The marks allocated for each question and its parts are indicated in square brackets, totaling 100% for this paper.

If you have any doubt as to the interpretation of the wordings of a question, make your own decision, but clearly state it on the script

Assume reasonable values for any data not given in or provided with the question paper, clearly make such assumptions made in the script

All examinations are conducted under the rules and regulations of the KDU

#### DETAILS OF ASSESSMENT

Learning Outcome (LO)	Questions that assess LO	Marks allocated (Total 40%)
LO1	Q1	10
LO2	Q2, Q3	10
LO3	Q2, Q3	7
LO4	Q4	8
LO5	Q3, Q4	5

2 75 x 10  
140 300  
28 30  
30

### Question 01

- a. Define IoT and describe its significance in modern technology. [6 marks]
- b. List and explain the four primary layers of the IoT Software Stack. [8 marks]
- c. Explain the role of IPv6 in IoT communication. [5 marks]
- d. Compare Zigbee and WiFi in terms of their applications, power consumption, and range. [6 marks]

### Question 02

- a. Describe three major benefits of Cloud services in IoT. Provide examples of three IoT cloud platforms. [8 marks]
- b. List and briefly describe four features of Python that make it suitable for IoT implementation. [4 marks]
- c. Explain with a diagram how a Raspberry Pi can interface with sensors and actuators for IoT applications. [7 marks]
- d. Discuss the differences between Bluetooth and GSM protocols in terms of their use in IoT systems. Provide examples of suitable applications for each. [6 marks]

### Question 3

- a. Explain the statement "IoT and Big Data are related and contribute to the evolution of each other" with real world an example. [4 Marks]
- b. Explain the function of the link layer with examples used in IoT networks. [5 Marks]
- c. In LoRaWAN protocol, an upper limit is set for the number of uplink packets sent by the end device. Explain the reason for the upper limit. [5 Marks]
- d. Explain the logical design principles of an IoT network. [5 Marks]
- e. Compare LoRa technology and Zigbee based on the cost, complexity, and communication distance. [6 Marks]

#### **Question 4**

Consider a heritage site that consists of ancient buildings. The government decides to open up the site for the public to uplift tourism. You are given a task to implement a system that monitors the ancient buildings' structure for the visitors' safety; also another efficient system that attracts many tourists to the site using IoT.

By analyzing the situation, it is required to identify where to place the sensors, how to do data processing, and how the system can be optimized. Select suitable protocols/ technologies with justification.

Note: An illustration of the system is mandatory.

[25 marks]

**- End of the Question Paper -**