



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2021/2022**

COURSE NAME : NETWORK AND COMMUNICATION
IN IOT

COURSE CODE : MET10403

PROGRAMME CODE : MET

EXAMINATION DATE : JANUARY / FEBRUARY 2022

DURATION : 3 HOURS

INSTRUCTION :
1. ANSWER ALL QUESTIONS
2. THIS FINAL EXAMINATION IS
AN **ONLINE** ASSESSMENT AND
CONDUCTED VIA **OPEN BOOK**

THIS QUESTION PAPER CONSIST OF **FOUR (4)** PAGES



- Q1** Evaluate the following the following wireless technologies based on the advantages and choose its best IoT applications.
- (a) Low power wide area network (LPWAN) (5 marks)
 - (b) Cellular system (4G and 5G) (5 marks)
 - (c) Bluetooth and Bluetooth low energy (5 marks)
 - (d) Wifi (5 marks)
 - (e) Radio Frequency Identification (RFID) (5 marks)
- Q2**
- (a)
 - (i) What is Zigbee Technology? (3 marks)
 - (ii) Differentiate between Zigbee and Bluetooth technology? (4 marks)
 - (iii) State **THREE (3)** applications of Zigbee technology? (3 marks)
 - (iv) Evaluate the operating frequency band of Zigbee (4 marks)
 - (b) Discuss Zigbee operating modes and based on the advantages, propose its best topologies. (11 marks)
- Q3**
- (a)
 - (i) Describe the characteristics of Wireless Sensor Networks? (5 marks)
 - (ii) Discuss the design challenges in sensor network? (5 marks)
 - (iii) State **FOUR (4)** most significant limitations of the smart objects in WSNs. (4 marks)
 - (b) Design a RFID based School Attendance System by providing the block diagram of the related electronic devices involve and explain the circuit works. (11 marks)



- Q4**
- (a) While an IoT-enabled future paints an impressive picture, it does not come without significant challenges. Many parts of IoT have become reality, but certain obstacles need to be overcome for IoT to become ubiquitous throughout industry and our everyday life.
- (i) Choose five of the most significant challenges and problems that IoT is currently facing. (5 marks)
 - (ii) Briefly explain each challenge stated in **Q4(a)(i)**. (10 marks)
- (b) Consider the block cipher in **Figure Q4(b)**. Suppose that each block cipher T_i simply reverses the order of the eight input bits (so that, for example, 11110000 becomes 00001111). Further suppose that the 64-bit scrambler does not modify any bits (so that the output value of the m th bit is equal to the input value of the m th bit).
- (i) With $n = 3$ and the original 64-bit input equal to 10100000 repeated eight times, what is the value of the output? (2 marks)
 - (ii) Repeat part (i) but now change the last bit of the original 64-bit input from a 0 to a 1. (4 marks)
 - (iii) Repeat parts (i) and (ii) but now suppose that the 64-bit scrambler inverses the order of the 64 bits. (4 marks)

- END OF QUESTIONS -

Faint, illegible text or markings at the bottom of the page.

FINAL EXAMINATION

SEMESTER/SESSION : SEMESTER II 2021/2022
COURSE NAME : NETWORK AND COMMUNICATION

PROGRAMME CODE : MET
COURSE CODE : MET10403

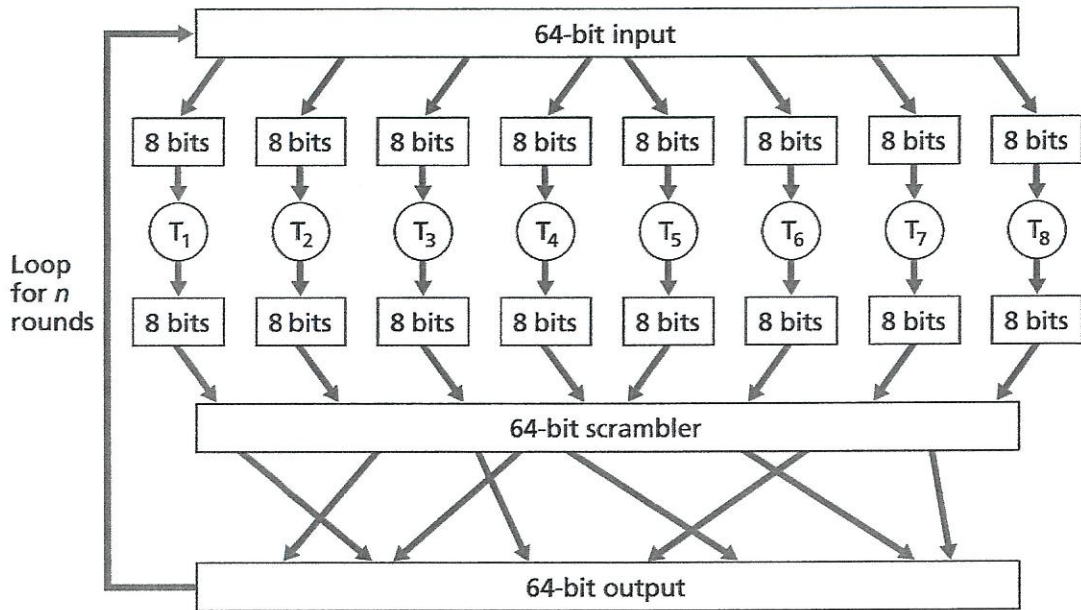


Figure Q4(b): Block Cipher