National University of Computer and Emerging Sciences, Lahore Campus

Introduction to Internet of Things (Code: IO4041)

Quiz 1 [BCS-2B] Spring 2022

Date: March 17, 2022 **Weighatge: 2.5%** **Marks: 15** **Duration: 25 Minutes**

Name: ---------- **Roll # ----------** **Section: ----------**

Question 1: Multiple choice questions / fill in the blanks / True or False: [5 Marks]

i. An IoT is a network of Internet-connected objects which are able to ----------.
A. collect data B. exchange data C. hide data D. collect and exchange data

ii. Multi-level wildcards "#" must appear ---------- of the string.
A. at the start B. at the end C. middle D. none of these

iii. In publish subscribe model, brokers accept data from publishers and send it to the appropriate subscribers.

iv. With respect to Internet protocol stack (TCP/IP), ---------- layer is responsible for data transfer between neighboring network elements.
A. application B. data link C. network D. transport

v. In MQTT, TCP is used instead of UDP.
A. True B. False

Question 2: Provide the precise answers to the following questions: [3+2+5 = **10 Marks**]

I. Write the names of any three major enablers of Internet of Things.

II. Describe the roles of setup and loop functions with respect to structure of a Sketch in Arduino.

III. Suppose packet length (i.e., remaining length) field of MQTT packet indicates that there are 10000 bytes in variable header and payload part. You are required to answer the following keeping in view the encoding algorithm. X represents the length i.e., X = 10000.
a) How many bytes are required for packet length field including extension bytes?
b) For each byte of the packet length, write down the encoded binary data.

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Note: Start writing your answer to Question 2 from here onward. You can make use of back side of this sheet of required.

Question 2: Answers

I. Miniaturization, portability, low power and low heat, connectivity, convergence, ecosystem, ….

II. **Setup function** is called when a sketch starts. It is used to initialize the variables, pin modes etc. It will only run once, after each power up or reset of the Arduino board. **Loop function** loops consecutively allowing the program to change and respond. It is used to actively control the Arduino board.

III. (a) 2 bytes are required, (b) First byte: 10010000, second byte: 01001110