

National University of Computer and Emerging Sciences, Lahore Campus

Introduction to Internet of Things (Code: IO4041)

Quiz 2 [BSCS-8A] Spring 2022

Date: April 12, 2022 **Weightage:** 2.5% **Marks:** 15 **Duration:** 30 Minutes

Name: -----

Roll # -----

Question 1: Encircle the correct option. Cutting/overwriting is not allowed: [5 Marks]

- i. Which of the following follows request response model?
A. CoAP B. MQTT C. HTTP **D. both CoAP and HTTP**
- ii. A TCP sender ----- its ----- if there is ----- perceived congestion on the path between itself and the destination.
A. reduces, send rate, little B. reduces, receive rate, less
C. increases, send rate, little D. increases, send rate, more
- iii. In TCP segment, head len field represents the size of the header in ----- bit words.
A. 64 **B. 32** C. 4 D. none of these
- iv. CoAP header is followed by ----- which may be of ----- bytes.
A. TKL, 8 **B. token, 0 to 8** C. token, 8 D. TKL, 0 to 8
- v. ----- is the correct combination of true and false for following statements (i) due to strict requirement in terms of high-throughput performance in many smart object networks, mechanisms in TCP such as sliding window algorithm and delayed ACK are not needed., (ii) UDP is well suited to traffic with low reliability demands.
A. true, true B. true, false C. false, false **D. false, true**

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

- I. UDP is termed as best effort delivery service. Elaborate this statement. [2 Marks]

Answer:

Since the underlying IP network does its best to deliver the datagram,

but does not guarantee delivery of the datagrams at the destination [may loss] and

does not guarantee that the datagrams are delivered in the same order as they were

sent [can be delivered out of order].

- II. CoAP defines confirmable and non-confirmable messages. What is the major difference between them? [2 Marks]

Answer:

CoAP defines confirmable messages and non-confirmable messages in order to define its own reliability mechanism. The former requires an ACK while the latter does not require any kind of ACK.

- III. Receive window (rwnd) is a variable maintained by receiver with respect to TCP flow control mechanism. Upon receipt of a certain TCP segment, receiver responds by setting rwnd value as 0 and the ACK goes back to source who has still some data to send and a kind of deadlock occurs. Describe the solution provided in TCP specification in order to get out of this deadlock situation. [3 Marks]

Answer:

TCP specification requires sender to send segment with one data byte when rwnd is 0. Such segments will be ACKed by receiver and new ACKs will eventually contain non-zero rwnd values.

- IV. Reliable Multi-Segment Transport Protocol is designed as a filter that could be attached to the directed diffusion protocol. Explain the basic working of directed diffusion protocol. [3 Marks]

Answer:

In directed diffusion protocol, a query is flooded in the network by the sink where multiple routes are established between the sink and source. The sink reinforces one of the paths and receives data in a shorter interval through this reinforced path. Therefore, packets of a flow follow the same path unless there is a node failure