

National University of Computer and Emerging Sciences, Lahore Campus

Introduction to Internet of Things (Code: IO4041)

Quiz 3 [BSCS-8B] Spring 2022

Date: May12, 2022 **Weightage:** 2.5% **Marks:** 10 **Duration:** 20 Minutes

Name: -----

Roll # -----

Question 1: Write down the names of three headers which are supported by 6LoWPAN adoption currently. **[3* 0.5 = 1.5 Marks]**

Question 2: Suppose an IPv6 datagram is exactly 442 bytes wide which consists of IPv6 base header, an unfragmentable 30-byte hop-by-hop option header and 24 byte fragmentable routing option header. Suppose we need to send this over a link with an MTU of only 142 bytes and this is possible only by performing fragmentation. Unfragmentable part in each fragment is followed by an 8-byte fragment header. Keeping in view this scenario, answer the following questions by showing necessary calculations in support of your answers: **[4+2.5+2 = 8.5 Marks]**

- I. How many fragments will be needed? Show necessary calculations in support of your answer:
- II. how many bytes of data including upper layer header are present in this original IPv6 datagram?
- III. How many bytes of data will be carried by the first and last fragment?

Question 1 Answer:

- I. A mesh addressing header,
- II. The fragment header, and
- III. The IPv6 header compression header

Question 2: Answer:

- I. 6 fragments

Calculations:

original datagram size= 442bytes

Unfragmentable part to be present in each fragment: IPv6 base header + hop-by-hop options header = 40 + 30 = 70 bytes

Fragmentable part in datagram (data+ fragmentable option header): 442 – 70 = 372 bytes

Fragment header in each fragment = 8 bytes

Thus, each fragment will have 78 necessary bytes and only 64 bytes are left for carrying fragmentable data of 372 bytes.

So, we need $372/64 = 6$ segments

II. Calculations: total datagram size = 442 bytes

Size of headers = base header of 40 bytes + 1 option header of 30 bytes + 1 option header of 24 bytes = $40 + 30 + 24 = 94$ bytes

So, data bytes in this datagram = $442 - 94 = 348$ bytes

III. 40 bytes, 52 bytes