**Report for LAB 3-2: TCP**

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| **Part I** | |
| 1 | Socket addresses:  Source :- (13.33.171.22, 443)  Destination :- (192.168.29.176, 32860) |
| 2 | Set flags: SYN, ACK |
| 3 | Sequence number and acknowledgement number: 0, 1 |
| 4 | Window size: 65535 |

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| **Part II** | |
| 1 | Set flag in HTTP GET message: Push (PSH), Acknowledgement (ACK) |
| 2 | Number of bytes transmitted by the HTTP GET message: 301 |
| 3 | Acknowledgement frequency: 3  Corresponding rule: |
| 4 | Number of bytes transmitted by each packet: 301  Relation to sequence and acknowledgement Number: |
| 5 | Original window sizes: 501  Are these numbers expected? Yes  How window sizes change? No |
| 6 | How the window size is used in flow control?   * Flow control is accomplished by the receiver sending back a window to the sender. * The size of this window, called the receive window, tells the sender how much data to send. Often, when the client is saturated, it might not be able to send back a receive window to the sender to signal it to slow down transmission. * However, the sliding windows protocol is designed to let the sender know, before reaching a meltdown, to start slowing down transmission by a steadily decreasing window size. * At the same time these flow control windows are going back and forth, the speed at which ACKs come back from the receiver to the sender provides additional information to the sender that caps the amount of data to send to the client. |
| 7 | Purpose of the HTTP OK message:   * The request has succeeded. The information returned with the response is dependent on the method used in the request, for example: GET an entity corresponding to the requested resource is sent in the response. |

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| **Part III** | |
| 1 | Number of TCP segments exchanged for connection termination: 4 |
| 1 | Which end point started the connection termination phase? The Client |
| 2 | Flags sets in each of the segments used for connection termination:  Flags Sets at Destination: FIN, ACK  Flag Sets at Source: ACK, |

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| **Part IV** | | |
| 1 | a. Source port number: 42720 | b. Destination port number: 443 |
| c. Sequence number: 0 | d. Acknowledgement number: 0 |
| e. Header length: 40 | f. Set flags: SYN |
| g. Window size: 64800 | h. Urgent pointer: 0 |
| 2 | Are answer in the question number 1 verified by the information in the detail pane lane? - Yes | |
| 3 | Does any of the TCP packet headers carry options? - Yes  Explain:  SACK Permitted (SACK\_PERM)  Window Scale (WS)  Maximum Segment Size (MSS) | |
| 4 | Size of a TCP packet with no option: 86  Size of a TCP packet with options: 94 | |
| 5 | Is window size in any of the TCP packet zero? Yes  Explain:   * When a client (or server) advertises a zero value for its window size, this indicates that the TCP receive buffer is full and it cannot receive any more data. * It may have a stuck processor or be busy with some other tasks, which can cause the TCP receive buffer to fill. * Zero Windows can also be caused by a problem within the application, where the TCP buffer is not being retrieved. | |

**Screenshots:**







