Part I

1. Is your browser running HTTP version 1.0 or 1.1? What version of HTTP is the server running?
    a. HTTP 1.1
2. What languages (if any) does your browser indicate that it can accept to the server?
    a. en-US, en
3. What is the IP address of your computer? Of the gaia.cs.umass.edu server?
    a. IP of our computer: 172.17.184.103
    b. IP of gaia.cs.umass.edu server: 128.119.245.12
4. What is the status code returned from the server to your browser? (ignore the favicon.ico request)
    a. 200 OK
5. When was the HTML file that you are retrieving last modified at the server?
    a. Last Modified: Tue, 24 Nov 2020 06:59:02 GMT
6. How many bytes of content are being returned to your browser?
    a. Content Length: 128 bytes (for the HTML file returned)
7. By inspecting the raw data in the packet content window, do you see any headers within the data that are not displayed in the packet-listing window? If so, name one.
    a. There are no protocol headers within the data not displayed in the packet-listing window. The raw data for that response only shows the raw text/html file.

Part II

8. Inspect the contents of the **first HTTP GET** request from your browser to the server. Do you see an “IF-MODIFIED-SINCE” line in the HTTP GET?
    a. No
9. Inspect the contents of the server response. Did the server explicitly return the contents of the file? How can you tell?
    a. Yes, after the HTTP response header, there is the line-based text-data which is the contents of the response.
10. Now inspect the contents of the second HTTP GET request from your browser to the server. Do you see an “IF-MODIFIED-SINCE:” line in the HTTP GET? If so, what information follows the “IF-MODIFIED-SINCE:” header?
    a. Yes there is an “IF-MODIFIED-SINCE” field in the HTTP request header of the second HTTP request.
    b. An e-tag field named “IF-None-Match” follows the “IF-MODIFIED-SINCE” field in the HTTP request header. It’s presence makes the HTTP request conditional.
11. What is the HTTP status code and phrase returned from the server in response to this second HTTP GET? Did the server explicitly return the contents of the file? Explain.
    a. Status Code: 304 Not Modified

b. No, the server did not return the contents of this file because the contents of the file are already cached in the browser.

Part III

12. How many HTTP GET request messages did your browser send? Which packet number in the trace contains the GET message for the Bill or Rights?
    a. 2 HTTP GET requests (one for the favicon, the other for the actual html)
    b. The Bill of Rights is requested in packet 15.
13. Which packet number in the trace contains the status code and phrase associated with the response to the HTTP GET request?
    a. Packet #19
14. What is the status code and phrase in the response?
    a. Status code 200 with phrase OK.
15. How many data-containing TCP segments were needed to carry the single HTTP response and the text of the Bill of Rights?
    a. 2 TCP segments were needed to carry out the response for the Bill of Rights. (one of which consisted of a reassembled PDU).

Part IV

16. How many HTTP GET request messages did your browser send? To which Internet addresses were these GET requests sent?
    a. 3 HTTP GET request messages were sent
    b. The IP address the GET requests were sent to is 128.119.245.12
17. Can you tell whether your browser downloaded the two images serially, or whether they were downloaded from the two websites in parallel? Explain.
    a. They were downloaded serially. In our trace, you can see the block where /pearson.png is requested and downloaded happens first (packets 1-21). Then the request for the /~kurose/cover_5th_ed.jpg happens afterwards (packets 26-136) by setting up a different TCP connection. If they were downloaded in parallel, both GET requests would have been made before either requests received their response and closed connection.