CS 372 Introduction to Computer Networks
Self-Check Exercises: Lecture 10 **Solutions**

1) What transport-layer protocol does HTTP use? What port number is reserved for this?
HTTP utilizes TCP, at port 80

2) In the HTTP protocol, how is an object addressable?
By its Uniform Resource Locator (URL)

3) What *states* does HTTP preserve? HTTP is stateless. It does not preserve states.

4) If an HTTP server can send 14 objects over a single TCP connection, this is an example of __Persistent___ HTTP.

5) A client's browser sends an HTTP request to a website. The website responds with a handshake and sets up a TCP connection. The connection setup takes 2 sec, including the RTT. The browser then sends the request for the website's index file. The index file references 6 additional image, which are to be requested/downloaded by the client's browser. How many requests (including the initial request) must be sent by the browser…
   a. With non-persistent HTTP? Show the Requests. ___14___
      RQ #1: TCP Connection Request
      RQ #2: Website Index Request
      RQ #3: TCP Connection Request
      RQ #4: Image #1 Request
      …
      RQ #13: TCP Connection Request
      RQ #14: Image #6 Request
   b. With persistent HTTP? Show the Requests. ____8___
      RQ #1: TCP Connection Request
      RQ #2: Website Index Request
      RQ #3: Image #1 Request
      …
      RQ #8: Image #6 Request
   c. Assuming that all other conditions are equal, which type of HTTP takes longer to complete the entire transfer? Non-persisted HTTP takes longer
   d. How much longer?
      (14 req – 8 req) * 2 sec/req = 12 seconds. It takes 12 seconds longer

6) Why does the HTTP request message require an extra \r\n at the end of the header section?
The HTTP header must be separated from the entity body