Part 1: (36 points - 3 points for each problem)

(C) 1. What does HTTP stand for?
   (A) Hyperlink and Text Transfer Protocol (B) Hyperlink and Text Transport Protocol
   (C) Hypertext Transfer Protocol (D) Hypertext Transport Protocol

(D) 2. Which statement is false?
   (A) TCP/IP is a protocol widely used for computer network connections.
   (B) An IPv4 address is a 32-bit number and written as four 8-bit numbers, separated by periods.
   (C) The Domain Name System (DNS) is used to convert an IP address to a domain name.
   (D) None of above

(D) 3. The default port for the HTTP server is: (A) 22 (B) 23 (C) 25 (D) 80

(A) 4. Which is not a Web server? (A) Mozilla Firefox (B) Apache Tomcat (C) IIS (D) None of above

(C) 5. If we want some text to appear in a monospace font, which HTML tag will be used?
   (A) <ms> (B) <sp> (C) <tt> (D) None of above

(B) 6. Which HTML tag can be used to specify a menu?
   (A) <menu> (B) <select> (C) <choice> (D) None of above

(A) 7. In Apache Tomcat, which file is the standard deployment descriptor?
   (A) web.xml (B) web.html (C) www.xml (D) www.html

(C) 8. Which directive in the httpd.conf file of an Apache server is used to define virtual document trees?
   (A) VirtualDocument (B) VirtualRoot (C) Alias (D) None of above

(B) 9. Which Java cookie method is used to give a cookie a specific lifetime?
   (A) setLifeTime (B) setMaxAge (C) setMaxTime (D) setExpiredTime

(D) 10. In Java, the keyword(s) that every typed method must have is:
   (A) void (B) static (C) public (D) return

(A) 11. Which keyword in Java can be used to declare a class that cannot be instantiated?
   (A) abstract (B) constant (C) final (D) static

(B) 12. Which SQL command is used to join one or more of the tables?
   (A) UPDATE (B) SELECT (C) JOIN (D) MODIFY

Part 2: (64 points)

1. (12 pts.) Briefly explain these terminologies. If they are acronyms, also write what they stand for.
   (a) **URL** A Uniform/Universal Resource Locator is used to identify the address of a document (resource) on the Internet.
   (b) **Proxy Server** A proxy server is a server that functions as a proxy and filter for the remote services.
   (c) **Servlet Container** A servlet container is a program that manages servlets.
   (d) **MIME** The Multi-purpose Internet Mail Extensions is an extension used to exchange different kinds of data files on the Internet: audio, video, images, application programs
2. (10 pts.) Describe the five most commonly used HTTP request methods.

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GET</td>
<td>Return the contents of the specified document</td>
</tr>
<tr>
<td>HEAD</td>
<td>Return the header information for the specified document</td>
</tr>
<tr>
<td>POST</td>
<td>Execute the specified document, using the enclosed data</td>
</tr>
<tr>
<td>PUT</td>
<td>Replace the specified document with the enclosed data</td>
</tr>
<tr>
<td>DELETE</td>
<td>Delete the specified document</td>
</tr>
</tbody>
</table>

3. (a) (6 pts.) Describe the three life-cycle methods called by the servlet engine.
   (b) (6 pts.) What is a session to a Web server? What is a cookie?

(a) • **init** initializes a servlet and prepares it to respond to client requests.
   • **service** controls how the servlet responds to client requests.
   • **destroy** takes the servlet out of service, making it unavailable for client request.

(b) i. A session to a Web server is the collection of all the requests made by a particular browser from the time the browser is started until the user exits the browser.
   ii. A cookie is an object that is sent the server to a connected browser, where it is stored.

4. (a) (4 pts.) What is an instance method in Java? What is a static method in Java?
   (b) (6 pts.) Consider the following Java code. Write the result after running it in the command line as follows:
   ```java
   java Hello Norah Jones Jay Leno Ray
   public class Hello {
   public static void message (int i, String args[]){
   String Hello = "Hello, ";
   Hello += args[i] + " " + (++i < args.length ? args[i] : "!"));
   System.out.println(Hello);
   }
   public static void main (String args[]){
   for (int i = 0; i < args.length; i++) message(i++, args);
   }
   }
   ```

(a) i. A instance method is a method which must be invoked via an instance of a class.
   ii. A static method is a method which can be invoked via the name of the class in which they are defined.

(b) Hello, Norah Jones
    Hello, Jay Leno
    Hello, Ray !
5. (6 pts.) Explain three-tier architecture of a Web site supported by databases.

![Diagrame](Browser) $\iff$ Web Server and Database Applications $\iff$ Database System

(a) The first tier has the Web browser, which provides the user interface.
(b) The middle tier has Web server and the applications that require database access.
(c) The third tier has the database system and the database itself.

6. (a) (6 pts.) Write an HTML document that is used to collect the information about a movie.
   
   i. This HTML document has a form with three text input widgets to collect the title, the director’s name, and the released year of a movie respectively.
   
   ii. The input data is sent to a servlet program that can be accessed at 
       \textit{http://kirk.cs.wichita.edu:6550/servlet/QueryMovie}.

   (b) (8 pts.) Complete the following JDBC servlet that has following functions:
   
   i. Collect the information of a movie from the three text input widgets specified in the above HTML document.
   
   ii. Insert the collected movie information into the \textit{Movie} table of the \textit{Movie} database in MySQL DBMS. The information about the \textit{Movie} database and the \textit{Movie} table is shown as follows:

   \begin{tabular}{|c|c|}
   \hline
   Field & Type \\
   \hline
   Title & varchar(20) \\
   Director & varchar(25) \\
   Release Year & integer \\
   \hline
   \end{tabular}

   iii. Display a list of the movies that have the same director as the movie that is just inserted into the database.

\begin{verbatim}
<html>
<head>
<title>A Movie Search Site</title>
</head>
<body>
<form action = "http://kirk.cs.wichita.edu:6550/servlet/QueryMovie" method = "POST">
<input type = "text" name = "title" size = "20"><br />
<input type = "text" name = "director" size = "20"><br />
<input type = "text" name = "released_year" size = "10"><br />
<input type = "submit" value = "Submit">
</form>
</body>
</html>
\end{verbatim}
import javax.servlet.*;
import javax.servlet.http.*;
import java.io.*;
import java.sql.*;

public class QueryMovie extends HttpServlet {
    public void doPost (HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException, ClassNotFoundException,
            IllegalAccessException, InstantiationException, SQLException {
        Class.forName("com.mysql.jdbc.Driver").newInstance();

        Connection conn = DriverManager.getConnection(
            "jdbc:mysql://kirk/Movie?user=movie&password=movie123");

        response.setContentType("text/html");
        PrintWriter out = response.getWriter();

        String title = request.getParameter("title");
        String director = request.getParameter("director");
        String released_year = request.getParameter("released_year");

        out.println("<html><head><title>Movie</title></head><body>");

        Statement stmt = conn.createStatement();
        String sql_cmd = "insert into Movie values ('" +
            title + ", ' + director + ", " + released_year + ");";

        int rows = stmt.executeUpdate(sql_cmd);

        sql_cmd = "select * from Movie where Director = '" + director + ");";

        ResultSet RS = stmt.executeQuery(sql_cmd);

        out.println("<table border>");
        out.println("<tr><th>Title</th><th>Director</th><th>Released Year</th></tr>");

        while (RS.next()) {
            out.println("<tr><td>" + RS.getString(1) + "</td>");
            out.println("<td>" + RS.getString(2) + "</td>");
            out.println("<td>" + RS.getFloat(3) + "</td></tr>";
        }

        out.println("</table>");
        out.println("</body></html>");
        out.close();

        RS.close();
        stmt.close();
        conn.close();
    }
}