

PART A: MULTIPLE CHOICES (30 MARKS)

1. Given:

```
public class Calculator {
    int num = 100;
    public void calc(int num) {
        this.num = num * 10;
    }

    public void printNum(){
        System.out.println(num);
    }
    public static void main(String[] args) {
        Calculator obj = new Calculator ();
        obj.calc(2);
        obj.printNum();
    }
}
```

What is the result?

- a. 20
- b. 100
- c. 1000
- d. 2

2. Given the following class

```
public abstract class Customer {
    private String name;
    public Customer (String name) {
        this.name = name;
    }
    public String getName() { return name; }
    public abstract void buy();
}
```

Which statement are **TRUE** about Customer class?

- a. The Customer class cannot be extended.
- b. The Customer class cannot be instantiated.
- c. Subclasses of Customer cannot override `getName()` method.
- d. Concrete subclasses of Customer must use a default constructor

3. What will be the output of the following Java code?

```
class A {
    public int i;
    private int j;
}
class B extends A {
    void display() {
```

```

    super.j = super.i + 1;
    System.out.println(super.i + " " + super.j); }
}
class inheritance {
    public static void main(String args[]) {
        B obj = new B();
        obj.i=1;
        obj.j=2;
        obj.display();
    }
}

```

- a. 2 2
- b. 3 3
- c. Runtime Error
- d. Compilation Error

4. What is Java EE component?

- a. Special icons for creating the user interface elements for thin clients.
- b. A data module saved to the component area of the database
- c. A self-contained functional software unit that is assembled into a Java EE application and interfaces with other application components
- d. A JAR file

5. "request" is instance of which one of the following classes?

- a. Request
- b. HttpRequest
- c. HttpServletRequest
- d. ServletRequest

6. Which of the following code is used to get an attribute in a HTTP Session object in servlets?

- a. session.getAttribute(String name)
- b. session.alterAttribute(String name)
- c. session.updateAttribute(String name)
- d. session.setAttribute(String name)

7. The following is the sequence of the life cycle of the servlets

1. init() 2. destroy() 3.service()

- a. 1,2,3
- b. 3,2,1
- c. 2,1,3
- d. 1,3,2

8. All the _____ data is kept at the application server _____ data is kept at the web server?

- a. HTML, Servlet.
- b. static, dynamic
- c. dynamic, static.
- d. Servlet, HTML.

9. Which is not a directive?

- a. include
- b. page
- c. export
- d. useBean

10. Servlet are used to program which component in a web application?

- a. client
- b. tomcat
- c. server
- d. applet

11. Which are the session tracking techniques?

- i. URL rewriting
- ii. Using session object
- iii. Using response object
- iv. Using hidden fields
- v. Using cookies
- vi. Using servlet object

- a. i, ii, iii, vi
- b. i, ii, iv, v
- c. i, vi, iii, v
- d. i, ii, iii, v

12. Which of the following is true?

- a. A bean cannot have any constructors with parameters
- b. A bean must be a private class
- c. A bean must have a public argument constructor
- d. All of the above.

13. Which one is the correct order of phases in JSP life cycle?

- a. Initialization, Cleanup, Compilation, Execution
- b. Initialization, Compilation, Cleanup, Execution
- c. Compilation, Initialization, Execution, Cleanup
- d. Cleanup, Compilation, Initialization, Execution

14. Java code is embedded under which tag in JSP?

- a. Declaration
- b. Scriptlet
- c. Expression
- d. Comment

15. Which one of the following is correct for directive in JSP?

- a. `<%@directive%>`
- b. `<%!directive%>`
- c. `<%directive%>`
- d. `<%=directive%>`

ANSWER FOR PART A (30 MARKS)

- 1. ☐ =B= =C= =D=
- 2. =A= ☐ =C= =D=
- 3. =A= =B= =C= ☐
- 4. =A= =B= ☐ =D=
- 5. =A= =B= ☐ =D=
- 6. ☐ =B= =C= =D=
- 7. =A= =B= =C= ☐
- 8. =A= =B= ☐ =D=
- 9. =A= =B= ☐ =D=
- 10. =A= =B= ☐ =D=
- 11. =A= ☐ =C= =D=
- 12. ☐ =B= =C= =D=
- 13. =A= ☐ =C= =D=
- 14. =A= ☐ =C= =D=
- 15. ☐ =B= =C= =D=

PART B (10 MARKS)

1. **What is Model-View-Controller(MVC).** briefly explain each of MVC THREE layers? (4 marks)

- a. Model layer: Model will handle data and logic of the systems. It is the layer or structure that represents the data, attributes and fields of classes contained in the applications. Usually consist of java object classes or business logic.
- b. View layer: View acts as the front end of the system and will be responsible to display interfaces to users as intended. In the view layer, it basically contains the user interface and display.
- c. Controller layer: Controller acts as the middle process between the View layer and Model layer. It processes user input from the view layer and communicates with the model layer or database if necessary.

2. Given a Staff Javabeen in the following code.

```
public class Staff {  
    private String name;  
    private double salary;  
    public void setName(String name){  
        this.name = name;  
    }  
    public void setSalary(double salary){  
        this.salary = salary;  
    }  
  
    public String getName(){return name;}  
    public String getSalary(){return salary;}  
}
```

a. Create an instance of the Staff class and associates it with the id attribute converter to be use in the entire JSP with page as the scope attribute. (2 marks)

```
<jsp:useBean id="staff" class="Staff" scope="page"/>
```

b. Assign the Staff properties using the JSP standard set method.

(2 marks)

```
<jsp:setProperty name="staff" property="name" value="Hariz Farhan"/>  
<jsp:setProperty name="staff" property="salary" value="500"/>
```

c. Retrieve the Staff converter properties using the JSP standard get method. (2 marks)

```
<jsp:getProperty name="staff" property="name"/>  
<jsp:getProperty name="staff" property="salary"/>
```

PART C. (10 MARKS)

The purpose of the following Web page in **Figure 1** is to calculate the Body Mass Index (BMI). The user enters name, height in meters and weight in kilograms. The BMI formula is given as: $BMI = \text{weight(kg)} / \text{height(m)}^2$

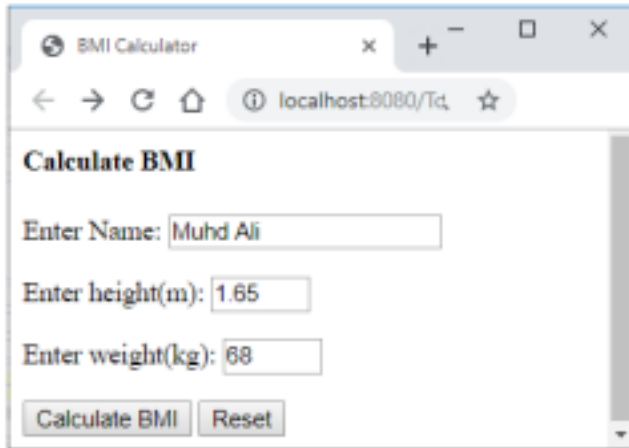


Figure 1

Refer to the table below to determine categories of healthy body weight based on BMI calculator.

BMI range	Category
< 18.5	Underweight
18.5 – 24.9	Normal
25.0 – 29.9	Overweight
> 30.0	Obese

Assume there is existing HTML page that prompts the user to enter height and weight of adult. Click the Calculate BMI button will invoke a JSP to compute BMI and display the category of healthy body weight.

Write the `BMICalculator.jsp` that fulfill the following requirement:

a. To handle the two predefined variables using the request parameter object.

```
<%  
    String name = request.getParameter("name");  
    String heightStr = request.getParameter("height");  
    String weightStr = request.getParameter("weight");  
%>
```

b. Calculate the BMI.

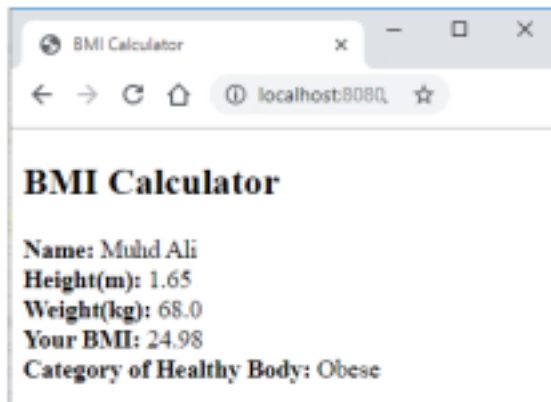
<%

```
double height = Double.parseDouble(heightStr);
double weight = Double.parseDouble(weightStr);
double bmi = weight / (height * height);
String category;
```

```
if (bmi < 18.5) {
    category = "Underweight";
} else if (bmi >= 18.5 && bmi < 24.9) {
    category = "Normal";
} else if (bmi >= 25.0 && bmi < 29.9) {
    category = "Overweight";
} else {
    category = "Obese";
}
```

%>

c. Display the result as following:



```
<h3>BMI Calculator</h3>
<p>Name: <%= name %></p>
<p>Height(m): <%= height %></p>
<p>Weight(kg): <%= weight %></p>
<p>Your BMI: <%= bmi %></p>
<p>Category of Health Body: <%= category %></p>
```