

## Sw Testing

Section Id :	64065349291
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	18
Number of Questions to be attempted :	18
Section Marks :	100
Display Number Panel :	Yes
Section Negative Marks :	0

Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653103480
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 32 Question Id : 640653698439 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DEGREE LEVEL : SOFTWARE TESTING (COMPUTER BASED EXAM)"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?  
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

(IF IT IS NOT THE CORRECT SUBJECT, PLS CHECK THE SECTION AT THE TOP FOR THE SUBJECTS REGISTERED BY YOU)

Options :

6406532332617.  YES

6406532332618.  NO

Sub-Section Number :	2
Sub-Section Id :	640653103481
Question Shuffling Allowed :	Yes
Is Section Default? :	null

**Question Number : 33 Question Id : 640653698440 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the following code segment.

```
long factorial(long n){
    long f = -1;
    if(n >= 0) {
        if(n < 2)
            f = 1;
        else{
            f = 1;
            for(long i = 2; i <= n; ++i)
                f *= i;
        }
    }
    return f;
}
```

What is the cyclomatic complexity of the function factorial?

**Options :**

6406532332619. ✖ 2

6406532332620. ✖ 3

6406532332621. ✔ 4

6406532332622. ✖ 5

**Question Number : 34 Question Id : 640653698441 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Let the three partitions with blocks be  $[A, B, C, D]$ ,  $[1, 2, 3]$ , and  $[x, y]$ . What will be the minimum number of total tests that need to be prepared using the Each Choice Coverage (ECC) criteria?

Options :

6406532332623. ✓ 4

6406532332624. ✖ 7

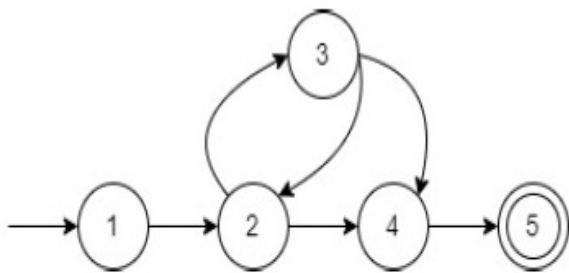
6406532332625. ✖ 15

6406532332626. ✖ 24

**Question Number : 35 Question Id : 640653698442 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the control flow graph (CFG) given below.



Considering that the prime path is [1, 2, 4, 5], match the following from the prime path coverage perspective:

Coverage type	Test paths
A. Touring the prime path without side trips and detours	1. [1, 2, 3, 4, 5]
B. Touring the prime path with a side trip	2. [1, 2, 4, 5]
C. Touring the prime path with a detour	3. [1, 2, 3, 2, 4, 5]

Options :

6406532332627. ✖ A-3, B-1, C-2

6406532332628. ✖ A-3, B-2, C-1

6406532332629. ✖ A-2, B-1, C-3

6406532332630. ✓ A-2, B-3, C-1

**Sub-Section Id :** 640653103482

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653698443 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (36 to 37)**

**Question Label : Comprehension**

Consider the control flow graph (CFG),  $G = \{V, E\}$ , where

- Set of vertices  $V = \{1, 2, 3, 4, 5\}$ ,
- Set of edges  $E = \{(1, 2), (2, 3), (2, 5), (3, 4), (3, 5), (4, 3)\}$ ,
- Initial vertex  $V_0 = 1$ ,
- Final vertex  $V_f = 5$ .

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 36 Question Id : 640653698444 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

**Question Label : Multiple Choice Question**

What are the minimum number of test cases to be prepared for node coverage and edge coverage?

**Options :**

6406532332631. ✔ It is 1 for node coverage, and 2 for edge coverage

6406532332632. ✖ It is 2 for node coverage, and 1 for edge coverage

6406532332633. ✖ It is 1 for both node coverage and edge coverage

6406532332634. ✖ It is 2 for both node coverage and edge coverage

**Question Number : 37 Question Id : 640653698445 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Identify the number of prime paths in the given CFG.

**Options :**

6406532332635. ✖ 4

6406532332636. ✖ 5

6406532332637. ✔ 6

6406532332638. ✖ 7

<b>Sub-Section Number :</b>	4
<b>Sub-Section Id :</b>	640653103483
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 38 Question Id : 640653698446 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the following classes for the code base to be tested and the test class.

```
//code base
public class StringEdit {
    private String str;
    public StringEdit(String s) {
        str = s;
    }
    public String substr(int startIndex, int endIndex) {
        String s = "";
        if(startIndex <= endIndex && endIndex <= str.length()) {
            for(int i = startIndex; i <= endIndex; i++)
                s += str.charAt(i);    //get the char at position i from string str
        }
        return s;
    }
}

//test class
import static org.junit.Assert.*;
import org.junit.*;

public class TestStringEdit {
    private StringEdit se;
    @Test
    public void testcase1() {
        se = new StringEdit("mouse");
        assertEquals("ous", se.substr(1, 3));
    }
    @Test
    public void testcase2() {
        se = new StringEdit("mouse");
        assertEquals("e", se.substr(4, 4));
    }
    @Test
    public void testcase3() {
        se = new StringEdit("mouse");
        assertNull(se.substr(4, 2));
    }
    @Test
    public void testcase4() {
        se = new StringEdit("mouse");
        assertTrue(se.substr(4, 2) == "");
    }
}
```

Identify the test case method that will fail for the given code base.

### Options :

6406532332639. ✖ testcase1()

6406532332640. ✖ testcase2()

6406532332641. ✔ testcase3()

6406532332642. ✖ testcase4()

**Question Number : 39 Question Id : 640653698447 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Mutations of the statement  $a = w * h$  to the statements like  $a = a * h$ ,  $w = w * h$ ,  $a = w * w$ ,  $h = w * h$  and  $a = h * h$  are examples of which kind of mutation operator?

**Options :**

6406532332643. ✖ Conditional operator replacement

6406532332644. ✖ Logical operator replacement

6406532332645. ✔ Scalar variable replacement

6406532332646. ✖ Relational Operator replacement

**Question Number : 40 Question Id : 640653698448 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Given a context free grammar over a finite alphabet  $\Sigma = \{a, b, c\}$ , with the production rules as follows:

$$\begin{aligned} S &\rightarrow aXa, \\ X &\rightarrow bXb, \\ X &\rightarrow c \end{aligned}$$

Let  $S$  be the starting variable. Which of the following sets below corresponds to the language generated by the given grammar?

**Options :**

6406532332647. ✖  $\{(ab)^n c (ba)^n \mid n \geq 0\}$

6406532332648. ✔  $\{ab^n cb^n a \mid n \geq 1\}$



6406532332649. ✖  $\{a^n b^n c b^n a^n \mid n \geq 1\}$

6406532332650. ✖  $\{a b^n c b^n a \mid n \geq 0\}$

**Question Number : 41 Question Id : 640653698449 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the following code segment.

```
//code base
int squareIt(int n) {
    return n * n;
}
int doubleIt(int n) {
    return 2 * n;
}

int evaluate(int x, int y, int z) {
    int t1 = squareIt(x);
    int t2 = doubleIt(y);
    if(t1 > 0 && t2 > 0) {
        if(t1 * t2 > 10 * z) {    //LINE-1
            z = t1 * t2;
        }
    }
    return t2;
}
```

At LINE-1, two instances of symbolic execution are created. Identify the path constraints applicable for those two instances.

**Options :**

6406532332651. ✖  $((x_0 * x_0) * (2 * y_0) > 10 * z_0)$  and  $((x_0 * x_0) * (2 * y_0) \leq 10 * z_0)$

6406532332652. ✖  $(x_0 * x_0 > 0 \wedge 2 * y_0 > 0) \wedge ((x_0 * x_0) * (2 * y_0) > 10 * z_0)$  and  $(x_0 * x_0 > 0 \wedge 2 * y_0 \leq 0) \wedge ((x_0 * x_0) * (2 * y_0) \leq 10 * z_0)$

6406532332653. ✔  $(x_0 * x_0 > 0 \wedge 2 * y_0 > 0) \wedge ((x_0 * x_0) * (2 * y_0) > 10 * z_0)$  and  $(x_0 * x_0 > 0 \wedge 2 * y_0 > 0) \wedge ((x_0 * x_0) * (2 * y_0) \leq 10 * z_0)$

6406532332654. ✖  $(x_0 * x_0 > 0 \wedge 2 * y_0 \leq 0) \wedge ((x_0 * x_0) * (2 * y_0) > 10 * z_0)$  and  $(x_0 * x_0 > 0 \wedge 2 * y_0 > 0) \wedge ((x_0 * x_0) * (2 * y_0) \leq 10 * z_0)$

**Sub-Section Number :** 5  
**Sub-Section Id :** 640653103484  
**Question Shuffling Allowed :** No  
**Is Section Default? :** null

**Question Id :** 640653698450 **Question Type :** COMPREHENSION **Sub Question Shuffling Allowed :** No **Group Comprehension Questions :** No **Question Pattern Type :** NonMatrix **Calculator :** None **Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0  
**Question Numbers : (42 to 43)**

**Question Label :** Comprehension

Consider the truth table for predicate  $p = (a \vee b) \wedge c$  given below.

Row#	$a$	$b$	$c$	$p$	$p_a$	$p_b$	$p_c$
1	$T$	$T$	$T$	$T$			$T$
2	$T$	$T$					$T$
3	$T$		$T$	$T$	$T$		$T$
4	$T$						$T$
5		$T$	$T$	$T$		$T$	$T$
6		$T$					$T$
7			$T$		$T$	$T$	
8							

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 42 Question Id : 640653698451 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

With reference to the truth table row numbers (Row#) given in the mainquestion, identify the *GICC* pairs for clause  $a$  from the following options?

**Options :**

6406532332655. ✓ (1, 5) for  $p = true$ , (2, 6), (2, 8), (4, 6), (4, 8) for  $p = false$

6406532332656. ✖ (1, 5) for  $p = true$ , (2, 6), (4, 8) for  $p = false$

6406532332657. ✖ (1, 3) for  $p = true$ , (2, 4), (2, 8), (6, 4), (6, 8) for  $p = false$

6406532332658. ✖ No feasible pairs for  $p = true$ , (2, 6), (4, 8) for  $p = false$

**Question Number : 43 Question Id : 640653698452 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

With reference to the truth table row numbers (Row#) given in the mainquestion, identify the *RICC* pairs for clause  $a$  from the following options?

**Options :**

6406532332659. ✖ (1, 5) for  $p = true$ , (2, 6), (2, 8), (4, 6), (4, 8) for  $p = false$

6406532332660. ✓ (1, 5) for  $p = true$ , (2, 6), (4, 8) for  $p = false$

6406532332661. ✖ (1, 3) for  $p = true$ , (2, 4), (2, 8), (6, 4), (6, 8) for  $p = false$

6406532332662. ✖ No feasible pairs for  $p = true$ , (2, 6), (4, 8) for  $p = false$

Sub-Section Number :	6
Sub-Section Id :	640653103485
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 44 Question Id : 640653698453 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 5

Question Label : Multiple Choice Question

Consider the following Java program.

```
class X{
    protected int a, b;
    public X() { a = b = 0; }
    public void setA(int _a) {
        a = _a;
    }
    public void setB(int _b) {
        b = _b;
    }
    public void print() {
        System.out.println(a + ", " + b);
    }
}

class Y extends X{
    public void setY(int _a) {
        a = _a;
    }
}

class Z extends Y{
    protected int b;
    public void setB(int _b) {
        b = _b;
    }
}

public class Math {
    public static void main(String[] args) {
        Z obj = new Z();
        obj.setA(10);
        obj.setB(20);
        obj.print();
    }
}
```

The above program generates output as 10, 0, instead 10, 20, since the inherited `b` is overridden in the descendant `Z` that hides the instance variable `b` in `X`. Identify the type of anomaly/fault in the given scenario.

**Options :**

6406532332663. ✖ Inconsistent type use

6406532332664. ✖ State definition anomaly

6406532332665. ✔ State definition inconsistency anomaly

6406532332666. ✖ State visibility anomaly

**Question Number : 45 Question Id : 640653698454 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the following code segment in Java.

```
class Math {  
    public double sum(int a, double b) {  
        return a + b;  
    }  
    public double sum(double a, int b) {  
        return a + b;  
    }  
}  
public class Test{  
    public static void main(String[] args) {  
        Math m = new Math();  
        double r = m.sum(10, 20.5);    //LINE-1  
        //some more code  
    }  
}
```

Consider that the LINE-1 is mutated as follows:

```
double r = m.sum(20.5, 10);    //LINE-1
```

Which kind of mutation operator is applied in this case?

**Options :**

6406532332667. ✖ Overloading Method Change (OMC)

6406532332668. ✖ Argument Number Change (ANC)

6406532332669. ✔ Argument Order Change (AOC)

6406532332670. ✖ Actual Type Change (ATC)

**Question Number : 46 Question Id : 640653698455 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction**

**Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

An application transition graph (ATG) has a transition from one web component to another which would be triggered when user manually edits the URL. Which of the following types of transition is it?

**Options :**

6406532332671. ✖ Simple link transition

6406532332672. ✖ Form link transition

6406532332673. ✔ Operational transition

6406532332674. ✖ Redirect transition

**Sub-Section Number :** 7

**Sub-Section Id :** 640653103486

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653698456 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (47 to 48)**

Question Label : Comprehension



Consider the code segment of a Java servlet below. The atomic sections are marked as  $P_1, P_2, P_3, \dots$ .

	<pre> /* result_ds stores the marks scored by a student for different subjects */ ArrayList&lt;Integer&gt; result_ds = null; response.setContentType("text/html"); PrintWriter out = response.getWriter(); </pre>
$P_1$	<pre> out.print("&lt;HTML&gt;&lt;HEAD&gt;&lt;TITLE&gt;"); out.print("Student's result"); out.println("&lt;/TITLE&gt;&lt;/HEAD&gt;&lt;BODY&gt;"); String roll_num = request.getParameter("roll"); /* getResult() considers the roll number (roll_num) as input, runs a query in the database, and returns an ArrayList object containing the marks for different subjects for the student */ result_ds = getResult(roll_num); int total_marks = 0; </pre>
	<pre> if(total_marks != null) { </pre>
	<pre>     for (Integer m : result_ds) { </pre>
$P_2$	<pre>         total_marks += m; </pre>
	<pre>     }     if(total_marks &gt; 50) { </pre>
$P_3$	<pre>         out.println("Score: " + total_marks + "&lt;/BR&gt;");         out.println("Status : Pass&lt;/BR&gt;"); </pre>
	<pre>     }     else { </pre>
$P_4$	<pre>         out.println("Score: " + total_marks + "&lt;/BR&gt;");         out.println("Status : Fail&lt;/BR&gt;"); </pre>
	<pre>     } } else{ </pre>
$P_5$	<pre>     out.println("Invalid roll number&lt;/BR&gt;"); </pre>
	<pre> } </pre>
$P_6$	<pre> out.println ("&lt;/BODY&gt;&lt;/HTML&gt;"); out.close(); </pre>

Based on the above data, answer the given subquestions.

### Sub questions

**Question Number : 47 Question Id : 640653698457 Question Type : MCQ Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**



**Correct Marks : 5**

Question Label : Multiple Choice Question

Identify the component expression corresponding to the given code.

**Options :**

6406532332675. ✖  $P_1 \cdot (P_2^* \cdot P_3 \cdot (P_4|P_5))|P_6$

6406532332676. ✖  $P_1 \cdot (P_2 \cdot (P_3^*|(P_4|P_5))) \cdot P_6$

6406532332677. ✔  $P_1 \cdot ((P_2^* \cdot (P_3|P_4))|P_5) \cdot P_6$

6406532332678. ✖  $P_1 \cdot ((P_2^*|P_3)|(P_4|P_5)) \cdot P_6$

**Question Number : 48 Question Id : 640653698458 Question Type : MCQ Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Which of the following is a content variable in the given atomic section P3 of code ?

**Options :**

6406532332679. ✖ `out.println`

6406532332680. ✖ `</BR>`

6406532332681. ✔ `total_marks`

6406532332682. ✖ `"Score: "`

**Sub-Section Number :** 8  
**Sub-Section Id :** 640653103487  
**Question Shuffling Allowed :** Yes  
**Is Section Default? :** null

**Question Number : 49 Question Id : 640653698459 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Which of the following is considered as control flow level bypass testing?

**Options :**

6406532332683. ✖ A testing approach that uses data captured during user sessions to create test cases.

6406532332684. ✖ A testing approach that tries to verify if a web application adequately evaluates invalid inputs.

6406532332685. ✖ A testing approach that tries to check for issues related to relationships among different parameters of an input.

6406532332686. ✔ A testing approach that tries to verify web applications by executing test cases that break the normal execution sequence.

**Question Number : 50 Question Id : 640653698460 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Which of the following is not a type/technique of security testing?

**Options :**

6406532332687. ✖ To verify that only authorized accesses to the system are permitted.

6406532332688. ✖ To identify back doors in the system left open by developers.

6406532332689. ✔ To measure the ability of system to keep operating over specified periods of time.

6406532332690. ✖ To ensure that virus checkers prevent or curtail entry of viruses into the system.

**Question Number : 51 Question Id : 640653698461 Question Type : MCQ Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the following code segment for symbolic testing.

```
//code base
int product(int l, int h) {
    int prod = 1;
    for(int i = l; i <= h; i++) {    //LINE-1
        r = sym_input();
        if(r < 0)
            break;
        prod *= r;
    }
    return prod;
}
```

Identify the appropriate program condition (PC) for the for loop (at LINE-1) with a sequence of  $n$  trues followed by a false.

Consider each  $r_i$  is a fresh symbolic value.

**Options :**

6406532332691. ✖  $(\bigwedge_{i \in [l, h]} r_i \geq 0) \wedge (r_{h+1} < 0)$

6406532332692. ✖  $(\bigwedge_{i \in [l, l+n]} r_i > 0) \wedge (r_{l+n+1} \leq 0)$

6406532332693. ✔  $(\bigwedge_{i \in [l, l+n-1]} r_i \geq 0) \wedge (r_{l+n} < 0)$

6406532332694. ✖  $(\wedge_{i \in [l,n]} r_i \geq 0) \wedge (r_{n+1} < 0)$

Sub-Section Number : 9  
Sub-Section Id : 640653103488  
Question Shuffling Allowed : Yes  
Is Section Default? : null

Question Number : 52 Question Id : 640653698462 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 5 Max. Selectable Options : 0

Question Label : Multiple Select Question  
Which of the following is/are considered as product quality Metrics?

Options :

6406532332695. ✔ Mean time to failure

6406532332696. ✖ Fix backlog and backlog management

6406532332697. ✖ Phase-based defect removal pattern

6406532332698. ✔ Satisfaction of customers

AI

Section Id : 64065349292  
Section Number : 3  
Section type : Online  
Mandatory or Optional : Mandatory  
Number of Questions : 9  
Number of Questions to be attempted : 9  
Section Marks : 25