

Sw Testing

Section Id :	64065364219
Section Number :	1
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 :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134719
Question Shuffling Allowed :	No

Question Number : 1 Question Id : 640653906709 Question Type : MCQ Calculator : Yes

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 :

6406533052039. ✓ YES

6406533052040. ✗ NO

Sub-Section Number :

2

Sub-Section Id :

640653134720

Question Shuffling Allowed :

Yes

Question Number : 2 Question Id : 640653906710 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

What is the main objective of reliability tests?

Options :

6406533052041. ✗ To determine if a system protects data and maintains security related functionality as intended.

6406533052042. ✗ To determine whether the system can inter-operate with other third-party products.

6406533052043. ✗ To determine the upper limit capacity of the system.

6406533052044. ✓ To measure the ability of system to keep operating over specified periods of time.

Question Number : 3 Question Id : 640653906716 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Which client-side testing needs to verify the inter-value constraints like credit card number and the expiry date?

Options :

6406533052061. ✗ Value level bypass testing

6406533052062. ✓ Parameter level bypass testing

6406533052063. ✗ Control flow level bypass testing

6406533052064. ✗ User-session Data based Testing

Question Number : 4 Question Id : 640653906718 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

The statement `if (x == y)` is mutated to create the following statements:

`if (x != y)`, `if (x > y)`, `if (x >= y)`, `if (x < y)`, `if (x <= y)`.

Identify the mutation operator applied.

Options :

6406533052069. ✓ Relational operator replacement
6406533052070. ✗ Conditional operator replacement
6406533052071. ✗ Arithmetic operator replacement
6406533052072. ✗ Logical operator replacement

Question Number : 5 Question Id : 640653906731 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider input space partitioning (ISP) for a program computing the annuities of an investment scheme presented in the table below, consisting of characteristics and blocks.

Characteristic	Block-1	Block-2	Block-3	Block-4
investedAmount	< 10K	≥ 10K and < 30K	≥ 30K and < 50K	≥ 50K
yearsOfInvestment	< 7	≥ 7		
gender	M	F	OTH	

What is the minimum number of tests required to satisfy each choice coverage (ECC) criterion?

Options :

6406533052109. ✗ 3
6406533052110. ✓ 4
6406533052111. ✗ 7
6406533052112. ✗ 24

Sub-Section Number :

3

Sub-Section Id :

640653134721

Question Shuffling Allowed :

Yes

Question Number : 6 Question Id : 640653906711 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Match the following regarding software and software quality metrics.

Metrics	Metric type
1. Mean time to failure	A. Software metrics
2. Number of Lines of Code (KLOC)	B. Product quality metric
3. Defect Removal Effectiveness (DRE)	C. Maintenance quality metric
4. Backlog Management Index (BMI)	D. In-process quality metric

Options :

6406533052045. ✗ 1-B, 2-D, 3-A, 4-C
6406533052046. ✗ 1-C, 2-D, 3-A, 4-B
6406533052047. ✓ 1-B, 2-A, 3-D, 4-C

6406533052048. ✖ 1-C, 2-A, 3-D, 4-B

Question Number : 7 Question Id : 640653906717 Question Type : MCQ Calculator : Yes Correct Marks : 5

Question Label : Multiple Choice Question

Identify the regular expression that represents all the strings of only 0's or only 1's and ending with 01.

Options :

6406533052065. ✖ $(01)^*$

6406533052066. ✖ $0^* \cdot 1^*$

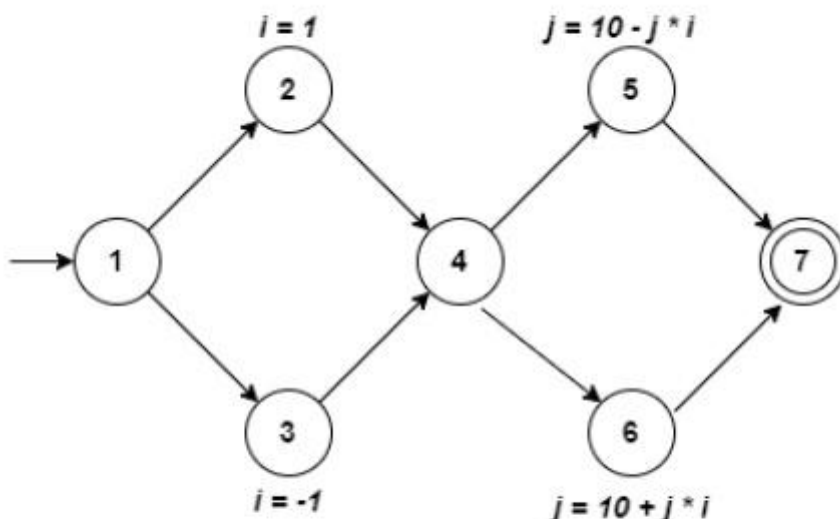
6406533052067. ✖ $(0 + 1)^* \cdot 01$

6406533052068. ✔ $(0^* + 1^*) \cdot 01$

Question Number : 8 Question Id : 640653906723 Question Type : MCQ Calculator : Yes Correct Marks : 5

Question Label : Multiple Choice Question

Consider the annotated CFG below.



Given the following set of test paths:

$\{[1, 2, 4, 6, 7], [1, 3, 4, 5, 7]\}$,

which of the following coverage criteria is/are fulfilled?

Options :

6406533052085. ✖ Only all defs coverage for *i*

6406533052086. ✖ Only all uses coverage for *i*

6406533052087. ✖ All du-paths coverage for *i*

6406533052088. ✔ All defs coverage for *i* and also All uses coverage for *i*, but not all du-paths coverage for *i*

Question Number : 9 Question Id : 640653906727 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Consider the code given below.

```
int getVal(int a, int b, int c){  
    boolean r = false;  
    if (a > b)  
        r = true;  
  
    if(r && a > c)  
        return a;  
    else  
        return c;  
}
```

Which of the following lists predicates that satisfy *RACC* for the method `getVal`?

Please note that the variable `r` needs to be re-written in terms of inputs in the second predicate to achieve various coverage criteria. We use the predicate `a > b` to represent `r`.

Options :

6406533052097. ✖ `a > b = true and a > c = true,`
`a > b = false and a > c = true`

6406533052098. ✖ `a > b = false and a > c = false,`
`a > b = true and a > c = true.`

6406533052099. ✔ `a > b = true and a > c = true, a > b = false and a > c = true,`
`a > b = true and a > c = true, a > b = true and a > c = false.`

6406533052100. ✖ `a > b = true and a > c = false, a > b = false and a > c = false,`
`a > b = false and a > c = true, a > b = false and a > c = false.`

Question Number : 10 Question Id : 640653906732 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Consider the code given below.

```
class A{
    protected int x, y;
    public void setX(int x) { this.x = x; }
    public void setY(int y) { this.y = y; }
    public int getX() { return this.x; }
    public int getY() { return this.y; }
}
class B extends A {
    public void setY(int y){ this.y = y * 10; }
    public int getX() { return this.x - 10; }
    public int getY() { return this.y - 10; }
}
class C extends B{
    public void setX(int x) { this.x = x * 20; }
    public int getX(){ return this.x - 20; }
}
public class Test {
    public static void main(String[] args) {
        boolean flag = false;
        //LINE-1: flag = true/false;
        A obj;
        if(flag)
            obj = new B();
        else
            obj = new C();
        obj.setX(10);
        obj.setY(20);
        int x = obj.getX();
        int y = obj.getY();
    }
}
```

Which of the following set of methods will be invoked when the variable flag is read with a value of false at LINE-1?

Options :

6406533052113. ✖ A::setX(), A::setY(), A::getX(), A::getY()

6406533052114. ✖ C::setX(), B::setY(), B::getX(), B::getY()

6406533052115. ✖ C::setX(), C::setY(), C::getX(), C::getY()

6406533052116. ✔ C::setX(), B::setY(), C::getX(), B::getY()

Question Number : 11 Question Id : 640653906733 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Consider the following code segment.

```
1. class A{
2.     protected int x;
3.     public A(){
4.         this.x = 1;
5.     }
6.     public A(int x){
7.         this.x = x;
8.     }
9.     public void print(){
10.        System.out.println(x);
11.    }
12. }
13. class B extends A{
14.     public B(int x){
15.         super(x);
16.     }
17. }
```

Suppose a mutant of the code is created by deleting LINE-15. What type of mutation operator is applied in this case?

Options :

6406533052117. ✖ Overriding method deletion (OMD)

6406533052118. ✖ Overriding method moving (OMM)

6406533052119. ✔ Parent constructor deletion (PCD)

6406533052120. ✖ Super keyword deletion (SKD):

Question Number : 12 Question Id : 640653906734 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Consider the following Java program.

```
class Person{
    protected String name;
    public Person(){ name = "unknown"; }
    public void setName(String n) { name = n; }
}
class Player extends Person{
    protected int ID;
    public Player(){ ID = -1; }
    public void setID(int i) { ID = i; }
    public void print() { System.out.println(ID + ", " + name); }
}
class Captain extends Player{
    protected String pname;
    public Captain(){ pname = "unknown"; }
    public void setName(String n){ pname = n; }
}
public class TeamMgt {
    public static void main(String[] args) {
        Captain obj = new Captain();
        obj.setName("sunil");
        obj.setID(11);
        obj.print();
    }
}
```

The above program generates output as 11, unknown, instead of 11, sunil. The reason is that `Captain::setName` is invoked before the invocation of the `Player::print` function, and `Captain::setName` does not define `Person::name`. Identify the type of anomaly or fault in the given scenario.

Options :

- 6406533052121. ✖ Inconsistent type use
- 6406533052122. ✔ State definition anomaly
- 6406533052123. ✖ State definition inconsistency anomaly
- 6406533052124. ✖ State visibility anomaly

Sub-Section Number :

4

Sub-Section Id :

640653134722

Question Shuffling Allowed :

Yes

Question Number : 13 Question Id : 640653906712 Question Type : MSQ Calculator : Yes

Correct Marks : 5 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider test-driven development (TDD) for a web application that validates users by OTP. Both the user's registered mobile number and email address receive the OTP during login. The system prompts the user to enter the OTP. One of the user stories of the application is: "OTP length validation: Invalid number of digits entered can be verified". Below are the test cases for the "OTP length validation" user story.

```
import static org.junit.Assert.*;
import org.junit.Test;

public class TestOTPValidation {
    private OTPValidation obj;
    @Test
    public void test() {
        obj = new OTPValidation();

        assertFalse(obj.validate("12345"));
        assertFalse(obj.validate("1234567"));
        assertTrue(obj.validate("123456"));
    }
}
```

Which of the following are the appropriate implementations for the user story?

Options :

```
public class OTPValidation {
    public boolean validate(String num) {
        if(num.length() != 6) {
            System.out.println("OTP size is not allowed");
            return false;
        }
        else
            return true;
    }
}
```

6406533052049. ✓

```
public class OTPValidation {
    public boolean validate(String num) {
        if(num.length() == 6) {
            System.out.println("OTP size is not allowed");
            return false;
        }
        else
            return true;
    }
}
```

6406533052050. ✗

6406533052051. ✗

```

public class OTPValidation {
    public boolean validate(String num) {
        if(num.length() <= 6) {
            System.out.println("OTP is less than minimum size allowed");
            return false;
        }
        else if(num.length() >= 6) {
            System.out.println("OTP is more than maximum size allowed");
            return false;
        }
        else
            return true;
    }
}

```

```

        public class OTPValidation {
            public boolean validate(String num) {
                if(num.length() < 6) {
                    System.out.println("OTP is less than minimum size allowed");
                    return false;
                }
                else if(num.length() > 6) {
                    System.out.println("OTP is more than maximum size allowed");
                    return false;
                }
                else
                    return true;
            }
        }

```

6406533052052. ✓

Question Number : 14 Question Id : 640653906722 Question Type : MSQ Calculator : Yes

Correct Marks : 5 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider a CFG, $G = \{V, E\}$, where

- $V = \{1, 2, 3, 4, 5, 6, 7\}$,
- Initial vertex, $v_0 = \{1\}$.
- Final vertex, $v_f = \{7\}$,
- $E = \{(1, 2), (2, 3), (2, 4), (3, 2), (4, 5), (5, 6), (5, 7), (6, 4)\}$.

Identify the correct set(s) of test paths that provide edge-pair coverage.

Options :

6406533052081. ✖ [1, 2, 3, 2, 4, 5, 6, 5, 7]

6406533052082. ✖ $\{[1, 2, 4, 5, 7], [1, 2, 3, 2, 4, 5, 7], [1, 2, 4, 5, 6, 5, 7]\}$
 6406533052083. ✔ $\{[1, 2, 4, 5, 7], [1, 2, 3, 2, 3, 2, 4, 5, 7], [1, 2, 4, 5, 6, 4, 5, 7]\}$
 6406533052084. ✔ $\{[1, 2, 4, 5, 7], [1, 2, 3, 2, 3, 2, 4, 5, 6, 4, 5, 6, 4, 5, 7]\}$

Sub-Section Number : 5
Sub-Section Id : 640653134723
Question Shuffling Allowed : No

Question Id : 640653906713 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (15 to 16)

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> /* dept_salaries stores salaries for every employee of a given department ID */ ArrayList<Double> dept_salaries = null; response.setContentType("text/html"); PrintWriter out = response.getWriter(); out.print("<HTML><HEAD><TITLE>"); out.print("Department Status"); out.println("</TITLE></HEAD><BODY> "); String dept_id = request.getParameter("DEPT"); /* </pre>
P_1	<pre> getSalaries() considers the department ID (dept_id) as input, runs a query in the database, and returns an ArrayList object containing the salaries of the employees belong of the given department ID */ dept_salaries = getSalaries(dept_id); double total_salary = 0.0; </pre>
	<pre> if(dept_salaries != null) { </pre>
	<pre> for (Double sal : dept_salaries) { </pre>
P_2	<pre> total_salary += sal; </pre>
	<pre> } if(total_salary >= 10000000.00) { </pre>
P_3	<pre> out.println("Department is overspending</BR>"); </pre>
	<pre> } else </pre>
P_4	<pre> {} </pre>
	<pre> } else{ </pre>
P_5	<pre> out.println("Invalid department ID</BR>"); </pre>
	<pre> } </pre>
P_6	<pre> out.println ("</BODY></HTML>"); out.close(); </pre>

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 15 Question Id : 640653906714 Question Type : MCQ Calculator : Yes Correct Marks : 5

Question Label : Multiple Choice Question

Identify the component expression corresponding to the given code

Options :

6406533052053. ✖ $P_1 \cdot (P_2^* \cdot P_3 \cdot (P_4|P_5))|P_6$

6406533052054. ✖ $P_1 \cdot (P_2|(P_3^* \cdot (P_4|P_5))) \cdot P_6$

6406533052055. ✔ $P_1 \cdot ((P_2^* \cdot (P_3|P_4))|P_5) \cdot P_6$

6406533052056. ✖ $P_1 \cdot ((P_2^*|P_3) \cdot (P_4|P_5)) \cdot P_6$

Question Number : 16 Question Id : 640653906715 Question Type : MCQ Calculator : Yes Correct Marks : 4

Question Label : Multiple Choice Question

Identify the empty atomic section in the given code.

Options :

6406533052057. ✖ P_2

6406533052058. ✖ P_3

6406533052059. ✔ P_4

6406533052060. ✖ P_5

Question Id : 640653906724 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (17 to 18)

Question Label : Comprehension

Consider the following code segment for symbolic testing.

```
//code base
int pvprod(int n1, int n2) {
    int prod = 1, i = n1;
    int r;
    while(i < n2) {
        r = sym_input();
        if(r < 0)
            break;
        prod *= r;
        i++;
    }
    return prod;
}
```

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 17 Question Id : 640653906725 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Identify the appropriate program condition (PC) for the while loop with a sequence m of trues followed by a false.

Consider each r_j is a fresh symbolic value.

Options :

6406533052089. ✖ $(\bigwedge_{j \in [1, m]} (r_j < 0)) \wedge (r_{m+1} \geq 0)$

6406533052090. ✖ $(\bigwedge_{i \in [1, m-1]} (r_j \geq 0)) \wedge (r_m < 0)$

6406533052091. ✔ $(\bigwedge_{j \in [1, m]} (r_j \geq 0)) \wedge (r_{m+1} < 0)$

6406533052092. ✖ $(\bigwedge_{j \in [n1, n2+m-1]} (r_j > 0)) \wedge (r_{n1+m} \geq 0)$

Question Number : 18 Question Id : 640653906726 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Identify the value of `prod` at the end of the symbolic execution of the `while` loop with a sequence of m `true`s followed by a `false`.

Options :

6406533052093. ✖ $\{r \mapsto r_{m+1}, prod \mapsto \sum_{j \in [1, m]} r_j\}$

6406533052094. ✔ $\{r \mapsto r_{m+1}, prod \mapsto \prod_{j \in [1, m]} r_j\}$

6406533052095. ✖ $\{r \mapsto r_m, prod \mapsto \sum_{j \in [1, m-1]} r_j\}$

6406533052096. ✖ $\{r \mapsto r_m, prod \mapsto \prod_{j \in [1, m-1]} r_j\}$

Sub-Section Number :

6

Sub-Section Id :

640653134724

Question Shuffling Allowed :

No

Question Id : 640653906719 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (19 to 20)

Question Label : Comprehension

Consider the following method in Java.

```
int getMax(int arr[]) {  
    int i;  
    int max = arr[0];  
  
    for (i = 1; i < arr.length; i++)  
        if (arr[i] > max)  
            max = arr[i];  
  
    return max;  
}
```

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 19 Question Id : 640653906720 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

What is the minimum number of test paths are required for node coverage and edge coverage of the given method?

Options :

6406533052073. ✓ 1 for both node coverage and edge coverage

6406533052074. ✗ 1 for node coverage and 2 for edge coverage

6406533052075. ✗ 2 for both node coverage and edge coverage

6406533052076. ✗ 1 for node coverage and 3 for edge coverage

Question Number : 20 Question Id : 640653906721 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

What is the cyclomatic complexity of the given method?

Options :

6406533052077. ✓ 3

6406533052078. ✗ 4

6406533052079. ✗ 5

6406533052080. ✗ 6

Sub-Section Number :

7

Sub-Section Id :

640653134725

Question Shuffling Allowed :

No

Question Id : 640653906728 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (21 to 22)

Question Label : Comprehension

Consider the predicate given below:

$$p = a \wedge (b \vee c).$$

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 21 Question Id : 640653906729 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Identify the condition when a determines p .

Options :

6406533052101. ✓ When $(b \vee c)$ is true

6406533052102. ✖ When $(b \vee c)$ is false

6406533052103. ✖ When $(b \vee \neg c)$ is true

6406533052104. ✖ When $(b \wedge \neg c)$ is false

Question Number : 22 Question Id : 640653906730 Question Type : MCQ Calculator : Yes Correct Marks : 6

Question Label : Multiple Choice Question

From the given options, identify one that covers all the RICC pairs for the clause a .

Options :

6406533052105. ✖ $\{(a = T, b = T, c = T), (a = T, b = F, c = T)\}$ for $p = true$, and $\{(a = F, b = T, c = T), (a = F, b = F, c = T)\}$, $\{(a = F, b = T, c = F), (a = F, b = F, c = F)\}$ for $p = false$

6406533052106. ✖ $\{(a = T, b = T, c = T), (a = T, b = T, c = F)\}$, $\{(a = T, b = T, c = F), (a = T, b = F, c = F)\}$, $\{(a = F, b = T, c = T), (a = F, b = F, c = T)\}$ for $p = T$, and No feasible pairs for $p = F$.

6406533052107. ✔ No feasible pairs for $p = T$, and $\{(a = T, b = F, c = F), (a = F, b = F, c = F)\}$ for $p = F$

6406533052108. ✖ $\{(a = T, b = T, c = T), (a = F, b = T, c = T)\}$, $\{(a = T, b = T, c = F), (a = F, b = T, c = F)\}$, $\{(a = T, b = F, c = T), (a = F, b = F, c = T)\}$ for $p = T$, and No feasible pairs for $p = F$.