Sw Testing

Section Id :	64065364131
Section Number :	3
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 :	640653134089
Question Shuffling Allowed :	No

Question Number : 45 Question Id : 640653904076 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 :

6406533044365. ✔ YES

6406533044366. ✖ NO

Sub-Section Number :	2
Sub-Section Id :	640653134090
Question Shuffling Allowed :	Yes

Question Number : 46 Question Id : 640653904077 Question Type : MSQ Calculator : Yes
Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following is/are considered as security testing?

Options :

6406533044367. ✔ Verify that only authorized accesses to the system are permitted.

6406533044368. ✖ Verify whether the system can inter-operate with other third-party products.

6406533044369. ✖ Verify the ability of system to keep operating over specified periods of time.

6406533044370. ✔ Ensure that virus checkers prevent/curtail entry of viruses into the system.

Sub-Section Number :	3
Sub-Section Id :	640653134091
Question Shuffling Allowed :	Yes

Question Number : 47 Question Id : 640653904079 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 prompt the user to enter his/her registered mobile number for sending OTP for authentication. One of the user stories of the application is: "Mobile number length validation: Invalid number of digits entered can be verified". Below are the test cases for the "Mobile number length validation" user story.

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

public class TestMobileNumberValidator {
    MobileNumberValidation obj;
    @Test
    public void test() {
        obj = new MobileNumberValidation();
        assertFalse(obj.validate("123456789"));
        assertFalse(obj.validate("12345678912"));
        assertTrue(obj.validate("1234567890"));
    }
}
```

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

Options :

6406533044375. ✖

```java
public class MobileNumberValidation {
    public boolean validate(String num) {
        if(num.length() <= 10) {
            System.out.println("length is less than minimum allowed");
            return false;
        }
        else if(num.length() >= 10) {
            System.out.println("length is less than maximum allowed");
            return false;
        }
        else
            return true;
    }
}
```

```java
public class MobileNumberValidation {
    public boolean validate(String num) {
        if(num.length() < 10) {
            System.out.println("length is less than minimum allowed");
            return false;
        }
        else if(num.length() > 10) {
            System.out.println("length is less than maximum allowed");
            return false;
        }
        else
            return true;
    }
}
```

6406533044376. ✔

```java
public class MobileNumberValidation {
    public boolean validate(String num) {
        if(num.length() != 10) {
            System.out.println("length is not allowed");
            return false;
        }
        else
            return true;
    }
}
```

6406533044377. ✔

6406533044378. ✖

```
public class MobileNumberValidation {
    public boolean validate(String num) {
        if(num.length() < 11) {

            System.out.println("length is less than minimum allowed");
            return false;
        }
        else if(num.length() > 9) {
            System.out.println("length is less than maximum allowed");
            return false;
        }
        else
            return true;
    }
}
```

Question Number : 48 Question Id : 640653904089 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, $v_f = \{7\}$,
- $E = \{(1, 2), (2, 3), (2, 4), (3, 2), (4, 5), (5, 6), (5, 7), (6, 5)\}$.

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

Options :
6406533044407. ✖ [1, 2, 3, 2, 4, 5, 6, 5, 7]
6406533044408. ✖ {[1, 2, 4, 5, 7], [1, 2, 3, 2, 4, 5, 7], [1, 2, 4, 5, 6, 5, 7]}
6406533044409. ✔ {[1, 2, 4, 5, 7], [1, 2, 3, 2, 3, 2, 4, 5, 7], [1, 2, 4, 5, 6, 5, 6, 5, 7]}
6406533044410. ✔ {[1, 2, 4, 5, 7], [1, 2, 3, 2, 3, 2, 4, 5, 6, 5, 6, 5, 7]}

Sub-Section Number :	4
Sub-Section Id :	640653134092
Question Shuffling Allowed :	Yes

Question Number : 49 Question Id : 640653904083 Question Type : MCQ Calculator : Yes
Correct Marks : 4
Question Label : Multiple Choice Question

Match the following from the context of deploying software.

Deployment types	Description
A. Bundled	1. Installed on a hardware device, usually with no direct communication with user.
B. Shrink-wrap	2. Pre-installed on computer.
C. Contract	3. Bought and installed by end-users.
D. Embedded	4. Purchaser pays developer to develop and install, usually for a fixed price.

Options :

6406533044387. ✷ A-2, B-4, C-3, D-1

6406533044388. ✔ A-2, B-3, C-4, D-1

6406533044389. ✷ A-1, B-4, C-3, D-2

6406533044390. ✷ A-1, B-3, C-4, D-2

Question Number : 50 Question Id : 640653904085 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Which type of mutants are valid and can be killed by a test case?

Options :

6406533044395. ✷ Stillborn mutant

6406533044396. ✷ Trivial mutant

6406533044397. ✷ Equivalent mutant

6406533044398. ✔ Dead mutant

Question Number : 51 Question Id : 640653904098 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
investedAmount	$< 10K$	$\geq 10K$ and $< 50K$	$\geq 50,000$
yearsOfInvestment	< 5	≥ 5	
gender	M	F	OTH
isSeniorCitizen	true	false	

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

Options :

6406533044435. ✔ 3

6406533044436. ✷ 4

6406533044437. ✳ 7

6406533044438. ✳ 36

Sub-Section Number :   5

Sub-Section Id :   640653134093

Question Shuffling Allowed :   Yes

Question Number : 52 Question Id : 640653904078 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Match following regarding software and software quality metrics.

Metrics	Metric type
1. Defect density	A. Software metrics
2. Cyclomatic complexity	B. Product quality metric
3. Defect Removal Effectiveness (DRE)	C. Maintenance quality metric
4. Backlog Management Index (BMI)	D. In-process quality metric

Options :

6406533044371. ✳ 1-B, 2-D, 3-A, 4-C

6406533044372. ✳ 1-C, 2-D, 3-A, 4-B

6406533044373. ✔ 1-B, 2-A, 3-D, 4-C

6406533044374. ✳ 1-C, 2-A, 3-D, 4-B

Question Number : 53 Question Id : 640653904084 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Identify the regular expression that represents all the strings of 0's and 1's beginning with 0 and ending with 1.
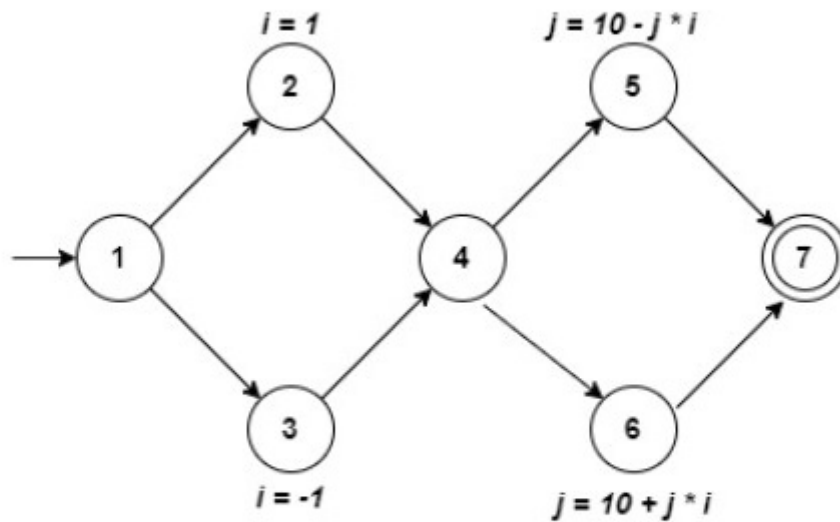
Options :

6406533044391. ✳ $(0+1)^*$

6406533044392. ✳ $0^* \cdot 1^*$

6406533044393. ✔ $0 \cdot (0+1)^* \cdot 1$

6406533044394. ✳ $0 \cdot (0^* + 1^*) \cdot 1$

Question Number : 54 Question Id : 640653904090 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:

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

which of the following coverage criteria is/are fulfilled?

Options :

6406533044411. ✸ Only all defs coverage for i

6406533044412. ✸ Only all uses coverage for i

6406533044413. ✔ All du-paths coverage for i

6406533044414. ✸ All defs coverage for i and also All uses coverage for i, but not all du-paths coverage for i

Question Number : 55 Question Id : 640653904094 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Consider the code given below.

```
int getVal(int x, int y, int z){
    boolean r = false;
    if (x > y)
        r = true;

    if(r || x > z)
        return x;
    else
        return z;
}
```

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 x > y to represent r.

Options :

6406533044423. ✖   x > y = true and x > z = false,
                    x > y = false and x > z = false.

6406533044424. ✖   x > y = false and x > z = false,
                    x > y = true and x > z = true.

6406533044425. ✖   x > y = true and x > z = true, x > y = false and x > z = true,
                    x > y = true and x > z = true, x > y = true and x > z = false.

6406533044426. ✔   x > y = true and x > z = false, x > y = false and x > z = false,
                    x > y = false and x > z = true, x > y = false and x > z = false.

Question Number : 56 Question Id : 640653904099 Question Type : MCQ Calculator : Yes
Correct Marks : 5
Question Label : Multiple Choice Question

Consider the code given below.

```java
class X{
    protected int a, b;
    public void setA(int a) { this.a = a; }
    public void setB(int b) { this.b = b; }
    public int getA() { return this.a; }
    public int getB() { return this.b; }
}
class Y extends X {
    public void setB(int b){ this.b = b * 10; }
    public int getA() { return this.a - 10; }
}
class Z extends Y{
    public void setA(int a) { this.a = a * 20; }
    public int getA(){ return this.a - 20; }
}
public class Test {
    public static void main(String[] args) {
        boolean flag;
        //LINE-1: flag = true/false;
        X obj;
        if(flag)
            obj = new Z();
        else
            obj = new Y();
        obj.setA(10);
        obj.setB(20);
        int x = obj.getA();
        int y = obj.getB();
    }
}
```

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

Options :

6406533044439. ✖ `X::setA(), X::setB(), X::getA(), X::getB()`

6406533044440. ✖ `X::setA(), Y::setB(), Y::getA(), Y::getB()`

6406533044441. ✔ `Z::setA(), Y::setB(), Z::getA(), X::getB()`

6406533044442. ✖ `Z::setA(), Z::setB(), Y::getA(), Y::getB()`

Question Number : 57 Question Id : 640653904100 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 void print(){
7.            System.out.println(x);
8.        }
9.   }
10.  class B extends A{
11.        protected int x;
12.        public void setX(int n){
13.            super.x = n;
14.        }
15.        public void print(){
16.            System.out.println(x);
17.        }
18.  }
```

Suppose a mutant of the code is created by modifying LINE-13 as follows:

13.   x = n;

What type of mutation operator is applied in this case?

Options :

6406533044443. �./ Hiding variable insertion (HVD)

6406533044444. ✴ Hiding variable deletion (HVD)

6406533044445. ✴ Parent constructor deletion (PCD)

6406533044446. ✔ Super keyword deletion (SKD):

Question Number : 58 Question Id : 640653904101 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Consider the following Java program.

```java
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 name;
    public Captain(){ name = "unknown"; }
    public void setName(String n){ name = n; }
}
public class Math {
    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 Person::name is overridden in the descendant Captain which hides the inherited variable Person::name in class Captain. Identify the type of anomaly or fault in the given scenario.

Options :

6406533044447. ✖ Inconsistent type use

6406533044448. ✖ State definition anomaly

6406533044449. ✔ State definition inconsistency anomaly

6406533044450. ✖ State visibility anomaly

Sub-Section Number :   6

Sub-Section Id :   640653134094

Question Shuffling Allowed :   No

Question Id : 640653904080 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (59 to 60)

Question Label : Comprehension

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

P_1	```/*
dept_salaries stores the salary of every employee of a given department
*/
ArrayList<Double> dept_salaries = null;
response.setContentType("text/html");
PrintWriter out=response.getWriter();
out.println ("<HTML><HEAD><TITLE>Bonus Budget</TITLE></HEAD><BODY>");
String dept_id = request.getParameter("DEPTID");
/*
getSalaries() takes department number (dept_id) as input, runs a query
in the database, and returns a ArrayList object containing the salaries
of all the employees in the given dept_id
*/
dept_salaries = getSalaries(dept_id);
double total_salaries = 0.0;
double bonus_budget = 0.0;
if(dept_salaries == null){```
P_2	``` out.println("Invalid department number</BR>");```
	``}
else{
for (Double sal : dept_salaries) {```
P_3	``` total_salaries += sal;```
	`` }
if(total_salaries < 10000000.0)```
P_4	``` bonus_budget = total_salaries * 0.03;```
	``` else```
P_5	``` bonus_budget = total_salaries * 0.05;```
P_6	``` out.println("Bonus budget:" + bonus_budget + "</BR>");```
	```}```
P_7	```out.println ("</BODY></HTML>");
out.close();```

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 59 Question Id : 640653904081 Question Type : MCQ Calculator : Yes
Correct Marks : 5
Question Label : Multiple Choice Question
Identify the component expression corresponding to the given code
Options :

6406533044379. ✖ $P_1 \cdot (P_2|(P_3^* \cdot (P_4 \cdot P_5|P_6))) \cdot P_7$

6406533044380. ✖ $P_1 \cdot ((P_2^* \cdot P_3 \cdot (P_4|P_5))|P_6) \cdot P_7$

6406533044381. ✖ $P_1 \cdot (P_2|(P_3^* \cdot P_4 \cdot (P_5|P_6))) \cdot P_7$

6406533044382. ✔ $P_1 \cdot (P_2|(P_3^* \cdot (P_4|P_5) \cdot P_6)) \cdot P_7$

Question Number : 60 Question Id : 640653904082 Question Type : MCQ Calculator : Yes
Correct Marks : 4

Question Label : Multiple Choice Question

From the following options, identify the content variable for code given.

Options :

6406533044383. ✖ `"Bonus budget:"`

6406533044384. ✖ `"</BODY></HTML>"`

6406533044385. ✔ `bonus_budget`

6406533044386. ✖ `out.println`

Question Id : 640653904091 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (61 to 62)

Question Label : Comprehension

Consider the following code segment for symbolic testing.

```
//code base
int pvsum(int x, int y) {
    int sum = 0, i = x;
    int r;
    while(i < y) {
        r = sym_input();
        if(r < 0)
            break;
        sum += r;
        i++;
    }
    return sum;
}
```

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 61 Question Id : 640653904092 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 n
of trues followed by a false.
Consider each r_j is a fresh symbolic value.

Options :

6406533044415. ✖ $(\bigwedge_{j \in [0,n]} (r_j > 0)) \bigwedge (r_{n+1} \le 0)$

6406533044416. ✔ $(\bigwedge_{j \in [1,n]} (r_j \ge 0)) \bigwedge (r_{n+1} < 0)$

6406533044417. ✖ $(\bigwedge_{j \in [x,y]} (r_j \ge 0)) \bigwedge (r_{y+1} < 0)$

6406533044418. ✖ $(\bigwedge_{j \in [x,y+n]} (r_j > 0)) \bigwedge (r_{n+1} \ge 0)$

Question Number : 62 Question Id : 640653904093 Question Type : MCQ Calculator : Yes
Correct Marks : 4
Question Label : Multiple Choice Question

Identify the value of sum at the end of the
symbolic execution of the while loop with a
sequence of n trues followed by a false.

Options :

6406533044419. ✖ $\{r \mapsto r_{n-1}, sum \mapsto \sum_{j \in [1,n]} r_j\}$

6406533044420. ✖ $\{r \mapsto r_n, sum \mapsto \prod_{j \in [1,n]} r_j\}$

6406533044421. ✔ $\{r \mapsto r_{n+1}, sum \mapsto \sum_{j \in [1,n]} r_j\}$

6406533044422. ✖ $\{r \mapsto r_{n+1}, sum \mapsto \prod_{j \in [1,n]} r_j\}$

Sub-Section Number :   7

Sub-Section Id :   640653134095

Question Shuffling Allowed :   No

Question Id : 640653904086 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (63 to 64)

Question Label : Comprehension

Consider the following method in Java.

```java
void search(int[] arr, int val){
    boolean test = false;
    for (int elem : arr) {
        if (elem == val) {
            test = true;
            break;
        }
    }
    return test;
}
```

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 63 Question Id : 640653904087 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 :

6406533044399. ✔ 1 for both node coverage and edge coverage

6406533044400. ✖ 1 for node coverage and 2 for edge coverage

6406533044401. ✖ 2 for both node coverage and edge coverage

6406533044402. ✖ 1 for node coverage and 3 for edge coverage

Question Number : 64 Question Id : 640653904088 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

What is the cyclomatic complexity of the given method?

Options :

6406533044403. ✔ 3

6406533044404. ✳ 4

6406533044405. ✳ 5

6406533044406. ✳ 6

Sub-Section Number :   8

Sub-Section Id :   640653134096

Question Shuffling Allowed :   No

Question Id : 640653904095 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (65 to 66)

Question Label : Comprehension

Consider the predicate given below:
$p = a \vee (b \vee c)$.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 65 Question Id : 640653904096 Question Type : MCQ Calculator : Yes Correct Marks : 5

Question Label : Multiple Choice Question

Identify the condition when a determines p.

Options :

6406533044427. ✳ When $(b \vee c)$ is true

6406533044428. ✔ When $(b \vee c)$ is false

6406533044429. ✳ When $(b \vee \neg c)$ is true

6406533044430. ✳ When $(b \wedge \neg c)$ is false

Question Number : 66 Question Id : 640653904097 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 :

6406533044431. ✖ $\{(a=T,b=T,c=T),(a=T,b=F,c=T)\}$ 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 $p=false$

6406533044432. ✖ $\{(a=T,b=T,c=T), (a=T,b=T,c=F)\}, \{(a=T,b=T,c=F), (a=T,b=F,c=F)\}, \{(a=F,b=T,c=T), (a=F,b=F,c=T)\}$ for $p=T$, and No feasible pairs for $p=F$.

6406533044433. ✖ No feasible pairs for $p=T$, and $\{(a=T,b=F,c=F), (a=F,b=F,c=F)\}$ for $p=F$

6406533044434. ✔ $\{(a=T,b=T,c=T), (a=F,b=T,c=T)\}, \{(a=T,b=T,c=F), (a=F,b=T,c=F)\}, \{(a=T,b=F,c=T), (a=F,b=F,c=T)\}$ for $p=T$, and No feasible pairs for $p=F$.