

# Indian Institute of Technology, Madras - Centre for Continuing Education

## Notations :

- Options shown in green color and with ✓ icon are correct.
- Options shown in red color and with ✗ icon are incorrect.

<b>Question Paper Name :</b>	IIT M DIPLOMA AN4 EXAM QPD4 26 Feb 2023
<b>Subject Name :</b>	2023 Feb: IIT M DIPLOMA AN4 EXAM QPD4
<b>Creation Date :</b>	2023-02-22 17:08:46
<b>Duration :</b>	240
<b>Total Marks :</b>	750
<b>Display Marks:</b>	Yes
<b>Share Answer Key With Delivery Engine :</b>	Yes
<b>Actual Answer Key :</b>	Yes
<b>Calculator :</b>	Scientific
<b>Magnifying Glass Required? :</b>	No
<b>Ruler Required? :</b>	No
<b>Eraser Required? :</b>	No
<b>Scratch Pad Required? :</b>	No
<b>Rough Sketch/Notepad Required? :</b>	No
<b>Protractor Required? :</b>	No
<b>Show Watermark on Console? :</b>	Yes
<b>Highlighter :</b>	No
<b>Auto Save on Console?</b>	Yes
<b>Change Font Color :</b>	No
<b>Change Background Color :</b>	No

<b>Change Theme :</b>	No
<b>Help Button :</b>	No
<b>Show Reports :</b>	No
<b>Show Progress Bar :</b>	No

## **Group I**

<b>Group Number :</b>	1
<b>Group Id :</b>	64065311136
<b>Group Maximum Duration :</b>	0
<b>Group Minimum Duration :</b>	90
<b>Show Attended Group? :</b>	No
<b>Edit Attended Group? :</b>	No
<b>Break time :</b>	0
<b>Group Marks :</b>	750
<b>Is this Group for Examiner? :</b>	No
<b>Examiner permission :</b>	Cant View
<b>Show Progress Bar? :</b>	No
<b>Revisit allowed for group Instructions? :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Minimum Instruction Time :</b>	0
<b>Group Time In :</b>	Minutes
<b>Navigate To Group Summary From Last Question? :</b>	No
<b>Disable Submit Button During Assessment? :</b>	No
<b>Section Selection Time? :</b>	0
<b>No of Optional sections to be attempted :</b>	0

<b>Section Id :</b>	64065330357
<b>Section Number :</b>	1
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	10
<b>Number of Questions to be attempted :</b>	10
<b>Section Marks :</b>	25
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065367834
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 1 Question Id : 640653470474 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 "MATHEMATICS FOR DATA SCIENCE II"**

**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 :**

6406531563373. ✓ YES

6406531563374. ✘ NO

**Sub-Section Number :**

2

**Sub-Section Id :**

64065367835

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

**Question Number : 2 Question Id : 640653470475 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

**Question Label : Multiple Choice Question**

Match the systems of linear equations in Column A with their number of solutions in column B and their geometric representation in Column C.

	System of linear equations (Column A)		Number of solutions (Column B)		Geometric representations (Column C)
i)	$x - y - z = 8, -x + y + z = 4$	a)	No solution	1)	
ii)	$x + y - z = 3, x - y + z = 3$	b)	Infinitely many solutions	2)	

Table: M2Q1:1

Choose the correct option from the following:

**Options :**

6406531563375. ✘ i) → b → 1, ii) → a → 2.

6406531563376. ✘ i) → a → 1, ii) → b → 2.

6406531563377. ✘ i) → b → 2, ii) → a → 1.

6406531563378. ✓ i) → a → 2, ii) → b → 1.

**Question Number : 3 Question Id : 640653470482 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Under which of the following conditions on  $a$  and  $b$  does the system of linear equations

$$\begin{bmatrix} 3 & -2 & 1 \\ 5 & -8 & 9 \\ 2 & 1 & a \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} b \\ 3 \\ -1 \end{bmatrix}$$
 have no solution?

**Options :**

6406531563396. ✓  $a = -3, b \neq \frac{1}{3}$

6406531563397. ✗  $a = \frac{2}{3}, b \neq \frac{1}{3}$

6406531563398. ✗  $a \neq \frac{1}{4}, b = \frac{1}{3}$

6406531563399. ✗  $a \neq -3, b \neq \frac{1}{3}$

**Sub-Section Number :** 3

**Sub-Section Id :** 64065367836

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 4 Question Id : 640653470476 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following matrices are not the square of a  $3 \times 3$  matrix with real entries?

**Options :**

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

6406531563379. \*

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

6406531563380. ✓

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

6406531563381. \*

$$\begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

6406531563382. ✓

**Sub-Section Number :**

4

**Sub-Section Id :**

64065367837

**Question Shuffling Allowed :**

No

**Is Section Default? :**

null

**Question Id : 640653470477 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 : (5 to 6)**

Question Label : Comprehension

Let  $M$  and  $N$  be two  $3 \times 3$  matrices such that  $MN = NM$ .

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 5 Question Id : 640653470478 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following is true?

**Options :**

6406531563383. ✘  $M^2N = N^2M$

6406531563384. ✘  $M^2 + N^2 = (M + N)^2$

6406531563385. ✓  $M^2 - N^4 = (M - N^2)(M + N^2)$

6406531563386. ✘ None of the other options are true.

**Question Number : 6 Question Id : 640653470479 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Suppose further that  $M \neq N^2$

and  $M^2 = N^4$ , then which of the following is true?

**Options :**

6406531563387. ✘  $\det(M^2 + MN^2) = 1$

6406531563388. ✘  $\det(M^2 + MN^2) < 0$

6406531563389. ✘  $\det(M^2 + MN^2)$  can be any real number

6406531563390. ✓ None of the other options are true.

**Sub-Section Number :** 5

**Sub-Section Id :** 64065367838

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 7 Question Id : 640653470480 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

**Question Label :** Short Answer Question

Find out the value of  $a$  for which the matrix  $\begin{bmatrix} a & 3 \\ 0 & -5 \end{bmatrix}$  will be in the spanning set of the matrices  $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$  and  $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$  in  $M_{2\times 2}(\mathbb{R})$  with usual matrix addition and scalar multiplication.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

11

**Question Number : 8 Question Id : 640653470484 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

**Question Label :** Short Answer Question

Let  $W$  be the set of  $3\times 3$  skew-symmetric real matrices, i.e.

$$W = \{A \in M_{3\times 3}(\mathbb{R}) \mid A^T = -A\}.$$

$W$  is a vector subspace of  $M_{3\times 3}(\mathbb{R})$  with usual matrix addition and scalar multiplication.

What is the dimension of  $W$ ?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

3

**Sub-Section Number :**

6

**Sub-Section Id :** 64065367839

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 9 Question Id : 640653470481 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

If  $A$  and  $B$  are two skew-symmetric matrices of order  $n$ , i.e.,  $A^T = -A$  and  $B^T = -B$ , where  $A^T$  denotes the transpose of  $A$ , then

**Options :**

6406531563392. ❌  $AB$  is a skew-symmetric matrix.

6406531563393. ❌  $AB$  is a symmetric matrix ( $M$  is a symmetric matrix if  $M^T = M$ ).

6406531563394. ✓  $AB$  is a symmetric matrix if  $A$  and  $B$  commute.

6406531563395. ❌  $AB$  must be a diagonal matrix.

**Sub-Section Number :** 7

**Sub-Section Id :** 64065367840

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 10 Question Id : 640653470483 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Short Answer Question

Two vector subspaces  $W_1$  and  $W_2$  of  $\mathbb{R}^3$  are defined as follows:

$$W_1 = \{(x, y, 0) \mid x, y \in \mathbb{R}\}$$

and

$$W_2 = \{(0, y, z) \mid y, z \in \mathbb{R}\}$$

with usual addition and scalar multiplication, i.e.,

*Addition:*  $(x_1, y_1, z_1) + (x_2, y_2, z_2) = (x_1 + x_2, y_1 + y_2, z_1 + z_2);$   
 $(x_1, y_1, z_1), (x_2, y_2, z_2) \in \mathbb{R}^3$

*Scalar multiplication:*  $c(x, y, z) = (cx, cy, cz); (x, y, z) \in \mathbb{R}^3, c \in \mathbb{R}.$

What is the dimension of  $W_1 \cap W_2$ ?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

**Sub-Section Number :** 8

**Sub-Section Id :** 64065367841

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id :** 640653470485 **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 :** (11 to 15)

**Question Label :** Comprehension

For some fixed real number  $\alpha \neq 0$  define the set  $V_\alpha = \{(x, \alpha, y) \mid x, y \in \mathbb{R}\}$  along with the following operations:

*Addition:*  $(x_1, \alpha, y_1) + (x_2, \alpha, y_2) = (x_1 + x_2, \alpha, y_1 + y_2);$   
 $(x_1, \alpha, y_1), (x_2, \alpha, y_2) \in V_\alpha$

*Scalar multiplication:*  $c(x, \alpha, y) = (cx, \alpha, cy); (x, \alpha, y) \in V_\alpha, c \in \mathbb{R}.$

Answer the subquestions with respect to the given information.

### Sub questions

**Question Number : 11 Question Id : 640653470486 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is(are) true?

**Options :**

6406531563402. ✘  $V_\alpha$  is closed under the given addition but not closed under the given scalar multiplication.

6406531563403. ✘  $V_\alpha$  is not closed under the given addition but closed under the given scalar multiplication.

6406531563404. ✘  $V_\alpha$  is neither closed under the given addition nor closed under the given scalar multiplication.

6406531563405. ✓  $V_\alpha$  is closed under the given addition and also closed under the given scalar multiplication.

**Question Number : 12 Question Id : 640653470487 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is(are) correct?

**Options :**

$V_\alpha$  has no zero element with respect to the given addition.

6406531563406. ✘

(0, 0, 0) is the zero element of  $V_\alpha$  with respect to the given addition.

6406531563407. ✘

(0,  $\alpha$ , 0) is the zero element of  $V_\alpha$  with respect to the given addition.

6406531563408. ✓

( $\alpha$ ,  $\alpha$ ,  $\alpha$ ) is the zero element of  $V_\alpha$  with respect to the given addition.

6406531563409. ✘

**Question Number : 13 Question Id : 640653470488 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Consider the element  $v = (2, \alpha, 0)$ .

Which of the following options  
is(are) correct?

**Options :**

6406531563410. ✘  $v$  is not an element of  $V_\alpha$ .

$v$  has no inverse element with respect to the given addition in  $V_\alpha$ .

6406531563411. ✘

6406531563412. ✓  $(-1)v$  is the inverse element of  $V_\alpha$ .

6406531563413. ✓  $(-2, \alpha, 0)$  is the inverse element of  $V_\alpha$ .

**Question Number : 14 Question Id : 640653470489 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Choose the correct option(s).

**Options :**

For each element of  $v \in V_\alpha$  and for

6406531563414. ✓ each pair  $a, b \in \mathbb{R}$ ,  $(a+b)v = av + bv$ .

For each vector of  $a \in \mathbb{R}$  and for each

6406531563415. ✓ pair  $v_1, v_2 \in V_\alpha$ ,  $a(v_1 + v_2) = av_1 + av_2$ .

For any real number  $c$ , we always

have  $c(0, \alpha, 1) = (0, \alpha, 1)$ .

6406531563416. ✗

There does not exist any real  
number  $c$ , such that

$c(0, \alpha, 1) = (0, \alpha, 1)$

6406531563417. ✗

**Question Number : 15 Question Id : 640653470490 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Consider the subset  $S = \{(1, \alpha, 0), (0, \alpha, 1)\}$

of  $V_\alpha$ . Which of the following options

is(are) true?

**Options :**

6406531563418. ✓  $S$  is linearly independent.

6406531563419. ✗  $\text{Span}(S) \neq V_\alpha$ .

6406531563420. ✓  $S$  forms a basis of  $V_\alpha$ .

6406531563421. ✗  $\dim(V_\alpha) = 3$

## Statistics2

**Section Id :** 64065330358

**Section Number :** 2

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 12

**Number of Questions to be attempted :** 12

**Section Marks :** 40

**Display Number Panel :** Yes

**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 :** 64065367842

**Question Shuffling Allowed :**

No

**Is Section Default? :**

null

**Question Number : 16 Question Id : 640653470491 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 "STATISTICS FOR DATA SCIENCE II"**

**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 :**

6406531563422. ✓ YES

6406531563423. ✗ NO

**Question Number : 17 Question Id : 640653470492 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

Discrete random variables:

Distribution	PMF ( $f_X(k)$ )	CDF ( $F_X(x)$ )	$E[X]$	$\text{Var}(X)$
Uniform( $A$ ) $A = \{a, a+1, \dots, b\}$	$\frac{1}{n}, \quad x = k$ $n = b - a + 1$ $k = a, a+1, \dots, b$	$\begin{cases} 0 & x < 0 \\ \frac{k-a+1}{n} & k \leq x < k+1 \\ & k = a, a+1, \dots, b-1, b \\ 1 & x \geq n \end{cases}$	$\frac{a+b}{2}$	$\frac{n^2-1}{12}$
Bernoulli( $p$ )	$\begin{cases} p & x = 1 \\ 1-p & x = 0 \end{cases}$	$\begin{cases} 0 & x < 0 \\ 1-p & 0 \leq x < 1 \\ 1 & x \geq 1 \end{cases}$	$p$	$p(1-p)$
Binomial( $n, p$ )	${}^n C_k p^k (1-p)^{n-k},$ $k = 0, 1, \dots, n$	$\begin{cases} 0 & x < 0 \\ \sum_{i=0}^k {}^n C_i p^i (1-p)^{n-i} & k \leq x < k+1 \\ & k = 0, 1, \dots, n \\ 1 & x \geq n \end{cases}$	$np$	$np(1-p)$
Geometric( $p$ )	$(1-p)^{k-1} p,$ $k = 1, \dots, \infty$	$\begin{cases} 0 & x < 0 \\ 1 - (1-p)^k & k \leq x < k+1 \\ & k = 1, \dots, \infty \end{cases}$	$\frac{1}{p}$	$\frac{1-p}{p^2}$
Poisson( $\lambda$ )	$\frac{e^{-\lambda} \lambda^k}{k!},$ $k = 0, 1, \dots, \infty$	$\begin{cases} 0 & x < 0 \\ e^{-\lambda} \sum_{i=0}^k \frac{\lambda^i}{i!} & k \leq x < k+1 \\ & k = 0, 1, \dots, \infty \end{cases}$	$\lambda$	$\lambda$

Continuous random variables:

Distribution	PDF ( $f_X(k)$ )	CDF ( $F_X(x)$ )	$E[X]$	$\text{Var}(X)$
Uniform $[a, b]$	$\frac{1}{b-a}, a \leq x \leq b$	$\begin{cases} 0 & x \leq a \\ \frac{x-a}{b-a} & a < x < b \\ 1 & x \geq b \end{cases}$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$
Exp( $\lambda$ )	$\lambda e^{-\lambda x}, x > 0$	$\begin{cases} 0 & x \leq 0 \\ 1 - e^{-\lambda x} & x > 0 \end{cases}$	$\frac{1}{\lambda}$	$\frac{1}{\lambda^2}$
Normal( $\mu, \sigma^2$ )	$\frac{1}{\sigma\sqrt{2\pi}} \exp\left(\frac{-(x-\mu)^2}{2\sigma^2}\right),$ $-\infty < x < \infty$	No closed form	$\mu$	$\sigma^2$
Gamma( $\alpha, \beta$ )	$\frac{\beta^\alpha}{\Gamma(\alpha)} x^{\alpha-1} e^{-\beta x}, x > 0$		$\frac{\alpha}{\beta}$	$\frac{\alpha}{\beta^2}$
Beta( $\alpha, \beta$ )	$\frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)} x^{\alpha-1} (1-x)^{\beta-1}$ $0 < x < 1$		$\frac{\alpha}{\alpha+\beta}$	$\frac{\alpha\beta}{(\alpha+\beta)^2(\alpha+\beta+1)}$

1. Markov's inequality: Let  $X$  be a discrete random variable taking non-negative values with a finite mean  $\mu$ . Then,

$$P(X \geq c) \leq \frac{\mu}{c}$$

2. Chebyshev's inequality: Let  $X$  be a discrete random variable with a finite mean  $\mu$  and a finite variance  $\sigma^2$ . Then,

$$P(|X - \mu| \geq k\sigma) \leq \frac{1}{k^2}$$

### Options :

6406531563424. ✓ Useful Data has been mentioned above.

6406531563425. ✗ This data attachment is just for a reference & not for an evaluation.

**Sub-Section Number :** 2

**Sub-Section Id :** 64065367843

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 18 Question Id : 640653470493 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

The joint PMF of two discrete random variables  $X$  and  $Y$  is

$$f_{XY}(x, y) = \begin{cases} \frac{1}{27}(2x + y), & x, y \in \{0, 1, 2\}, \\ 0, & \text{otherwise} \end{cases}$$

What is the value of  $P(0 \leq X < 1.5 | X > 0)$ ?

**Options :**

6406531563426. ✘  $\frac{1}{3}$

6406531563427. ✘  $\frac{1}{9}$

6406531563428. ✓  $\frac{3}{8}$

6406531563429. ✘  $\frac{24}{27}$

**Question Number : 19 Question Id : 640653470494 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Let  $X \sim \text{Uniform}\{-2, -1, 0, 1, 2\}$  and  $Y \sim \text{Uniform}\{-1, 1\}$  be two independent random variables. Define another random variable  $Z = |X| - |Y|$ . Find the PMF of  $Z$ .

**Options :**

$z$	-1	0	1
$f(z)$	2/5	1/5	2/5

6406531563431. ✘

$z$	-1	0	1
$f(z)$	1/10	2/5	3/10

$z$	-3	-2	-1	0	1	2	3
$f(z)$	1/10	1/10	1/5	1/5	1/5	1/10	1/10

6406531563432. ✘

$z$	-1	0	1
$f(z)$	1/5	2/5	2/5

6406531563433. ✓

**Question Number : 20 Question Id : 640653470497 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Consider a function  $f : \mathbb{R} \rightarrow \mathbb{R}$  such that

$$f(x) = \begin{cases} e^{(1-ax)}, & 0 < x < \infty, \\ 0, & \text{otherwise,} \end{cases}$$

where  $a$  is any real constant. Find  $a$  such that the function  $f$  is a valid density function.

Hint:  $\int e^{kx} dx = \frac{e^{kx}}{k}$

**Options :**

6406531563436. ✘  $\frac{1}{e}$

6406531563437. ✘  $1 - e$

6406531563438. ✘  $\frac{2}{e} - \frac{1}{e^2}$

6406531563439. ✓  $e$

<b>Sub-Section Number :</b>	3
<b>Sub-Section Id :</b>	64065367844
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 21 Question Id : 640653470495 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Short Answer Question

The joint PMF of two discrete random variables  $X$  and  $Y$  is given in the following table:

$\backslash$	$X$	-1	0
$Y$			
-1	$\frac{1}{12}$	$\frac{1}{\alpha}$	
0	$\frac{1}{6}$	$\frac{1}{3}$	
1	$\frac{1}{4} - \frac{1}{\alpha}$	$\frac{1}{6}$	

In the table,  $\alpha$  is any positive real number. Find the value of  $\alpha$  such that  $\text{Cov}(X, Y) = 0$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

6

**Question Number : 22 Question Id : 640653470496 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Short Answer Question

Suppose an unbiased coin is tossed  $n$  times. Let  $Y$  denote the ratio of the number of heads to the number of tosses. Using Chebyshev's inequality, find the minimum value of  $n$  such that the probability that  $Y$  lies between 0.4 and 0.6 is at least 0.9.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

250

**Sub-Section Number :** 4

**Sub-Section Id :** 64065367845

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653470498 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 : (23 to 24)**

Question Label : Comprehension

An unbiased coin is tossed three times independently. Let

$X$  represent the number of heads,

$Y$  represent the number of tails after the first toss.

Define another random variable  $U = XY$ .

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 23 Question Id : 640653470499 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Find the PMF of  $U$ .

**Options :**

$u$	0	1	2
$f(u)$	1/4	1/4	1/2

6406531563440. \*

$u$	0	1	2	3
$f(u)$	1/8	1/4	1/2	1/8

6406531563441. \*

$u$	0	1	2
$f(u)$	3/8	1/4	3/8

6406531563442. ✓

$u$	0	2
$f(u)$	1/4	3/4

6406531563443. \*

**Question Number : 24 Question Id : 640653470500 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Short Answer Question

If  $P(U = a|U \geq 1) = \frac{3}{5}$ ,

then find the value of  $a$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

**Question Id : 640653470501 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 : (25 to 26)**

Question Label : Comprehension

Urn I contains three balls numbered 0, 1, and 2, and Urn II contains three balls numbered 1, 2, and 3. One ball from each of the urns is drawn randomly and independently. Let

$X_1$  denote the number on the ball drawn from Urn I,

$X_2$  denote the number on the ball drawn from Urn-II.

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 25 Question Id : 640653470502 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Short Answer Question

Suppose  $Y = X_1 - X_2$ . Find the value of  $P(Y \geq 0)$ . Enter the answer correct to two decimal places.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

0.31 to 0.35

**Question Number : 26 Question Id : 640653470503 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Suppose  $Z = \max(X_1, X_2)$ .

Find the value of  $P(Z \leq 1)$ .

**Options :**

6406531563446. ✘  $\frac{2}{3}$

6406531563447. ✘  $\frac{1}{9}$

6406531563448. ✓  $\frac{2}{9}$

6406531563449. ✘  $\frac{4}{9}$

**Question Id : 640653470504 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 : (27 to 28)**

Question Label : Comprehension

Two matches are played between John and Walter. The probability that John wins the first match against Walter is 0.75. The probability that John wins the second match given that he won the first is 0.9, and the probability that John wins the second match given that he lost the first is 0.5. No match ends in a draw. Let  $X_1, X_2$  be two random variables defined as

$$X_i = \begin{cases} 1 & \text{if John wins the } i^{\text{th}} \text{ match} \\ 0 & \text{if Walter wins the } i^{\text{th}} \text{ match} \end{cases}$$

for  $i \in \{1, 2\}$ .

Based on the above data, answer the given subquestions.

### **Sub questions**

**Question Number : 27 Question Id : 640653470505 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Find the joint PMF of  $X_1$  and  $X_2$ .

**Options :**

$X_1 \backslash X_2$	0	1
0	$\frac{1}{8}$	$\frac{1}{8}$
1	$\frac{3}{40}$	$\frac{27}{40}$

6406531563450. \*

$X_1 \backslash X_2$	0	1
0	$\frac{1}{8}$	$\frac{27}{40}$
1	$\frac{1}{8}$	$\frac{3}{40}$

6406531563451. \*

$X_1$	0	1
$X_2$		
0	$\frac{1}{8}$	$\frac{3}{40}$
1	$\frac{1}{8}$	$\frac{27}{40}$

6406531563452. ✓

$X_1$	0	1
$X_2$		
0	$\frac{1}{8}$	$\frac{1}{8}$
1	$\frac{27}{40}$	$\frac{3}{40}$

6406531563453. ✗

**Question Number : 28 Question Id : 640653470506 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Short Answer Question

Find the probability that John loses the second match. Enter the answer correct to one decimal place.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

0.19 to 0.21

**Question Id : 640653470507 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 : (29 to 30)**

**Question Label : Comprehension**

From a well-shuffled deck of 52 cards, one card is drawn randomly. Let  $X$  and  $Y$  be defined as

$$X = \begin{cases} 0, & \text{if the drawn card is a red color card(Hearts or Diamonds),} \\ 1, & \text{otherwise} \end{cases}$$

$$Y = \begin{cases} 0, & \text{if the drawn card is a face card(J or Q or K),} \\ 1, & \text{otherwise} \end{cases}$$

Based on the above data, answer the given subquestions.

### **Sub questions**

**Question Number : 29 Question Id : 640653470508 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

**Question Label : Short Answer Question**

Find  $E[X^2Y^2]$ . Enter the answer

correct to three decimal places.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

0.36 to 0.41

**Question Number : 30 Question Id : 640653470509 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

**Question Label : Multiple Choice Question**

Find  $\text{Var}(XY)$ .

**Options :**

6406531563456. ✘  $\frac{69}{676}$

6406531563457. ✓  $\frac{40}{169}$

6406531563458. ✘ 0

6406531563459. ✘  $\frac{1}{2704}$

**Question Id : 640653470510 Question Type : COMPREHENSION Sub Question Shuffling**

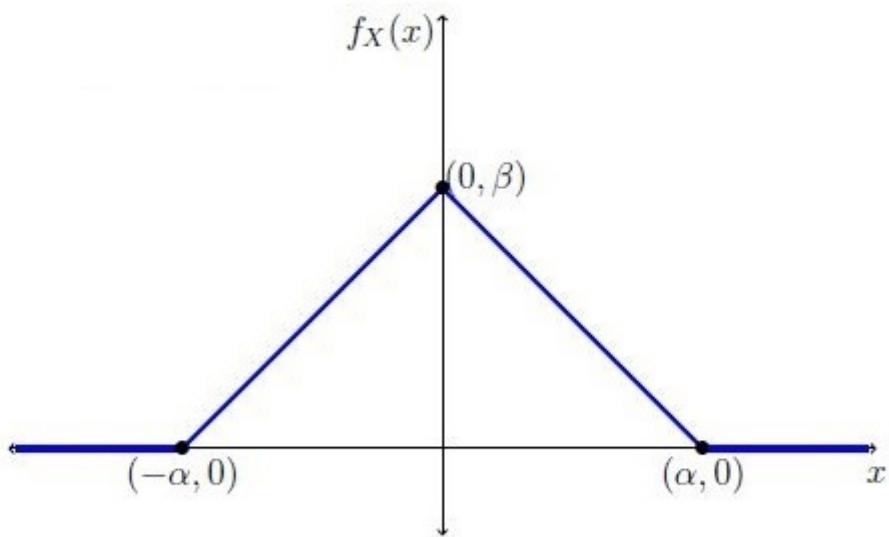
**Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (31 to 32)**

Question Label : Comprehension

The graph of a probability density function ( $f_X(x)$ ) of a continuous random variable ( $X$ ) is shown below:



5.1: Graph of a pdf of  $X$

where  $\alpha, \beta \in \mathbb{R}$ .

Based on the above data, answer the given subquestions.

### Sub questions

**Question Number : 31 Question Id : 640653470511 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is true?

**Options :**

6406531563460. ✘  $\alpha\beta = \frac{1}{2}$

6406531563461. ✓  $\alpha\beta = 1$

6406531563462. ✘  $\alpha\beta = 2$

6406531563463. ✘  $\frac{1}{\alpha} + \frac{1}{\beta} = 1$

**Question Number : 32 Question Id : 640653470512 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Short Answer Question

Find  $P\left(|X| > \frac{\alpha}{2}\right)$ . Enter the answer

correct to two decimal places.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

0.23 to 0.27

## CT

<b>Section Id :</b>	64065330359
<b>Section Number :</b>	3
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	15
<b>Number of Questions to be attempted :</b>	15
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065367846
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 33 Question Id : 640653470513 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 "[COMPUTATIONAL THINKING](#)"**

**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 :**

6406531563465. ✓ YES

6406531563466. ✗ NO

**Question Number : 34 Question Id : 640653470514 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

<b>Scores</b>								
SeqNo	Name	Gender	DateOfBirth	TownCity	Mathematics	Physics	Chemistry	Total
0	Bhuvanesh	M	7 Nov	Erode	68	64	78	210
■ ■ ■								
29	Naveen	M	13 Oct	Vellore	72	66	81	219

<b>Words</b>			
SeqNo	Word	PartOfSpeech	LetterCount
0	It	Pronoun	2
■ ■ ■			
64	cane.	Noun	4

<b>Library</b>							
SeqNo	Name	Author	Genre	Language	Pages	Publisher	Year
0	Igniting Minds	Kalam	Nonfiction	English	178	Penguin	2002
■ ■ ■							
29	Malgudi Days	Narayan	Fiction	English	150	Indian Thought	1943

# Olympics

SeqNo	Name	Gender	Nationality	Host country	Year	Sport	Medal
0	Karnam Malleswari	F	Indian	Australia	2000	Weightlifting	Bronze
- - -							
49	Michael Phelps	M	American	China	2008	Swimming	Gold

## Three sample cards out of 30 for Shopping Bills dataset

Item List



SV Stores		Srivatsan		1
Item	Category	Qty	Price	Cost
Carrots	Vegetables/Food	1.5	50	75
Soap	Toiletries	4	32	128
Tomatoes	Vegetables/Food	2	40	80
Bananas	Vegetables/Food	8	8	64
Socks	Footwear/Apparel	3	56	168
Curd	Dairy/Food	0.5	32	16
Milk	Dairy/Food	1.5	24	36
				567

Sun General		Vignesh		14
Item	Category	Qty	Price	Cost
Phone Charger	Utilities	1	230	230
Razor Blades	Grooming	1	12	12
Razor	Grooming	1	45	45
Shaving Lotion	Grooming	0.8	180	144
Earphones	Electronics	1	210	210
Pencils	Stationery	3	5	15
				656

Big Bazaar		Sudeep		2
Item	Category	Qty	Price	Cost
Baked Beans	Canned/Food	1	125	125
Chicken Wings	Meat/Food	0.5	600	300
Cocoa powder	Canned/Food	1	160	160
Capsicum	Vegetables/Food	0.8	180	144
Tie	Apparel	2	390	780
Clips	Household	0.5	32	16
				1525

Options :

6406531563467. ✓ Useful Data has been mentioned above.

6406531563468. ❌ This data attachment is just for a reference & not for an evaluation.

Sub-Section Number :

2

Sub-Section Id :

64065367847

Question Shuffling Allowed :

Yes

Is Section Default? :

null

Question Number : 35 Question Id : 640653470515 Question Type : MCQ Is Question

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

Time : 0

Correct Marks : 2

Question Label : Multiple Choice Question

Let X and Y be two rows in the "Words" dataset. Select the most appropriate datatype for each item/expression in the left column.

Field	Data Type
a. X.Word == Y.Word	1. String
b. X.Word == "a"	2. Invalid
c. X.PartOfSpeech	3. Boolean
d. X.LetterCount	4. Integer

### Options :

6406531563469. ✓ a - (3), b - (3), c- (1), d - (4)

6406531563470. ✗ a - (1), b - (3), c- (4), d - (3)

6406531563471. ✗ a - (3), b - (2), c- (1), d - (4)

6406531563472. ✗ a - (1), b - (2), c- (3), d - (4)

**Question Number : 36 Question Id : 640653470516 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Words" dataset. What will **count** represent at the end of the execution?

```
1 count = 0
2 while(Table 1 has more rows){
3     flag = False
4     Read the first row X in Table 1
5     if(X.Partofspeech == "Noun"){
6         flag = True
7     }
8     if(X.LetterCount >= 4){
9         flag = True
10    }
11    if(flag){
12        count = count + 1
13    }
14    Move X to Table 2
15 }
```

**Options :**

6406531563473. ✘ Number of words which are nouns and have at least four letters
6406531563474. ✘ Number of words which are either nouns or have at least four letters but not both
6406531563475. ✓ Number of words which are either nouns or have at least four letters or both
6406531563476. ✘ Number of words which are not nouns and have at most three letters

**Sub-Section Number :** 3

**Sub-Section Id :** 64065367848

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 37 Question Id : 640653470517 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

The following pseudocode is executed using the "Scores" dataset. What will **count2** represent at the end of the execution?

```
1 count1 = 0, count2 = 0
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     if(X.Gender == 'F' or X.Mathematics > X.Physics){
5         count1 = count1 + 1
6     }
7     else{
8         count2 = count2 + 1
9     }
10    Move X to Table 2
11 }
```

**Options :**

6406531563477. ✘ Number of male students whose Physics marks are greater than Mathematics marks
6406531563478. ✓ Number of male students whose Physics marks are greater than or equal to Mathematics marks
6406531563479. ✘ Number of female students whose Physics marks are greater than or equal to

## Mathematics marks

6406531563480. ✖ Number of female students whose Physics marks are less than or equal to Mathematics marks

**Question Number : 38 Question Id : 640653470518 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Library" dataset. Procedure **biGenre(A)** returns True if the author A has written equal number of fictional and non-fictional books. Choose the correct code fragment to complete the pseudocode. Assume that the dataset has only two possible genres.

```
1 Procedure biGenre(A)
2     count = 0
3     while(Table 1 has more rows){
4         Read the first row x in Table 1
5         Move X to Table 2
6         *****
7         * Fill the code *
8         *****
9     }
10    if(count == 0){
11        return(True)
12    }
13    return(False)
14 End biGenre
```

**Options :**

```
1 if(x.Author == A){
2     if(x.Genre == "Fiction"){
3         count = count + 1
4     }
5     else{
6         count = count - 1
7     }
8 }
```

6406531563481. ✓

6406531563482. ✖

```
1 if(x.Author == A){  
2     if(x.Genre == "Fiction"){  
3         count = 1  
4     }  
5     else{  
6         count = - 1  
7     }  
8 }
```

```
1 if(x.Author == A){  
2     count = count + 1  
3 }  
4 if(x.Genre == "Fiction"){  
5     count = count + 1  
6 }  
7 else{  
8     count = count - 1  
9 }
```

6406531563483. \*

```
1 if(x.Author == A){  
2     if(x.Genre == "Fiction"){  
3         return(True)  
4     }  
5     else{  
6         return(False)  
7     }  
8 }
```

6406531563484. \*

**Question Number : 39 Question Id : 640653470519 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Olympics" dataset. What will **count** represent at the end of the execution? Assume that every player has a distinct name.

```
1 count = 0
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     Move X to Table 2
5     flag = False
6     while(Table 1 has more rows){
7         Read the first row Y in Table 1
8         if(X.Name == Y.Name){
9             if((X.Sport == Y.Sport) and (X.Medal != Y.Medal)){
10                flag = True
11            }
12            Move Y to Table 2
13        }
14        else{
15            Move Y to Table 3
16        }
17    }
18    if(flag){
19        count = count + 1
20    }
21    Move all rows from Table 3 to Table 1
22 }
```

#### Options :

6406531563485. ✓ Number of players who have won different medals in the same sport

6406531563486. ✗ Number of players who have won the same medal in different sports

6406531563487. ✗ Number of pairs of players who have won different medals in the same sport

6406531563488. ✗ Number of pairs of players who have won the same medal in different sports

**Sub-Section Number :** 4

**Sub-Section Id :** 64065367849

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 40 Question Id : 640653470520 Question Type : MSQ Is Question**

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

**Correct Marks : 4 Selectable Option : 0**

## Question Label : Multiple Select Question

The following pseudocode is executed using the "Library" dataset. Assume there are  $m$  books with distinct names that are written by  $n$  authors and each book is written by only one author. Assume that every author has a distinct name.

```
1 count1 = 0, count2 = 0
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     Move X to Table 2
5     count1 = count1 + 1
6     while(Table 1 has more rows){
7         Read the first row Y in Table 1
8         if(X.Author == Y.Author){
9             count2 = count2 + 1
10        Move Y to Table 2
11    }
12    else{
13        Move Y to Table 3
14    }
15 }
16 Move all rows from Table 3 to Table 1
17 }
```

At the end of the execution of the above pseudocode, choose the correct option(s). It is a Multiple Select Question (MSQ).

### Options :

6406531563489. ✓ count1 = n

6406531563490. ✗ count1 = m

6406531563491. ✓ count2 = m - n

6406531563492. ✗ count2 = m + n

**Question Number : 41 Question Id : 640653470521 Question Type : MSQ Is Question**

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

**Correct Marks : 4 Selectable Option : 0**

Question Label : Multiple Select Question

The following pseudocode is executed using the "Scores" dataset. At the end of the execution, **A** captures the number of students who are either male from Bengaluru or have scored lower marks in Physics than the average Physics marks. Assume that the variable **Avg** holds the value of the average Physics marks. But the pseudocode may have mistakes. Identify all such mistakes (if any). Assume that all statements not listed in the options below are free of errors.

It is a Multiple Select Question (MSQ).

```
1 A = 0
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     C = False, D = False
5     if(X.Gender == 'M' or X.TownCity == "Bengaluru"){
6         C = True
7     }
8     if(X.Physics < Avg){
9         D = True
10    }
11    if(C and D){
12        A = A + 1
13    }
14    Move X to Table 2
15 }
```

### Options :

6406531563493. ❌ Line 1: Incorrect initialization of **A**

6406531563494. ✓ Line 5: Condition to update **C** is incorrect

6406531563495. ✓ Line 11: Condition to update **A** is incorrect

6406531563496. ❌ No error in the code

**Sub-Section Number :** 5

**Sub-Section Id :** 64065367850

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 42 Question Id : 640653470522 Question Type : MSQ Is Question**

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

**Correct Marks : 5 Selectable Option : 0**

**Question Label : Multiple Select Question**

The following pseudocode is executed using the "Scores" dataset. At the end of the execution, **count** captures the number of pairs of students who are of the same gender or are from the same city but not both. Choose the correct code fragment to complete the pseudocode.

It is a Multiple Select Question (MSQ).

```
1 count = 0
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     Move X to Table 2
5     while(Table 1 has more rows){
6         Read the first row Y in Table 1
7         Move Y to Table 3
8         count = count + findPair(X, Y)
9     }
10    Move all rows from Table 3 to Table 1
11 }
12 Procedure findPair(X, Y)
13 *****
14 ***** Fill the code *****
15 *****
16 End findPair
```

**Options :**

```
1 A = 0, B = 0
2 if(X.Gender == Y.Gender or X.TownCity == Y.TownCity){
3     A = A + 1
4 }
5 if(X.Gender == Y.Gender and X.TownCity == Y.TownCity){
6     B = B + 1
7 }
8 return(A-B)
```

6406531563497. ✓

```
1 A = 0, B = 0
2 if(X.Gender == Y.Gender and X.TownCity == Y.TownCity){
3     A = A + 1
4 }
5 if(X.Gender == Y.Gender or X.TownCity == Y.TownCity){
6     B = B + 1
7 }
8 return(A-B)
```

6406531563498. ✗

6406531563499. ✓

```
1 A = False, B = False
2 if(X.Gender == Y.Gender){
3     A = True
4 }
5 if(X.TownCity == Y.TownCity){
6     B = True
7 }
8 if((A and not B) or (not A and B)){
9     return(1)
10}
11 return(0)
```

```
1 A = False, B = False
2 if(X.Gender == Y.Gender){
3     A = True
4 }
5 if(X.TownCity == Y.TownCity){
6     B = True
7 }
8 if((A or not B) and (not A or B)){
9     return(1)
10}
11 return(0)
```

6406531563500. \*

**Question Number : 43 Question Id : 640653470523 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 5 Selectable Option : 0**

Question Label : Multiple Select Question

Two words are said to be conjugate if they fulfill following conditions:

- They are different words
- Number of vowels are same in both words
- Number of consonants are same in both words

For a row X in the "Words" dataset, assume that `vCount(X)` return the number of vowels in `X.Word`. At the end of the execution, `count` stores the number of conjugate pairs. Choose the correct code fragment(s) to complete the pseudocode. It is a Multiple Select Question (MSQ).

```
1 count = 0
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     Move X to Table 2
5     while(Table 1 has more rows){
6         Read the first row Y in Table 1
7         *****
8         * Fill the code *
9         *****
10        Move Y to Table 3
11    }
12    Move all rows from Table 3 to Table 1
13 }
```

### Options :

```
1 if(x.word != Y.word){
2     if(x.LetterCount == Y.LetterCount){
3         if(vCount(x) == vCount(Y)){
4             count = count + 1
5         }
6     }
7 }
```

6406531563501. ✓

```
1 if(x.word == Y.word){
2     if(x.LetterCount == Y.LetterCount){
3         if(vCount(x) == vCount(Y)){
4             count = count + 1
5         }
6     }
7 }
```

6406531563502. ✗

6406531563503. ✓

```
1 if(X.word != Y.word){  
2     if(vCount(X) == vCount(Y)){  
3         if(X.LetterCount - vCount(X) == Y.LetterCount - vCount(Y)){  
4             count = count + 1  
5         }  
6     }  
7 }
```

```
1 if(X.word == Y.word){  
2     exitloop  
3 }  
4 else{  
5     if(X.LetterCount == Y.LetterCount){  
6         if(vCount(X) == vCount(Y)){  
7             count = count + 1  
8         }  
9     }  
10 }
```

6406531563504. \*

**Sub-Section Number :** 6

**Sub-Section Id :** 64065367851

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 44 Question Id : 640653470524 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4**

**Question Label : Short Answer Question**

The following pseudocode is executed using a dataset similar to the "Words" dataset, based on the following paragraph.

"This is not what I selected yesterday. There was a design on the left pocket. The color is also different. I clearly remember that the color which I had chosen was slightly dark. I can not believe that the shopkeeper has sent me a different product."

```
1 count = 0, flag = True
2 while(Table 1 has more rows){
3     Read the first row x in Table 1
4     Move x to Table 2
5     if(flag){
6         if(1st letter of x.word == 't'){
7             if(2nd letter of x.word == 'h'){
8                 count = count + 1
9             }
10        }
11    }
12    flag = False
13    if(x.word ends with full stop){
14        flag = True
15    }
16 }
```

What would be the value of **count** at the end of the execution of the above pseudocode? Assume that upper case and lower case are ignored during comparison of letters.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

3

**Question Number : 45 Question Id : 640653470525 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4**

**Question Label : Short Answer Question**

What would be the value of **result** at the end of the execution of the following pseudocode if the value of **n** is 7?

```
1 i = 1
2 result1 = 1, result2 = 1, result = 1
3 while(i < n){
4     result1 = result1*i
5     result2 = result2*i*(i + 1)
6     i = i + 2
7 }
8
9 result = result2/result1
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

48

**Question Number :** 46 **Question Id :** 640653470526 **Question Type :** SA **Calculator :** None

**Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Correct Marks :** 4

**Question Label :** Short Answer Question

The following pseudocode is executed using the "Words" dataset.

```
1 Procedure dosomething(Table T1, Table T2)
2     count = 0
3     while(Table T1 has more rows){
4         Read the first row Y from Table T1
5         Read the first row Z from Table T2
6         if(Y.word == Z.word){
7             count = count + 1
8         }
9         else{
10            return(count)
11        }
12        Move the row Y to Table T11
13        Move the row Z to Table T22
14    }
15    return(count)
16 End dosomething
```

Let there be two datasets stored in Table 1 and Table 2 corresponding to the following sentences

Table 1:

"if you are honest with your work, the money is just a compliment"

Table 2:

"if you are honest with your work, the progress is just a compliment"

What will **doSomething**(Table 1, Table 2) return? Assume that upper case and lower case are ignored during comparison of words.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

8

**Sub-Section Number :** 7

**Sub-Section Id :** 64065367852

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653470527 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**

The following pseudocode is executed using the "Scores" dataset. Let variables

F, M, F250, and M250 represent the followings:

- F = Number of female students in the dataset
- M = Number of male students in the dataset
- F250 = Number of female students with total marks greater than 250
- M250 = Number of male students with total marks greater than 250

```
1 A = 0, B = 0
2 while(Table 1 has more rows){
3     Read the first row x from Table 1
4     flag = False
5     if(x.Gender == 'F'){
6         if(x.Total > 250){
7             flag = True
8         }
9     }
10    if(not flag){
11        A = A + 1
12        if(x.Total > 250){
13            B = B + 1
14        }
15    }
16    Move x to Table 2
17 }
```

Based on the above data, answer the given subquestions.

### **Sub questions**

**Question Number : 47 Question Id : 640653470528 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

What will be the value of **A** at the end of the execution?

**Options :**

6406531563508. ✘ F + F250

6406531563509. ✘ F250

6406531563510. ✓ M + (F - F250)

6406531563511. ✘ M + F250

**Question Number : 48 Question Id : 640653470529 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 4**

Question Label : Multiple Choice Question

What will be the value of **B** at the end of the execution?

**Options :**

6406531563512. ✘ M

6406531563513. ✘ F - F250

6406531563514. ✓ M250

6406531563515. ✘ M + (F - F250)

## Intro to Python

**Section Id :** 64065330360

**Section Number :** 4

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 14

**Number of Questions to be attempted :** 14

**Section Marks :** 50

**Display Number Panel :** Yes

<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065367853
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 49 Question Id : 640653470530 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 "[PROGRAMMING IN PYTHON](#)"**

**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 :**

6406531563516. ✓ YES

6406531563517. ✗ NO

<b>Sub-Section Number :</b>	2
<b>Sub-Section Id :</b>	64065367854
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 50 Question Id : 640653470531 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

`E` is a Boolean variable. Consider the following sequence of expressions:

```
1 not E
2 not not E
3 not not not E
4 not not not not E
5 .
6 .
7 .
```

This pattern keeps repeating for a thousand lines. If line number 500 evaluates to `False`, what is the value of `E`?

**Options :**

6406531563518. ✘ True

6406531563519. ✓ False

6406531563520. ✘ Cannot be determined

**Question Number : 51 Question Id : 640653470532 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following code block. `E_1`, `E_2` and `E_3` are all Boolean variables that have already been defined. `x` is a variable that has **NOT** been defined before.

```
1 if E_1:
2     x = 1
3 if E_2:
4     x = 2
5 if E_3:
6     x = 3
7 print(x)
```

When will this code throw an error?

**Options :**

6406531563521. ✘ When all three Boolean variables are `True`

6406531563522. ✓ When all three Boolean variables are `False`

6406531563523. ✘ When at least one of the three Boolean variables is `True`

6406531563524. ✘ When at least one of the three Boolean variables is `False`

6406531563525. ✘ This code will never throw an error

**Sub-Section Number :** 3

**Sub-Section Id :** 64065367855

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 52 Question Id : 640653470533 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

What will be the output of the code snippet given below?

```
1 L = []
2 for i in range(1, 10):
3     if len(L) == 0:
4         value = i + 1
5     else:
6         value = i % 2
7     L.append(value)
8 print(L)
```

**Options :**

1 | [1, 0, 1, 0, 1, 0, 1, 0, 1]

6406531563526. ✘

```
1 | [2, 0, 1, 0, 1, 0, 1, 0, 1]
```

6406531563527. ✓

```
1 | [2, 1, 0, 1, 0, 1, 0, 1, 0]
```

6406531563528. ✗

```
1 | [1, 1, 0, 1, 0, 1, 0, 1, 0]
```

6406531563529. ✗

**Sub-Section Number :** 4

**Sub-Section Id :** 64065367856

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 53 Question Id : 640653470534 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

**Question Label : Multiple Select Question**

Consider the following snippet of code:

```
1 word = input()
2 match = False
3 if word.count('(') == word.count(')'):
4     if word.count('[') == word.count(']'):
5         if word.count('{') == word.count('}'):
6             match = True
7 if match:
8     print('PERFECT!')
9 else:
10    print('IMPERFECT!')
```

Select all possible inputs for which this code prints `PERFECT!` as output.  
It is a Multiple Select Question (MSQ).

**Options :**

```
1 | (a{b[c]})
```

6406531563530. ✓

```
1 | abcd
```

6406531563531. ✓

```
1 | ){}[]{}{
```

6406531563532. ✓

```
1 | a(db]
```

6406531563533. ✘

**Sub-Section Number :**

5

**Sub-Section Id :**

64065367857

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

**Question Number : 54 Question Id : 640653470535 Question Type : MSQ Is Question**

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

**Correct Marks : 4 Selectable Option : 0**

Question Label : Multiple Select Question

Select all correct implementations of a program that prints the first 10 positive even numbers to the console, one number on each line. It is a Multiple Select Question (MSQ).

**Options :**

```
1 | for num in range(1, 11):
2 |     if num % 2 == 0:
3 |         print(num)
```

6406531563534. ✘

```
1 | for num in range(1, 20):
2 |     if num % 2 == 0:
3 |         print(num)
```

6406531563535. ✘

```
1 | for num in range(1, 21):
2 |     if num % 2 == 0:
3 |         print(num)
```

6406531563536. ✓

```
1 | for num in range(2, 21, 2):
2 |     print(num)
```

6406531563537. ✓

```
1 | count = 0
2 | num = 2
3 | while count < 10:
4 |     print(num)
5 |     num += 2
6 |     count += 1
```

6406531563538. ✓

```
1 | count = 0
2 | num = 2
3 | while count <= 10:
4 |     print(num)
5 |     num += 2
6 |     count += 1
```

6406531563539. ✘

**Question Number : 55 Question Id : 640653470536 Question Type : MSQ Is Question**

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

**Correct Marks : 4 Selectable Option : 0**

**Question Label : Multiple Select Question**

Consider the following snippet of code:

```
1 word = input()
2 valid = True
3 for i in range(len(word)):
4     char = word[i]
5     if i % 2 == 0 and char not in 'aeiou':
6         valid = False
7 print(valid)
```

Assume that a 10 letter word is passed as input to the code. If the output is `True`, then which of the following statements about the input word are `True`? It is a Multiple Select Question (MSQ).

**Options :**

6406531563540. ❌ The word has exactly five vowels

6406531563541. ✓ The word has at least five vowel

6406531563542. ✓ The letters at even indices are vowels (indexing starts from 0)

6406531563543. ❌ Every vowel in the word appears only at even indices (indexing starts from 0)

**Question Number : 56 Question Id : 640653470537 Question Type : MSQ Is Question**

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

**Correct Marks : 4 Selectable Option : 0**

**Question Label : Multiple Select Question**

`nums` is a list of positive integers. Select all correct implementations of a program that copies all the even numbers in `nums` to a list `even_nums` and stores them in the order in which they appear in `nums`. It is a Multiple Select Question (MSQ).

**Options :**

```
1 even_nums = []
2 for x in nums:
3     if x % 2 == 0:
4         even_nums.append(x)
```

6406531563544. ✓

```
1 even_nums = []
2 for i in range(len(nums)):
3     if i % 2 == 0:
4         even_nums.append(i)
```

6406531563545. ❌

```
1 even_nums = []
2 for i in range(len(nums)):
3     if i % 2 == 0:
4         even_nums.append(nums[i])
```

6406531563546. ❌

```
1 even_nums = []
2 for i in range(len(nums)):
3     if nums[i] % 2 == 0:
4         even_nums.append(nums[i])
```

6406531563547. ✓

**Question Number : 57 Question Id : 640653470538 Question Type : MSQ Is Question**

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

**Correct Marks : 4 Selectable Option : 0**

Question Label : Multiple Select Question

Assume `L` is a list of distinct positive integers. Consider the following code:

```
1 s = 0
2 for x in L:
3     s += x
4
5 flag = False
6 y = -1
7 for x in L:
8     if x * len(L) == s:
9         flag = True
10        y = x
11        break
```

If `flag` is `True` at the end of execution of the code given above, which of the following statements are `True`? It is a Multiple Select Question (MSQ).

**Options :**

6406531563548. ✓ `y` is an element in the list `L`

6406531563549. ❌ `y` is the smallest number in the list `L`

6406531563550. ✘  `y` is the greatest number in the list `L`

6406531563551. ✓  `y` is the average (arithmetic mean) of the numbers in the list `L`

6406531563552. ✘  `y` is the element at index `len(L) // 2` in the list `L`

**Sub-Section Number :** 6

**Sub-Section Id :** 64065367858

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 58 Question Id : 640653470539 Question Type : MSQ Is Question**

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

**Correct Marks : 5 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following options swaps the first and the last value of a list `L` with more than 2 elements. It is a Multiple Select Question (MSQ).

**Options :**

```
1 | temp = L[0]
2 | L[0] = L[len(L)]
3 | L[len(L)] = temp
```

6406531563553. ✘

```
1 | temp = L[0]
2 | L[0] = L[len(L) - 1]
3 | L[len(L) - 1] = temp
```

6406531563554. ✓

```
1 | temp = L[0]
2 | L[0] = L[-1]
3 | L[-1] = temp
```

6406531563555. ✓

```
1 | L[0], L[len(L) - 1] = L[len(L) - 1], L[0]
```

6406531563556. ✓

**Sub-Section Number :** 7

**Sub-Section Id :** 64065367859

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 59 Question Id : 640653470540 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4**

**Question Label :** Short Answer Question

What is the output of the following snippet of code? Each entry in the matrix `M` has one of these two characters: `'x'` or `'o'`.

```
1 M = [['x', 'x', 'o', 'x'],
2     ['o', 'x', 'o', 'o'],
3     ['o', 'x', 'o', 'o'],
4     ['o', 'o', 'o', 'o']]
5 n = len(M)
6 for i in range(n):
7     index = i
8     for j in range(1, n):
9         if M[i][j] != M[i][j - 1]:
10             index = -1
11             break
12         if M[j][i] != M[j - 1][i]:
13             index = -1
14             break
15     if index >= 0:
16         break
17 print(index)
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas : PlainText**

**Possible Answers :**

-1

**Sub-Section Number :** 8

**Sub-Section Id :** 64065367860

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 60 Question Id : 640653470541 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Short Answer Question

What is the output of the following snippet of code?

```
1 p = 3
2 n = 25
3 count = 0
4 answer = 0
5 while p <= n:
6     flag = True
7     for i in range(2, p):
8         if p % i == 0:
9             flag = False
10    if flag:
11        count += 1
12    if flag and (count % 2 != 0):
13        answer += p
14    p += 1
15 print(answer)
```

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

<b>Sub-Section Number :</b>	9
<b>Sub-Section Id :</b>	64065367861
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Id : 640653470542 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 : (61 to 63)**

Question Label : Comprehension

Answer the given subquestions.

### **Sub questions**

**Question Number : 61 Question Id : 640653470543 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

What will be the type of the following expression?

```
1 | 20 % 5 // 2 * 50 ** 3
```

### **Options :**

6406531563559. ❌ float

6406531563560. ✓ int

6406531563561. ❌ str

6406531563562. ❌ bool

**Question Number : 62 Question Id : 640653470544 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

What will be the type of the following expression?

```
1 | '#Python'
```

**Options :**

6406531563563. ✓ str

6406531563564. ✗ char

6406531563565. ✗ bool

6406531563566. ✗ Syntax error

**Question Number : 63 Question Id : 640653470545 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

What will be the type of the following expression?

```
1 | 100 ** 3 / 300 + 10 - 25
```

**Options :**

6406531563567. ✓ float

6406531563568. ✗ int

6406531563569. ✗ str

6406531563570. ✗ bool

**Sub-Section Number :** 10

**Sub-Section Id :** 64065367862

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653470546 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 : (64 to 67)**

Question Label : Comprehension

Consider the following code block. `A` and `B` are Boolean variables that have already been defined.

```
1 if A:  
2     print(A or B)  
3 elif B:  
4     print(not(A or not B))  
5 else:  
6     print(not(A and B))
```

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 64 Question Id : 640653470547 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following output is correct

for `A = True` and `B = True` ?

**Options :**

6406531563571. ✓ True

6406531563572. ✗ False

6406531563573. ✗ Cannot be determined

**Question Number : 65 Question Id : 640653470548 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

**Question Label : Multiple Choice Question**

Which of the following output is correct

for `A = True` and `B = False` ?

**Options :**

6406531563574. ✓ True

6406531563575. ✗ False

6406531563576. ✗ Cannot be determined

**Question Number : 66 Question Id : 640653470549 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following output is correct

for `A = False` and `B = True` ?

**Options :**

6406531563577. ✓ True

6406531563578. ✗ False

6406531563579. ✗ Cannot be determined

**Question Number : 67 Question Id : 640653470550 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following output is correct

for `A = False` and `B = False` ?

**Options :**

6406531563580. ✓ True

6406531563581. ✗ False

6406531563582. ✗ Cannot be determined

## **DBMS**

<b>Section Id :</b>	64065330361
<b>Section Number :</b>	5
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	17
<b>Number of Questions to be attempted :</b>	17
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065367863
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 68 Question Id : 640653470551 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 "DIPLOMA LEVEL : DATABASE MANAGEMENT SYSTEMS"**

**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 :**

6406531563583. ✓ YES

6406531563584. ✗ NO

**Sub-Section Number :** 2

**Sub-Section Id :** 64065367864

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 69 Question Id : 640653470552 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

**Question Label : Multiple Choice Question**

Consider the table **instructor** shown in Table 1.

<b>id</b>	<b>name</b>	<b>salary</b>
6001	Oliver	45000
6002	Jack	30000
6003	Oliver	45000
6004	Jack	30000
6005	Jacob	70000
6006	Tommy	60000
6007	Joseph	65000
6008	Jacob	70000

Table 1: **instructor**

What will be the output of the following query ?

```
SELECT name  
FROM instructor AS a  
WHERE( SELECT COUNT(*)  
      FROM instructor b  
      WHERE b.salary>a.salary)>2
```

EXCEPT ALL

```
SELECT DISTINCT(name)  
FROM instructor
```

**Options :**

name
Tommy
Joseph

6406531563585. \*

name
Oliver
Jack

6406531563586. ✓

name
Jacob

6406531563587. \*

name
Tommy

6406531563588. \*

**Question Number : 70 Question Id : 640653470554 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the table **instructor** given below.

id	name	dept_name	salary
10101	Srinivasan	Comp. Sci.	65000
12121	Wu	Finance	90000
15151	Mozart	Music	40000
22222	Einstein	Physics	95000
32343	El Said	History	60000
33456	Gold	Physics	87000
45565	Katz	Comp. Sci.	75000
58583	Califieri	History	62000
76543	Singh	Finance	80000
76766	Crick	Biology	72000
83821	Brandt	Comp. Sci.	92000
98345	Kim	Elec. Eng.	80000

Table 2: **instructor**

What will be the output of the following query?

```
with dept_total (dept_name, value) as
    (select dept_name, sum(salary)
     from instructor
     group by dept_name),
dept_total_avg(value) as
    (select avg(value)
     from dept_total)
select dept_name
from dept_total, dept_total_avg
where dept_total.value > dept_total_avg.value
```

**Options :**

dept_name
Physics
Comp. Sci.

dept_name
Finance
Physics

6406531563594. ✘

dept_name
Finance
Comp. Sci.

6406531563595. ✘

dept_name
Finance
Physics
Comp. Sci.

6406531563596. ✓

**Sub-Section Number :** 3

**Sub-Section Id :** 64065367865

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 71 Question Id : 640653470553 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

**Question Label : Multiple Choice Question**

Consider the relational schema player(*player\_id, name, jersey\_no, dob, team\_id*).

Identify the correct SQL command to create a view *player\_name*, by selecting two columns *name* and *team\_id* from the *player* relation. Select those players having names starting with 'K' and jersey number as 10.

**Options :**

```
CREATE VIEW player_name(name,team_id) TO
SELECT name,team_id from player
```

6406531563589. ✘ Where name like 'K%' AND jersey\_no=10

6406531563590. ✘

```
CREATE VIEW player_name(name,team_id) ON
SELECT name,team_id from player
Where name like 'K%' AND jersey_no=10
```

6406531563591. ✘ CREATE VIEW player\_name(name,team\_id) AS  
SELECT name,team\_id from player  
Where name like '%K' AND jersey\_no=10

6406531563592. ✓ CREATE VIEW player\_name(name,team\_id) AS  
SELECT name,team\_id from player  
Where name like 'K%' AND jersey\_no=10

**Question Number : 72 Question Id : 640653470556 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

The ability to modify the physical schema without changing the logical schema is known as

---

**Options :**

6406531563598. ✘ Logical Data Independence

6406531563599. ✓ Physical Data Independence

6406531563600. ✘ View Data Independence

6406531563601. ✘ None of these

**Question Number : 73 Question Id : 640653470558 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following languages defines and manipulates the schema of a database?

**Options :**

6406531563603. ✘ Data Manipulation Language

6406531563604. ✘ Data Control Language

6406531563605. ✘ Transaction Control Language

6406531563606. ✓ Data Definition Language

**Question Number : 74 Question Id : 640653470566 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which among the following options indicates the responsibility of a query processor?

**Options :**

6406531563629. ✘ To ensure that the database remains in a consistent state despite all the failures.

6406531563630. ✓ To estimate the cost of query operations.

6406531563631. ✘ To control the interaction among the concurrent transactions.

6406531563632. ✘ To interact with the operating system file manager.

**Question Number : 75 Question Id : 640653470567 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which among the following forms of authorization is used for the creation of new relations in a database schema?

**Options :**

6406531563633. ✘ Read

6406531563634. ✘ Alteration

6406531563635. ✘ Index

6406531563636. ✓ Resources

**Question Number : 76 Question Id : 640653470568 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

**Question Label : Multiple Choice Question**

Which among the following relational algebraic expressions is equivalent to the SQL statement given below?

```
SELECT name FROM product WHERE rating < 10  
EXCEPT  
SELECT name FROM product WHERE rating < 7
```

**Options :**

6406531563637. ❌  $\Pi_{name}(\sigma_{rating < 10 \vee rating < 7}(\text{product}))$

6406531563638. ❌  $\Pi_{name}(\sigma_{rating < 10 \wedge rating < 7}(\text{product}))$

6406531563639. ✓  $\Pi_{name}(\sigma_{rating < 10 \wedge rating \geq 7}(\text{product}))$

6406531563640. ❌  $\Pi_{name}(\sigma_{rating > 7 \vee rating \leq 10}(\text{product}))$

**Sub-Section Number :** 4

**Sub-Section Id :** 64065367866

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 77 Question Id : 640653470555 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4**

**Question Label : Short Answer Question**

Consider the table player and predict the output of the query that follows.

player_id	name	jersey_no
P001	Rudra	10
P002	Advik	20
P003	Raghab	30
P004	Krishna	40
P005	Rudra	80

Table 3: player

```
SELECT COUNT(name)
FROM (( SELECT player_id, name
      FROM player) as P
  NATURAL JOIN ( SELECT name, jersey_no
                  FROM player) as J)
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

7

**Question Number : 78 Question Id : 640653470557 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4**

**Question Label :** Short Answer Question

Consider an entity relationship in which entity sets student and course have a many- to-many relationship. The attributes of student entity are *id*, *name*, *dept\_name*, and *mobile\_no* where *id* is the primary key attribute and *mobile\_no* is the multivalued attribute · The attributes of course entity are *c\_id*, *name*, *dept\_name* and *credits* where *c\_id* is the primary key attribute.

What is the minimum number of tables needed to represent the above entity relationship?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

**Question Number :** 79 **Question Id :** 640653470561 **Question Type :** SA **Calculator :** None

**Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Correct Marks :** 4

**Question Label :** Short Answer Question

Let ABC ( $a, b, c$ ) and BQR ( $b, q, r$ ) be two relations with instances shown below:

a	b	c
2	3	5
4	3	1
2	4	1
1	1	2
5	2	5

Table 1: ABC

b	q	r
1	4	2
2	3	4
5	1	2
2	7	1

Table 1: BQR

What will be the number of tuples fetched by the given relational algebra operation?

$$\Pi_{q,r}(\sigma_{c>a}(ABC \bowtie BQR))$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

**Sub-Section Number :** 5

**Sub-Section Id :** 64065367867

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 80 Question Id : 640653470559 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the SQL query shown below.

```
create table person (
    ID char(10) primary key,
    name char(40) NOT NULL,
    father char(10),
    foreign key father references person(ID)
);
```

With respect to the above query, which constraint does the table **person** violate?

ID	name	father
P001	Rudra	NULL
P002	Advik	P001
P003	Raghab	P006
P004	Krishna	P002
P005	Rudra	P004

Table 4: person

**Options :**

6406531563607. ✘ NOT NULL

6406531563608. ✘ PRIMARY KEY

6406531563609. ✓ FOREIGN KEY

6406531563610. ✘ None of these

**Question Number : 81 Question Id : 640653470560 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following entity set given in Figure 1:

employee
<i>id</i>
<i>name</i>
<i>first_name</i>
<i>last_name</i>
{ <i>mobile_no</i> }
<i>annual_income</i>
<i>monthly_salary ()</i>

Figure 1: employee

Which among the following options is/are correct?

**Options :**

- id*: simple attribute
- first\_name*: composite attribute
- last\_name*: composite attribute
- mobile\_no*: multivalued attribute

6406531563611. ❌ *annual\_income*: derived attribute

- id*: simple attribute
- name*: composite attribute
- mobile\_no*: multivalued attribute

6406531563612. ✓ *monthly\_salary*: derived attribute

- id*: simple attribute
- name*: multivalued attribute
- mobile\_no*: composite attribute

6406531563613. ❌ *annual\_income*: derived attribute

- id*: simple attribute
- name*: multivalued attribute
- first\_name*: composite attribute
- last\_name*: composite attribute
- mobile\_no*: multivalued attribute

6406531563614. ❌ *monthly\_salary*: composite attribute

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

**Time : 0**

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Consider the table hotel\_db given in Figure 2.

name	no_of_rooms	address	no_of_vacant_rooms
The Paradise	50	Delhi	10
Beach View	20	Chennai	7
Spring Valley	25	Bhopal	15
Hillsight	25	Shillong	20
Dream Desert	35	Jaipur	5
The View	40	Pondicherry	15
Five Seasons	70	Delhi	25

Figure 2: hotel\_db

Which among the given SQL queries will return the name and number of vacant rooms available in the hotels located in either 'Delhi' or 'Chennai', where the total number of rooms is less than the maximum number of rooms among all the hotels?

**Options :**

SELECT name, no\_of\_vacant\_rooms  
FROM hotel  
WHERE address IN ('Delhi'), ('Chennai')  
6406531563616. ❌ AND no\_of\_rooms < (SELECT MAX(no\_of\_rooms) FROM hotel)

SELECT name, no\_of\_vacant\_rooms  
FROM hotel  
WHERE address = 'Delhi' AND 'Chennai'  
6406531563617. ❌ AND no\_of\_rooms > MAX(no\_of\_rooms)

SELECT name, no\_of\_vacant\_rooms  
FROM hotel  
WHERE address IN ('Delhi', 'Chennai')  
AND no\_of\_rooms < (SELECT MAX(no\_of\_rooms) FROM hotel)  
6406531563618. ✓

6406531563619. ❌

```

SELECT name, no_of_vacant_rooms
FROM hotel
WHERE address = 'Delhi' OR address 'Chennai'
AND no_of_rooms < MAX(no_of_rooms)

```

**Sub-Section Number :** 6  
**Sub-Section Id :** 64065367868  
**Question Shuffling Allowed :** Yes  
**Is Section Default? :** null

**Question Number : 83 Question Id : 640653470569 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Consider the three relations given in Figure 3.

r1		r2		r3	
A	B	A	B	A	B
a1	b1	a1	b1	a2	b2
a2	b2	a4	b4	a4	b4
a3	b3	a5	b5	a5	b5
a4	b4				
a5	b5				

Figure 3: Relations r1, r2 and r3

Choose the relational algebra expression that results in the relation given in Figure 4.

A	B
a4	a4
a5	a5

Figure 4: Resulting relation

**Options :**

6406531563641. ✓  $r1 \cap r2 \cap r3$

6406531563642. ✘  $r1 - (r1 - r2) - (r3 - r2)$

6406531563643. ✘  $r1 \times r2 \times r3$

6406531563644. ✓  $r1 \bowtie r2 \bowtie r3$

<b>Sub-Section Number :</b>	7
<b>Sub-Section Id :</b>	64065367869
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Id : 640653470563 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 : (84 to 85)**

Question Label : Comprehension

Consider the following relations and answer the given subquestions

employee(emp\_id, emp\_name, dob, dept\_id, desg\_id)  
department(dept\_id, dept\_name)  
designation(desg\_id, desg\_name, salary)

**Sub questions**

**Question Number : 84 Question Id : 640653470564 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4 Selectable Option : 0**

Question Label : Multiple Select Question

Choose the correct TRC or DRC expression, which returns the name and dob of those employees who belongs to the 'Finance' department and has a salary more than 50000.

**Options :**

6406531563620. ✘

$\{s \mid \exists e \in employee \exists d \in department \exists de \in designation(d.dept\_name = 'Finance' \wedge de.salary > 50000 \wedge e.dept\_id = d.dept\_id \wedge e.desg\_id = de.desg\_id)\}$

$\{s \mid \exists e \in employee \exists d \in department \exists de \in designation(s.emp\_name = e.emp\_name \wedge s.dob = e.dob \wedge d.dept\_name = 'Finance' \wedge de.salary > 50000 \wedge e.dept\_id = d.dept\_id \wedge e.desg\_id = de.desg\_id)\}$

$\{s \mid \exists e \in employee \exists d \in department \exists de \in designation(e.emp\_name = s.emp\_name \wedge e.dob = s.dob \wedge d.dept\_name = 'Finance' \vee de.salary > 50000)\}$

$\{< b, c > \mid \exists a, b, c, d, e (< a, b, c, d, e > \in employee) \wedge \exists x, y (< x, y > \in department \wedge y = 'Finance') \wedge \exists p, q, r (< p, q, r > \in designation \wedge r > 50000)\}$

$\{< b, c > \mid \exists a, b, c, d, e (< a, b, c, d, e > \in employee) \wedge \exists x, y (< x, y > \in department \wedge y = 'Finance') \wedge \exists p, q, r (< p, q, r > \in designation \wedge r > 50000 \wedge e = p \wedge d = x)\}$

**Question Number : 85 Question Id : 640653470565 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the DRC expression given below:

$\{< p, q > \mid \exists p, q, r (< p, q, r > \in designation \wedge r < 80000)\}$

Among the following options, choose the correct statement equivalent to the given DRC expression.

**Options :**

6406531563625. ✘ ID and name of the designation with salary more than 80000.

6406531563626. ✘ ID of the designation with salary less than 80000.

6406531563627. ✓ ID and name of the designation with salary less than 80000.

6406531563628. ✩ Name of the designation with salary more than 80000.

## PDSA

<b>Section Id :</b>	64065330362
<b>Section Number :</b>	6
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	17
<b>Number of Questions to be attempted :</b>	17
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065367870
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 86 Question Id : 640653470570 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 "DIPLOMA LEVEL : PROGRAMMING, DATA STRUCTURES AND ALGORITHMS USING PYTHON"**

**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 :**

6406531563645. ✓ YES

6406531563646. ✗ NO

**Sub-Section Number :** 2

**Sub-Section Id :** 64065367871

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 87 Question Id : 640653470571 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

**Question Label : Multiple Choice Question**

$$f1(n) = 3n^2 + 2n$$

$$f2(n) = 3n + (\log n)^2$$

$$f3(n) = \log(\log n)$$

$$f4(n) = 10 \log n$$

$$f5(n) = 3n \log n$$

Arrange the above functions in increasing order of asymptotic complexity.

**Options :**

6406531563647. ✗  $f3(n), f4(n), f2(n), f1(n), f5(n)$

6406531563648. ✗  $f3(n), f2(n), f1(n), f5(n), f4(n)$

6406531563649. ✗  $f4(n), f3(n), f2(n), f1(n), f5(n)$

6406531563650. ✓  $f_3(n), f_4(n), f_2(n), f_5(n), f_1(n)$

<b>Sub-Section Number :</b>	3
<b>Sub-Section Id :</b>	64065367872
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 88 Question Id : 640653470572 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Given the following sorted list :

[16, 53, 59, 81, 94, 99, 121, 150, 162, 170]

If we use binary search algorithm to search the element 99 in the list, then which of the following option corresponds to the correct sequence of comparison done in this process ?

*Note: Assume here binary search will compute the midpoint by using  $(firstIndex + lastIndex) // 2$*

**Options :**

6406531563651. ✗ 94, 99

6406531563652. ✗ 16, 99

6406531563653. ✗ 94, 150, 121, 99

6406531563654. ✓ 94, 150, 99

6406531563655. ✗ None of these

**Question Number : 89 Question Id : 640653470573 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

A list of  $n$  strings, each of length  $n$  is sorted in **lexicographical order** using the Merge Sort algorithm. What is its time complexity? (Assume that comparing strings lexicographically takes  $O(n)$ )

**Options :**

6406531563656. ✘  $O(n \log n)$

6406531563657. ✓  $O(n^2 \log n)$

6406531563658. ✘  $O(n^2)$

6406531563659. ✘  $O(\log n)$

**Question Number : 90 Question Id : 640653470574 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

4 sorted lists each of length  $n/2$  are merged into a single sorted list of  $2n$  elements using two way merging. What will be the minimum number of element comparisons needed for this process ?

**Options :**

6406531563660. ✘  $n - 1$

6406531563661. ✘  $2n - 1$

6406531563662. ✓  $4n - 3$

6406531563663. ✘  $4n - 1$

**Question Number : 91 Question Id : 640653470575 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Select the most appropriate data structure for the following applications.

Application	Data Structure
1. To implement undo - redo operations in a text editor	a. Array
2. Matrix operations	b. Graph
3. To implement a music playlist feature which plays songs in sequence	c. Stack
4. To represent communication networks	d. Queue

**Options :**

6406531563664. ✘ 1-d, 2-a, 3-c, 4-b

6406531563665. ✘ 1-d, 2-b, 3-c, 4-a

6406531563666. ✘ 1-d, 2-a, 3-b, 4-c

6406531563667. ✓ 1-c, 2-a, 3-d, 4-b

**Question Number : 92 Question Id : 640653470577 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider that **Quick sort** is applied on a list of size  $n$  which is already sorted. What will be the asymptotic running time of Quick sort if the pivot is taken to be

I) Middle element II) Last element

Choose the correct option corresponding to the correct pair of complexities for both pivots.

**Options :**

6406531563669. ✖ I :  $O(n^2)$  and II :  $O(n \log n)$

6406531563670. ✖ I :  $O(n^2)$  and II :  $O(n)$

6406531563671. ✖ I :  $O(n \log n)$  and II :  $O(n \log n)$

6406531563672. ✓ I :  $O(n \log n)$  and II :  $O(n^2)$

**Question Number : 93 Question Id : 640653470578 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Assume `s` is a stack and `q` is a queue. `Push` and `Pop` operations are usual stack operations, `Enqueue` and `Dequeue` are usual queue operations and `isEmpty()` is a method which returns true if either the stack or the queue are empty.

Now consider the function `fun` given below:

```
1 def fun(q):
2     while(!q.isEmpty()):
3         temp = q.Dequeue()
4         s.Push(temp)
5     while(!s.isEmpty()):
6         temp = s.Pop()
7         q.Enqueue(temp)
```

Suppose the initial content of the queue `q` is `[26, 78, 45, 10, 19, 56]` and the stack `s` is empty initially. If `fun` is invoked on `q` then what will be the content of `q` after `fun` finishes its execution?

**Options :**

6406531563673. ✖ [26, 78, 45, 10, 19, 56]

6406531563674. ✖ [56, 19, 10, 26, 78, 45]

6406531563675. ✓ [56, 19, 10, 45, 78, 26]

6406531563676. ✗ None of these

**Question Number : 94 Question Id : 640653470580 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following function:

```
1 def fun(n):
2     total = 0
3     for i in range(n//2,n):
4         j = 2
5         while(j <= n):
6             total = total + n/2
7             j = j * 2
8     return total
```

Which of the following option correctly mentions the return value (`total`) of function `fun` in terms of  $n$ ? Consider that input  $n = 2^k$  where  $k$  is a positive integer.

**Options :**

6406531563682. ✗  $n^2$

6406531563683. ✗  $(\log n)^2/4$

6406531563684. ✗  $(n \log n)/2$

6406531563685. ✓  $(n^2 \log n)/4$

Question Number : 95 Question Id : 640653470583 Question Type : MCQ Is Question

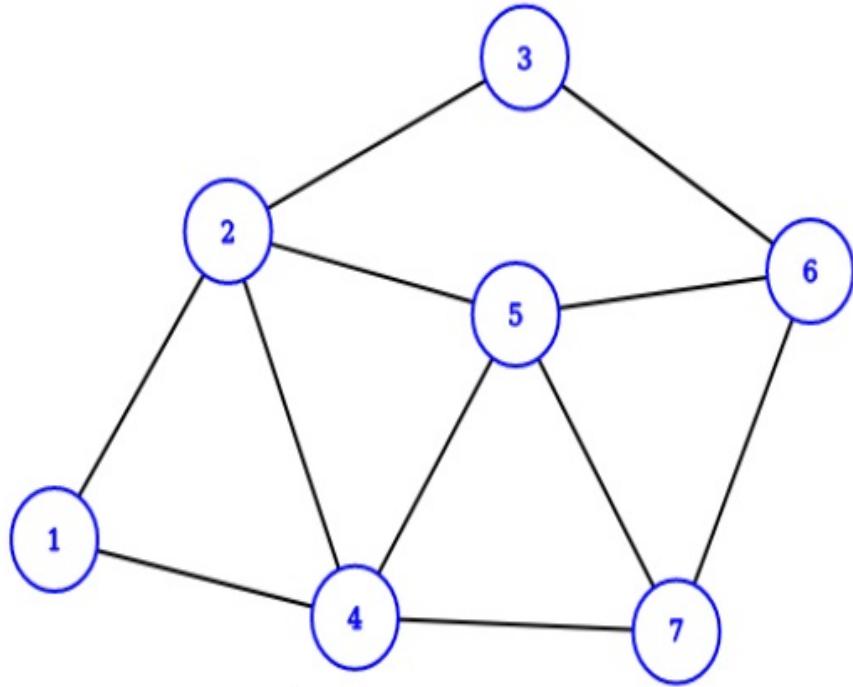
Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction

Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following graph



Which of the following vertex sequence(s) are possible **BFS traversals** on the graph started from node 5?

*Note : When a node has multiple neighbours, BFS would visit the numerically smaller valued node first.*

Options :

6406531563691. ✓ 5,2,4,6,7,1,3

6406531563692. ✗ 5,2,3,1,4,7,6

6406531563693. ✗ 5,2,1,4,7,6,3

6406531563694. ✗ 5,2,1,3,4,6,7

Question Number : 96 Question Id : 640653470584 Question Type : MCQ Is Question

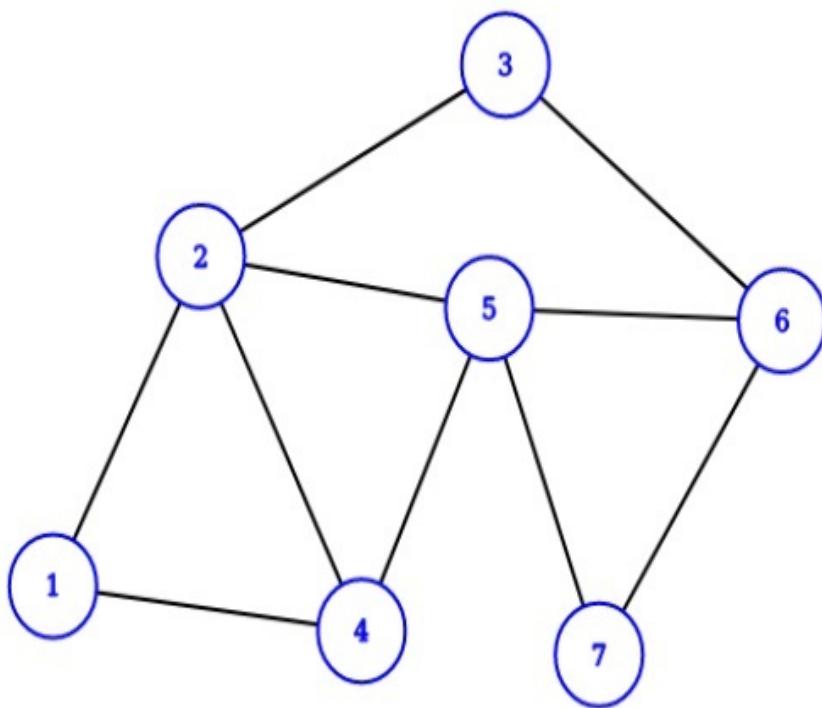
Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction

Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following graph



**DFS algorithm** is applied starting from vertex **5** on the given graph. What will be the maximum possible height till which the stack will grow while making the DFS traversal ?

*Note : When a node has multiple neighbours, DFS would visit the numerically smaller valued node first.*

**Options :**

6406531563695. ✘ 3

6406531563696. ✘ 4

6406531563697. ✓ 5

6406531563698. ✘ 6

6406531563699. ✘ 7

**Sub-Section Number :** 4

**Sub-Section Id :** 64065367873

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 97 Question Id : 640653470576 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4**

**Question Label : Short Answer Question**

Consider the following input list:

[38, 28, 43, 22, 112, 33, 39]

What will be the number of swaps that the following **Insertion sort** will make to sort this given list?

```
1 def insertionsort(L):
2     n = len(L)
3     if n < 1:
4         return(L)
5     for i in range(n):
6         j = i
7         while(j > 0 and L[j] < L[j-1]):
8             (L[j],L[j-1]) = (L[j-1],L[j])
9             j = j-1
10    return(L)
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

9

**Question Number : 98 Question Id : 640653470581 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4**

**Question Label :** Short Answer Question

**Linear probing** is an open addressing scheme in computer programming for resolving hash collisions in hash tables. Linear probing takes the original hash index and increments the value by 1 until a free slot is found.

A hash table contains 8 buckets indexed from 0 to 7 and uses linear probing to resolve collisions. The key values are integers and the hash function used is `key mod 8`. If key values 91, 27, 16, 64, 41 are inserted in to the table in the given order, in what location would the key value 160 be inserted after them?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

5

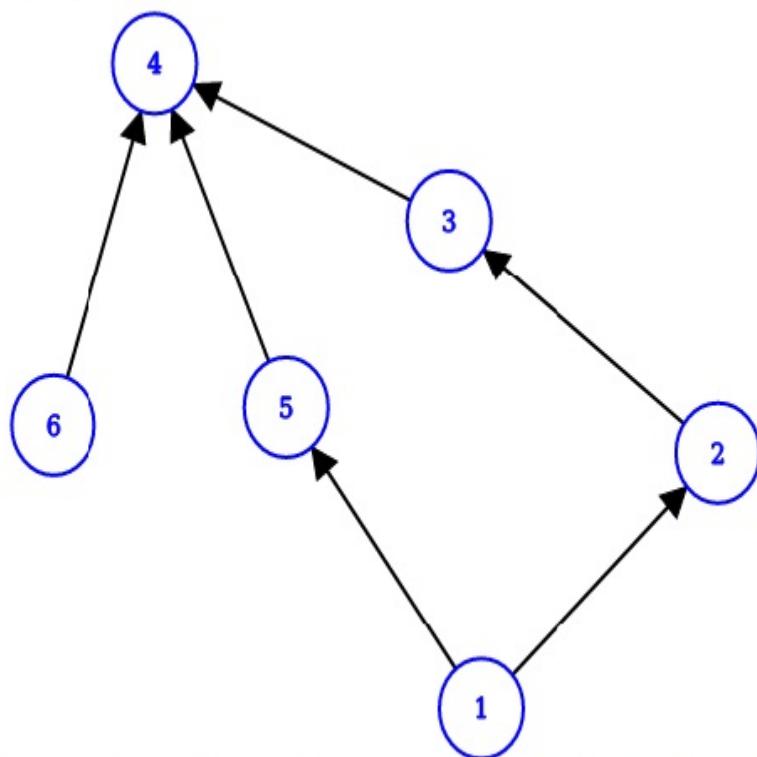
Question Number : 99 Question Id : 640653470585 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Short Answer Question

Consider the following graph



The number of different **topological orderings** possible for this DAG starting from vertex 1 is \_\_\_\_.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

12

Sub-Section Number :

5

**Sub-Section Id :** 64065367874

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 100 Question Id : 640653470579 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

```
1 class Node:  
2     def __init__(self,data):  
3         self.data = data  
4         self.next = None
```

Consider an implementation of a **singly linked list** where each node is created using the given class `Node`. Suppose it has a `head` pointer that points to the first node of the linked list and a `tail` pointer that points to the last element of the linked list.

Which of the following operation can be implemented in constant (**O(1)**) time with given representation of the linked list ?

**Options :**

6406531563677. ✓ Insertion of the new node at the front of the linked list.

6406531563678. ✓ Insertion of the new node at the end of the linked list.

6406531563679. ✓ Deletion of the first node of the linked list.

6406531563680. ✗ Deletion of the last node of the linked list.

6406531563681. ✓ Deletion of the second node (from starting) of the linked list

**Question Number : 101 Question Id : 640653470582 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following is/are possible degree sequence(s) of vertices of a connected undirected graph with six vertices?

Note: Degree sequence is a series of positive integer  $a_1, a_2, \dots, a_n$  where each  $a_i$  is the degree of the  $i^{th}$  vertex of the graph.

**Options :**

6406531563687. ✘ 1,1,1,1,1,1

6406531563688. ✓ 2,2,2,2,2,2

6406531563689. ✓ 1,1,2,2,3,5

6406531563690. ✘ 1,2,2,2,3,3

**Question Number : 102 Question Id : 640653470586 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statement(s) is/are **true** about **Depth First Search (DFS)** on an undirected and connected graph?

**Options :**

6406531563701. ✓ DFS can be used to detect cycles in the graph.

6406531563702. ✓ DFS can be used to identify connected components in an undirected graph.

Using an adjacency list instead of an adjacency matrix can improve the worst case complexity to  $O(V + E)$ , where  $V$  is number of vertices and  $E$  is number of edges.

6406531563704. ✘ In an unweighted graph, DFS can be used to identify the shortest path from a starting vertex  $s$  to every other vertex in the graph

6406531563705. ✓ DFS always produces the same number of tree edges irrespective of the order in which the vertices are considered for DFS.

# AppDev1

<b>Section Id :</b>	64065330363
<b>Section Number :</b>	7
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	17
<b>Number of Questions to be attempted :</b>	17
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065367875
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 103 Question Id : 640653470587 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 "DIPLOMA LEVEL : MODERN APPLICATION DEVELOPMENT I"**

**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 :

6406531563706. ✓ YES

6406531563707. ✗ NO

**Sub-Section Number :** 2

**Sub-Section Id :** 64065367876

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 104 Question Id : 640653470588 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider a simple web server using command prompt.

Filename - Hello.sh

```
#!/bin/bash
while true; do
    echo -e "Today's date and time is \n\t $(date)"
    | nc -l localhost 3500;
done
```

If this program is executed in one terminal, and it is waiting for a request, then identify the client part that generates the request to this server.

### Options :

6406531563708. ✗ Open another terminal and type - curl <http://localhost:8080>

6406531563709. ✓ Open another terminal and type - curl <http://localhost:3500>

6406531563710. ✗ Type curl <http://localhost:3500> in the server running terminal

6406531563711. ✗ Type curl <http://localhost:8080> in the server running terminal

**Question Number : 105 Question Id : 640653470594 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Match the component in column A with its correct feature given in column B.

Column A	Column B
1. Telephone Networks	a. Wires occupied only when data to be sent
2. Packet Switched Networks	b. First public packet switched network
3. ARPANET	c. Physical wires tied up for duration of call even if nothing said
4. TCP	d. Establishes reliable communications

**Options :**

6406531563732. ✘ 1 - a, 2 - b, 3 - c, 4 - d

6406531563733. ✘ 1 - b, 2 - d, 3 - a, 4 - c

6406531563734. ✘ 1 - d, 2 - c, 3 - b, 4 - a

6406531563735. ✓ 1 - c, 2 - a, 3 - b, 4 - d

**Question Number : 106 Question Id : 640653470596 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following is an incorrect way of creating an ordered list in HTML?

**Options :**

```
<ol type = "1">
    <li>programming</li>
    <li>Data Science</li>
    <li>Artificial Intelligence</li>
</ol>
```

6406531563740. ✘

```
<ol type = "a">
    <li>programming</li>
    <li>Data Science</li>
    <li>Artificial Intelligence</li>
</ol>
```

6406531563741. \*

```
<ul type = "i">
    <li>programming</li>
    <li>Data Science</li>
    <li>Artificial Intelligence</li>
</ul>
```

6406531563742. ✓

```
<ol>
    <li>programming</li>
    <li>Data Science</li>
    <li>Artificial Intelligence</li>
</ol>
```

6406531563743. \*

**Question Number : 107 Question Id : 640653470598 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following Python code snippet.

```
from jinja2 import Template

newlist = ['client', 'server', 'markup', 'api', 'url', 'net' ]

this_template = "{% for object in data %} \\
{% if object|length>4 %}{{object }}{% endif %}{% endfor %}"

out = Template(this_template)

print(out.render(data = newlist))
```

What will be the output on the terminal?

**Options :**

6406531563748. ✘ api url net

6406531563749. ✘ apiurlnet

6406531563750. ✘ client server markup

6406531563751. ✓ clientservermarkup

**Question Number : 108 Question Id : 640653470599 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Consider two python files, home.py and hello.py with following code snippets.

File1: home.py

```
import sys
import hello
print('Hello' + ' ' + sys.argv[1])
```

File2: hello.py

```
import sys
print('Hello' + ' ' + sys.argv[0])
```

What is the output of the following command “python home.py hello.py Mithun Sourav”?

**Options :**

Hello home.py

6406531563752. ✘ Hello home.py

Hello hello.py

6406531563753. ✘ Hello hello.py

Hello home.py

6406531563754. ✓ Hello hello.py

Hello Mithun

6406531563755. ✘ Hello Sourav

**Question Number : 109 Question Id : 640653470601 Question Type : MCQ Is Question**

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

**Time : 0**

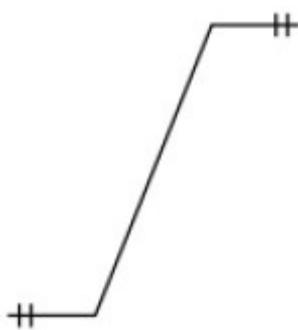
**Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following option represents a one-to-many relationship in the Entity-Relationship Diagram?

**Options :**

6406531563760. ✘



**Question Number : 110 Question Id : 640653470602 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

A text document of size 2000 bytes. Each character in the document are 8 bits ASCII encoding.

What is the number of characters in the text document?

[Note: 8 bits = 1 byte]

**Options :**

6406531563764. ✘ 250

6406531563765. ✘ 1000

6406531563766. ✓ 2000

6406531563767. ✘ 8000

**Sub-Section Number :** 3

**Sub-Section Id :** 64065367877

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 111 Question Id : 640653470589 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Ram wants to do the following operations on his bank website through the browser.

Find the HTTP methods conventionally used for the following operations?

1. To create a new fixed deposit account
2. To read his transaction history
3. To update the account after the transaction of money.
4. To remove his unused account.

**Options :**

6406531563712. ✘ 1 - GET, 2- POST, 3 - PUT, 4 - DELETE

6406531563713. ✘ 1 - POST, 2- GET, 3 - PUT, 4 - PATCH

6406531563714. ✓ 1 - POST, 2- GET, 3 - PUT, 4 - DELETE

6406531563715. ✘ 1 - PUT, 2- GET, 3 - POST, 4 - DELETE

**Question Number : 112 Question Id : 640653470591 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

How to represent the number  $111_{10}$  in the binary format?

**Options :**

6406531563720. ✘ 1110000

6406531563721. ✓ 1101111

6406531563722. ✘ 1100000

6406531563723. ✘ 1111000

**Question Number : 113 Question Id : 640653470592 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Find the output of the python program for the given command line arguments

Program:

```
import sys

a,b,c = sys.argv[1], sys.argv[2], sys.argv[3]
print(b,c)
```

Execution with command line arguments:

\$ python3 cl.py 10 11 12

**Options :**

6406531563724. ✘ cl.py 10

6406531563725. ✘ 10 11

6406531563726. ✓ 11 12

6406531563727. ✘ cl.py 11

**Question Number : 114 Question Id : 640653470593 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

**Question Label : Multiple Choice Question**

**Match the component in column A with its correct feature given in column B.**

Column A	Column B
1. Server	a. Data Pipeline
2. Client	b. Explicit Server(s), Explicit Client(s)
3. Client-Server Architecture	c. User Interaction
4. Network	d. Provides data on demand

**Options :**

6406531563728. ✘ 1 - a, 2 - b, 3 - c, 4 - d

6406531563729. ✘ 1 - b, 2 - d, 3 - a, 4 - c

6406531563730. ✓ 1 - d, 2 - c, 3 - b, 4 - a

6406531563731. ✘ 1 - c, 2 - a, 3 - b, 4 - d

**Sub-Section Number :** 4

**Sub-Section Id :** 64065367878

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 115 Question Id : 640653470590 Question Type : MCQ Is Question**

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

**Correct Marks : 4.5**

**Question Label : Multiple Choice Question**

Choose the SQL queries that correctly map the **view** application component of the MVC model based on the given table Student.

Table: Student

ID	Name	Age	Marks	Courses
1	Vishnu	20	98	M1
2	Kumar	18	90	M2
3	Leela	20	90	M1
4	Naren	18	98	M2
5	Vishal	19	95	M1
6	Pranav	20	95	M2
7	Vinu	19	90	M1
8	Viki	18	95	M2

1. CREATE TABLE Student (**ID int NOT NULL**, Name **varchar(255) NOT NULL**, Age **int**, Marks **int**, Courses **varchar(255)**, PRIMARY KEY (**ID**));
2. **Select \* from Student;**
3. **Select Name, Courses from Student where Marks>90;**
4. **UPDATE Student SET Name = 'Amrith', Age = 21 WHERE ID = 5;**

**Options :**

6406531563716. ✘ 1,2,3,4

6406531563717. ✘ 1,2,3

6406531563718. ✘ 1,3

6406531563719. ✓ 2,3

**Question Number : 116 Question Id : 640653470595 Question Type : MCQ Is Question**

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

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Read the statements given below carefully and select the correct option.

**Statement 1:** If an element that belongs to two different classes is styled externally using both the classes, then for the same attribute, it will acquire styling from the latest class in order.

**Statement 2:** If an element having an ID and a class is styled externally using both its ID and the class, then for the same attribute, it will acquire styling from the latest selector in order.

**Options :**

6406531563736. ✘ Both statements 1 and 2 are correct
6406531563737. ✘ Both statements 1 and 2 are incorrect
6406531563738. ✓ Statement 1 is correct but statement 2 is incorrect
6406531563739. ✘ Statement 2 is correct but statement 1 is incorrect

**Question Number : 117 Question Id : 640653470597 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider the following HTML document.

```
<!DOCTYPE html>
<html lang="en">
<head>
    <style>
        #mybox{
            border-style: dashed;
            background-color: orange;
        }
        .boxes{
            border-style: solid;
            border-color: blue;
        }
        div{
            width: 200px;
            border: 4px dotted yellow;
        }
    </style>
</head>
<body>
    <div id="mybox" class="boxes" style="background-color: limegreen;">
        <h1>Hello MAD-I</h1>
    </div>
</body>
</html>
```

How will the browser render the above HTML document?

**Options :**

6406531563744. ✘

**Hello MAD-I**

**Hello MAD-I**

6406531563745. \*

**Hello MAD-I**

6406531563746. ✓

**Hello MAD-I**

6406531563747. \*

**Sub-Section Number :**

5

**Sub-Section Id :**

64065367879

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

**Question Number : 118 Question Id : 640653470600 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 4.5 Selectable Option : 0**

**Question Label : Multiple Select Question**

Consider the following two tables, subject and student in SQLite database:

**student:**

RollNo	Name	SubjectID
1	Kavi	S1
2	Subhash	S2
3	Nazrul	S1
4	Tagore	S3
5	Rohit	S2
6	Sourav	S1

**subject:**

SubjectID	SubjectName
S1	Bengali
S2	English
S3	Hindi

**Which** of the following SQL query will return the name of the students who took the “Bengali” subject?

**Options :**

6406531563756. ✓ `SELECT student.Name FROM student, subject WHERE student.SubjectID = subject.SubjectID AND subject.SubjectName = 'Bengali'`

6406531563757. ✓ `SELECT student.Name FROM student INNER JOIN subject ON student.SubjectID = subject.SubjectID WHERE subject.SubjectName = 'Bengali'`

6406531563758. ✘ `SELECT student.Name FROM student, subject WHERE student.SubjectID = subject.SubjectID OR subject.SubjectName = 'Bengali'`

6406531563759. ✓ `SELECT student.Name FROM student NATURAL JOIN subject WHERE subject.SubjectName = 'Bengali'`

<b>Sub-Section Number :</b>	6
<b>Sub-Section Id :</b>	64065367880
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 119 Question Id : 640653470603 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following are the correct regarding the web server?

**Options :**

6406531563768. ✓ A web server is a computer system capable of delivering web content over the internet.

6406531563769. ✓ A web server sends the response as an HTML document which is rendered on the user's screen.

6406531563770. ✓ A web server listens for incoming network connections on a fixed port.

6406531563771. ✗ A web server is a software that allows to send the request over the internet.

## MLF

<b>Section Id :</b>	64065330364
<b>Section Number :</b>	8
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	16
<b>Number of Questions to be attempted :</b>	16
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes

<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065367881
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 120 Question Id : 640653470604 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 "DIPLOMA LEVEL : MACHINE LEARNING FOUNDATIONS"**

**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 :**

6406531563772. ✓ YES

6406531563773. ✗ NO

<b>Sub-Section Number :</b>	2
<b>Sub-Section Id :</b>	64065367882
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 121 Question Id : 640653470605 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following is/are true about loss after applying Encoder and Decoder functions to a given data?

**Options :**

6406531563774. ❌ The loss value can be equal to any real number.

6406531563775. ✓ The loss value cannot be negative.

6406531563776. ❌ A perfect encoder and decoder function will not exist for any data, that is loss value can never be equal to zero.

6406531563777. ✓ For some data, there can exist a perfect encoder and decoder functions, that is loss value can be equal to zero.

**Question Number : 122 Question Id : 640653470606 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statements is/are true?

**Options :**

6406531563778. ✓ Email spam detection falls under classification problem.

6406531563779. ❌ Predicting the price of a house based on previous datasets falls under classification problem.

6406531563780. ✓ Classifying whether handwriting belongs to a particular person or not based on previous data falls under the classification problem.

6406531563781. ✓ Finding out the probability that a particular poem is written by Shakespeare falls under unsupervised learning.

**Question Number : 123 Question Id : 640653470609 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statements is/are true about function  $f(x) = \begin{cases} \frac{|x|}{x^2}, & x \neq 0 \\ 0, & x = 0 \end{cases}$  ?

**Options :**

6406531563784. ✓ The function is differentiable for all the values of  $x$  except when  $x = 0$ .

6406531563785. ✗ The function is differentiable for all the values of  $x$ .

6406531563786. ✗ The function is continuous at  $x = 0$ .

6406531563787. ✓ The function is not continuous at  $x = 0$ .

**Sub-Section Number :** 3

**Sub-Section Id :** 64065367883

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 124 Question Id : 640653470617 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 4 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statements is/are true?

**Options :**

There exists a  $n \times n$  matrix  $A$ ,  $n$  is odd, for which the rank of  $A$  is not equal

6406531563811. ✓ to the nullity of  $A$ .

There exists a  $n \times n$  matrix  $A$ ,  $n$  is odd, for which the rank of  $A$  is equal to

6406531563812. ✗ the nullity of  $A$ .

There exists a  $n \times n$  matrix  $A$ ,  $n$  is even, for which the rank of  $A$  is not equal to

6406531563813. ✓ the nullity of  $A$ .

There exists a  $n \times n$  matrix  $A$ ,  $n$  is even, for which the rank of  $A$  is equal to 6406531563814. ✓ the nullity of  $A$ .

**Question Number : 125 Question Id : 640653470619 Question Type : MSQ Is Question**

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

**Correct Marks : 4 Selectable Option : 0**

Question Label : Multiple Select Question

Let  $P$  be the matrix that projects vectors in  $\mathbb{R}^3$  onto the subspace spanned by the vector  $a = [1, 2, 3]^T$ . Which of the following are eigenvectors of  $P$  corresponding to the eigenvalue 0?

**Options :**

6406531563819. ✗ [1, -2, 2]

6406531563820. ✗ [2, 2, -1]

6406531563821. ✓ [-2, 1, 0]

6406531563822. ✓ [-3, 0, 1]

**Sub-Section Number :** 4

**Sub-Section Id :** 64065367884

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 126 Question Id : 640653470610 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

A quadratic approximation of the function  $f(x) = \sin^2 x$  at  $x = \frac{\pi}{4}$  radian is:

**Options :**

$$Q_{\frac{\pi}{4}}[f(x)] = \frac{1}{2} + (x - \frac{\pi}{4}) + (x - \frac{\pi}{4})$$

6406531563788. ✗

$$Q \frac{\pi}{4} [f(x)] = \frac{1}{2} + (x - \frac{\pi}{4})$$

6406531563789. ✓

$$Q \frac{\pi}{4} [f(x)] = \frac{1}{2} + 2(x - \frac{\pi}{4}) + \frac{1}{2}(x - \frac{\pi}{4})$$

6406531563790. ✗

$$Q \frac{\pi}{4} [f(x)] = \frac{\pi}{2} + 2(x - \frac{\pi}{4}) + \frac{1}{2}(x - \frac{\pi}{4})$$

6406531563791. ✗

**Question Number : 127 Question Id : 640653470611 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

The direction of steepest descent for the function  $f(x, y, z) = \cos(x) \sin(y) \cos(z)$  at the point  $(x, y, z) = (\frac{\pi}{4}, \frac{\pi}{6}, \frac{\pi}{4})$  is?

**Options :**

$$\left[ -\frac{1}{4}, \frac{\sqrt{3}}{4}, -\frac{1}{4} \right]$$

6406531563792. ✗

$$\left[ \frac{1}{4}, -\frac{\sqrt{3}}{4}, \frac{1}{4} \right]$$

6406531563793. ✓

$$\left[ \frac{1}{4}, \frac{1}{4}, \frac{1}{4} \right]$$

6406531563794. ✗

$$\left[ -\frac{1}{4}, -\frac{1}{4}, -\frac{1}{4} \right]$$

6406531563795. ✗

**Question Number : 128 Question Id : 640653470612 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Which of the following is the equation of the line that passes through point

[1, 2, 3, 4] and is tangent to the function  $f(p, q, r, s) = p^2 + q^2 + r^2 + s^2 + pq + rs - 2p - 2q$  at the point  $[p, q, r, s] = [1, 3, 5, 1]$ ?

**Options :**

6406531563796. ✓ [1, 2, 3, 4] +  $\alpha$ [3, 5, 11, 7]

6406531563797. ✗ [3, 5, 11, 7] +  $\alpha$ [1, 2, 3, 4]

6406531563798. ✗ [1, 2, 3, 4] +  $\alpha$ [0, 4, 10, 2]

6406531563799. ✗ [1, 2, 3, 4] +  $\alpha$ [5, 3, 11, 7]

6406531563800. ✗ [5, 3, 11, 7] +  $\alpha$ [1, 2, 3, 4]

**Question Number : 129 Question Id : 640653470618 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 4**

Question Label : Multiple Choice Question

The characteristic polynomial of a matrix with eigenvalues 1, 2, 3 and 4 is

**Options :**

6406531563815. ✓  $\lambda^4 - 10\lambda^3 + 35\lambda^2 - 50\lambda + 24$

6406531563816. ✘  $\lambda^4 + 10\lambda^3 + 35\lambda^2 + 50\lambda + 24$

6406531563817. ✘  $\lambda^4 + 10\lambda^3 - 35\lambda^2 + 50\lambda - 24$

6406531563818. ✘  $2\lambda^4 - 20\lambda^3 + 35\lambda^2 - 100\lambda + 48$

**Sub-Section Number :** 5

**Sub-Section Id :** 64065367885

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 130 Question Id : 640653470614 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

If null space of a matrix  $A$  is  $\text{span} \left\{ \begin{bmatrix} 7/17 \\ 22/17 \\ -1 \end{bmatrix} \right\}$ , then which of the following can be row space of matrix  $A$ ?

**Options :**

$$\text{Span} \left\{ \begin{bmatrix} 1 \\ 0 \\ 7 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 22 \end{bmatrix} \right\}$$

6406531563802. ✓

$$\text{Span} \left\{ \begin{bmatrix} -1 \\ 0 \\ 7 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 22 \end{bmatrix} \right\}$$

6406531563803. ✘

$$\text{Span} \left\{ \begin{bmatrix} 1 \\ 0 \\ 7 \end{bmatrix}, \begin{bmatrix} 0 \\ -1 \\ 22 \end{bmatrix} \right\}$$

6406531563804. ✘

$$\text{Span} \left\{ \begin{bmatrix} -1 \\ 0 \\ 7 \\ 17 \end{bmatrix}, \begin{bmatrix} 0 \\ -1 \\ 22 \\ 17 \end{bmatrix} \right\}$$

6406531563805. \*

**Question Number : 131 Question Id : 640653470616 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Let  $A = \begin{bmatrix} 1 & 1 \\ 2 & 0 \\ 3 & 1 \\ 5 & 1 \end{bmatrix}$ , then which among the following is orthogonal to  $C(A)$ ?

**Options :**

$$\text{Span} \left\{ \begin{bmatrix} -3 \\ -5 \\ 1 \\ 2 \end{bmatrix}, \begin{bmatrix} -1 \\ -1 \\ 1 \\ 0 \end{bmatrix} \right\}$$

6406531563807. ✓

$$\text{Span} \left\{ \begin{bmatrix} 3 \\ 5 \\ 1 \\ 2 \end{bmatrix}, \begin{bmatrix} -1 \\ -1 \\ 1 \\ 0 \end{bmatrix} \right\}$$

6406531563808. \*

$$\text{Span} \left\{ \begin{bmatrix} 3 \\ 5 \\ 1 \\ 2 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 1 \\ 0 \end{bmatrix} \right\}$$

6406531563809. \*

$$\text{Span} \left\{ \begin{bmatrix} -3 \\ -5 \\ 1 \\ 2 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 1 \\ 0 \end{bmatrix} \right\}$$

6406531563810. \*

**Sub-Section Number :** 6  
**Sub-Section Id :** 64065367886  
**Question Shuffling Allowed :** Yes  
**Is Section Default? :** null

**Question Number : 132 Question Id : 640653470607 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

**Question Label :** Short Answer Question

For the data set  $\{(x^i, y^i)\} = \{(1, 1), (2, 6), (3, 8), (4, 15), (5, 26)\}$ ,  $i = 1$  to  $5$ , Consider the regression model  $f(x) = x^2 + 1$ . What is the mean squared loss of  $f(x)$ ? (Round your answer off to the nearest integer).

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Question Number : 133 Question Id : 640653470608 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

**Question Label :** Short Answer Question

What will be the average misclassification error when the functions  $g(X) = \text{sign}((x_1 - x_2)^2 - 8)$  is used to classify the data points into classes +1 or -1. Enter the answer closest to one decimal accuracy.

X	y
(5,2)	1
(5,6)	-1
(6,3)	1
(6,4)	-1
(4,8)	-1

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0.2

**Question Number :** 134 **Question Id :** 640653470613 **Question Type :** SA **Calculator :** None

**Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Correct Marks :** 3

**Question Label :** Short Answer Question

For a  $3 \times 3$  matrix  $A$  whose nullity is equal to 1, what is the value of  $R(A) + \dim(C(A)) + \dim(C(A^T))$ ?

Here  $R(A)$  stands for Rank of  $A$ ,  $\dim(C(A))$  stands for dimension of column space of  $A$ ,

and  $\dim(C(A^T))$  stands for dimension of column space of  $A^T$ . Enter the answer as an integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

6

**Sub-Section Number :** 7

**Sub-Section Id :** 64065367887

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number :** 135 **Question Id :** 640653470615 **Question Type :** SA **Calculator :** None

**Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Correct Marks :** 2

**Question Label :** Short Answer Question

If projection of vector  $A$  of length 10 units, onto vector  $B$  of length 8 units, has a magnitude of 5 units, then length of projection of vector  $B$  onto  $A$  is?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

## Java

**Section Id :** 64065330365

**Section Number :** 9

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 16

**Number of Questions to be attempted :** 16

**Section Marks :** 50

**Display Number Panel :** Yes

**Group All Questions :** No

**Enable Mark as Answered Mark for Review and** Yes

**Clear Response :**

**Maximum Instruction Time :** 0

**Sub-Section Number :** 1

**Sub-Section Id :** 64065367888

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Number : 136 Question Id : 640653470620 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 "DIPLOMA LEVEL : PROGRAMMING CONCEPTS USING JAVA"**

**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 :**

6406531563823. ✓ YES

6406531563824. ✗ NO

**Sub-Section Number :** 2

**Sub-Section Id :** 64065367889

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 137 Question Id : 640653470622 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Match the following terms with their descriptions.

- |                  |   |
|------------------|---|
| A. State         | 1. Methods that operate on an object                                  |
| B. Behaviour     | 2. Reuse of implementations   |
| C. Inheritance   | 3. Restricting modification of data by the methods of the object only |
| D. Encapsulation | 4. Determined by the information in the instance variables            |

**Options :**

6406531563829. ✓ A-4, B-1, C-2, D-3

6406531563830. ✗ A-1, B-4, C-3, D-2

6406531563831. ✗ A-4, B-2, C-1, D-3

6406531563832. ✗ A-2, B-1, C-4, D-3

**Question Number : 138 Question Id : 640653470624 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the code given below.

```
class Institute{
    public void teach() {
        System.out.println("Teaches");
    }
}
class College extends Institute{
    public void sports() {
        System.out.println("College sports");
    }
    public void research() {
        System.out.println("College research");
    }
}
class University extends College{
    public void research() {
        System.out.println("University research");
    }
}
public class Test{
    public static void main(String[] args) {
        College obj = new University();
        obj.teach(); //LINE 1
        obj.sports();
        obj.research(); //LINE 2
    }
}
```

Choose the correct option.

**Options :**

This code generates the output:

Teaches  
College sports  
6406531563837. ✘ College research

This code generates the output:

Teaches  
College sports  
6406531563838. ✓ University research

LINE 1 generates compilation error because method `teach()` cannot be invoked on `obj`.  
6406531563839. ✘

This code generates the below output followed by runtime Error at LINE 2 because there is ambiguity in which `research( )` method is being invoked.

Teaches  
College sports  
6406531563840. ✘

**Question Number : 139 Question Id : 640653470626 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the code given below.

```
class Employee{  
    public final void bonus(){  
        System.out.println("Employee bonus");  
    }  
}  
class TeamManager extends Employee{  
    public void bonus(){  
        System.out.println("Team manager bonus");  
    }  
}  
class Manager extends TeamManager{  
}  
public class Example{  
    public static void main(String[] args){  
        Manager m = new Manager();  
        m.bonus();  
    }  
}
```

Choose the correct option regarding the given code.

**Options :**

This code generates a compile time error because the method `bonus()` is not defined in the class `Manager`.  
**6406531563845.** ❌

This code generates a compile time error because the method `bonus()` cannot be overridden.  
**6406531563846.** ✓

This code generates output:  
**6406531563847.** ❌ Employee bonus

This code generates output:  
**6406531563848.** ❌ Team manager bonus

**Question Number : 140 Question Id : 640653470627 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

## Question Label : Multiple Choice Question

Consider the code given below.

```
class Professor{
    public void printInfo(){
        System.out.println("Professor info");
    }
}
class HOD extends Professor{
    public void printInfo(){
        System.out.println("HOD info");
    }
    public void additionalDuties(){
        System.out.println("additional duties");
    }
}
public class Test{
    public static void main(String[] args){
        Professor obj = new HOD();
        obj.printInfo();
        obj.additionalDuties();
    }
}
```

Choose the correct option regarding the given code.

### Options :

This code generates a compile time error because the method `additionalDuties()` is not defined in class `Professor`.

6406531563849. ✓ This code generates a compile time error because a variable of type `Professor` cannot refer to an object of type `HOD`.

This code generates output:  
Professor info  
6406531563851. ✗ additional duties

This code generates output:  
HOD info  
6406531563852. ✗ additional duties

**Question Number : 141 Question Id : 640653470629 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the code given below.

```
class Date{  
    int date, month, year;  
    //Constructor to initialize instance variables  
    public String toString() {  
        return "DOB = " + date + "-" + month + "-" + year;  
    }  
}  
  
class Student{  
    private String name;  
    private Date dob;  
    public Student(String name) {  
        this.name = name;  
    }  
    public Student(Student s) {  
        this.name = s.name;  
    }  
    public void setDob(Date dob) {  
        this.dob = dob;  
    }  
    public String toString() {  
        return "name = " + name+", "+dob;  
    }  
}  
  
public class ConTest {  
    public static void main(String[] args) {  
        Student obj1 = new Student("ABC");  
        obj1.setDob(new Date(1, 6, 1990));  
        Student obj2 = new Student(obj1);  
        obj2.setDob(new Date(31, 1, 1992));  
        System.out.println(obj1);  
        System.out.println(obj2);  
    }  
}
```

What will the output be?

**Options :**

6406531563857. \*

name = ABC, DOB = 1-6-1990  
name = ABC, DOB = 1-6-1990

name = ABC, DOB = 31-1-1992  
**6406531563858.** ✘ name = ABC, DOB = 31-1-1992

name = ABC, DOB = 1-6-1990  
**6406531563859.** ✘ name = ABC, DOB = null

name = ABC, DOB = 1-6-1990  
**6406531563860.** ✓ name = ABC, DOB = 31-1-1992

**Question Number : 142 Question Id : 640653470630 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the code given below.

```
public class SwitchTest {  
    public static void main(String[] args) {  
        int arr[] = {1, 2, 3};  
        int count = 0;  
        for (int i : arr) {  
            switch (i) {  
                case 2:  
                    count += 1;  
                case 1:  
                    count += 2;  
                default:  
                    count += 3;  
            }  
        }  
        System.out.println(count);  
    }  
}
```

What will the output be?

**Options :**

6406531563861. ✘ 0

6406531563862. ✘ 3

6406531563863. ✓ 14

6406531563864. ✘ 6

**Question Number : 143 Question Id : 640653470631 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the code given below.

```
class Sample{
    private int a;
    private long b;
    private double c;
    public Sample(int x, long y) {
        a = x;
        b = y;
    }
    public Sample(long p, double q) {
        b = p;
        c = q;
    }
    public void getResult() {
        String result = a+b+c+""; // LINE 1
        System.out.println(result);
    }
}
public class VarTest {
    public static void main(String[] args) {
        Sample s1 = new Sample(10, 20);
        Sample s2 = new Sample(40, 50.0);
        s1.getResult();
        s2.getResult();
    }
}
```

Choose the correct option.

**Options :**

6406531563865. ❌ Compilation error at LINE 1

This program generates the output:

30.0

6406531563866. ✓ 90.0

This program generates the output:

30.0

100.0

6406531563867. ❌

This program generates the output:

100.0

6406531563868. ❌ 100.0

**Question Number : 144 Question Id : 640653470635 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the code given below.

```
interface Promotable{
    boolean isPromoted();
    default void promoted() {
        System.out.println("Promoted to final year");
    }
    default void detained() {
        System.out.println("Not promoted to final year");
    }
}
class UGStudent implements Promotable{
    String name;
    int credits;
    public UGStudent(String n, int c) {
        //initialized instance variables
        University u = new University(this);
        u.promote();
    }
    public boolean isPromoted() {
        if(credits >= 73)
            return true;
        return false;
    }
}
public class University {
    private Promotable obj;
    //Constructor to initialize instance variables
    public void promote() {
        if(obj.isPromoted())
            obj.promoted();
        else
            obj.detained();
    }
    public static void main(String[] args) {
        Promotable s1 = new UGStudent("ABC", 74);
        Promotable s2 = new UGStudent("XYZ", 66);
    }
}
```

Choose the correct option.

**Options :**

6406531563881. ❌ This program generates no output.

This program generates the output:

Promoted to final year

Not promoted to final year

6406531563882. ✓

Program generates compilation error because methods `promoted()` and `detained()` should be overridden by the class `UGStudent`.  
**6406531563883.** ❌

This program generates the output:

Not promoted to final year

Promoted to final year

**6406531563884.** ❌

**Sub-Section Number :** 3

**Sub-Section Id :** 64065367890

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 145 Question Id : 640653470632 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

**Question Label : Multiple Choice Question**

Consider the code given below.

```
abstract class OnlineShop{
    abstract void delivery(); //LINE-1
    public void returns() { //LINE-2
        System.out.println("Returns accepted");
    }
}
class Keshoo extends OnlineShop{
    public void delivery() {
        System.out.println("Keesho delivers products");
    }
}
class Kyntra extends OnlineShop{
    public void delivery() {
        System.out.println("Kyntra delivers products");
    }
}
public class AbstractEx {
    public static void main(String[] args) {
        OnlineShop[] os = new OnlineShop[2];
        os[0] = new Keshoo(); //LINE-3
        os[1] = new Kyntra(); //LINE-4
        for (int i = 0; i < os.length; i++) {
            os[i].delivery();
            os[i].returns();
        }
    }
}
```

Choose the correct option.

**Options :**

Compilation error at LINE 1 because an abstract method should be public in  
**6406531563869.** ❌ an abstract class.

Compilation error at LINE 2 because you should write only abstract methods  
**6406531563870.** ❌ in an abstract class.

Compilation errors at LINE 3 and LINE 4 because it is illegal to add objects  
**6406531563871.** ❌ of type Keesho and Kyntra to OnlineShop array.

**6406531563872.** ✓

This program generates the output:

```
Keesho delivers products
Returns accepted
Kyntra delivers products
Returns accepted
```

**Question Number : 146 Question Id : 640653470633 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the code given below.

```
interface Vehicle{
    default void getNoOfWheels() {
        System.out.println("Has 2 Wheels");
    }
    default void getFuelCapacity() {
        System.out.println("Capacity: 20L Petrol");
    }
}
class ADMSBike implements Vehicle{ // LINE 1
    public void getFuelCapacity() {
        System.out.println("No petrol needed");
    }
}
class MaruthiCar implements Vehicle{ // LINE 2
    public void getNoOfWheels() {
        System.out.println("Has 4 Wheels");
    }
}
public class InterfaceTest {
    public static void main(String[] args) {
        Vehicle v[] = new Vehicle[2];
        v[0] = new ADMSBike();
        v[1] = new MaruthiCar();
        for (int i = 0; i < v.length; i++) {
            v[i].getNoOfWheels();
            v[i].getFuelCapacity();
        }
    }
}
```

Choose the correct option.

**Options :**

Compilation error at LINE 1 because method getNoOfWheels() is not overridden in class ADMSBike  
**6406531563873. ✘**

Compilation error at LINE 2 because method getFuelCapacity() is not overridden in class MaruthiCar  
**6406531563874. ✘**

This program generates the output:

No petrol needed

**6406531563875. ✘ Has 4 Wheels**

This program generates the output:

Has 2 Wheels  
No petrol needed  
Has 4 Wheels  
Capacity: 20L Petrol

6406531563876. ✓

**Question Number : 147 Question Id : 640653470634 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the code given below.

```
interface Workable{
    void work();
}

class Human{
    public Workable getHeart() {
        return new Heart();
    }
    public Workable getKidney() {
        return new Kidney();
    }
    private class Heart implements Workable{
        public void work() {
            System.out.println("Pumps blood");
        }
    }
    private class Kidney implements Workable{
        public void work() {
            System.out.println("Removes wastes");
        }
    }
}
public class PrivateTest {
    public static void main(String[] args) {
        //CODE BLOCK
    }
}
```

Choose the correct option to be filled in place of CODE BLOCK so that the output is:

Pumps blood  
Removes wastes

#### Options :

Human obj = new Human();  
obj.getHeart().work();  
**6406531563877. ✓ obj.getKidney().work();**

Workable obj = new Human();  
obj.getHeart().work();  
**6406531563878. ❌ obj.getKidney().work();**

**6406531563879. ❌**

```
new Heart().work();
new Kidney().work();
```

```
Human hn = new Human();
Heart ht = hn.getHeart();
ht.work();
Kidney kd = hn.getHeart();
kd.work();
```

6406531563880. ✘

**Sub-Section Number :** 4

**Sub-Section Id :** 64065367891

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 148 Question Id : 640653470621 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statements is/are correct?

**Options :**

6406531563825. ✘ Return value link points to the start of the previous activation record.

6406531563826. ✓ An activation record gets pushed into the stack when a function is called, and popped out when the function returns.

6406531563827. ✘ The variables present in every activation record in the stack are in scope and are accessible.

6406531563828. ✓ The variables present in the topmost activation record of the stack are in scope and are accessible.

**Question Number : 149 Question Id : 640653470623 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0****Question Label : Multiple Select Question**

Consider the code given below that checks whether two vehicles are the same. Method `equals` is overridden to compare two `Vehicle` objects as follows. If two vehicles have the same registration number, then they are the same. Based on the given information, answer the question that follows.

```
class Vehicle{  
    private String regno;  
  
    //Constructor to initialize instance variables  
  
    public String toString() {  
        return regno;  
    }  
    public boolean equals(Object obj) {  
        // CODE BLOCK  
    }  
}  
public class Test {  
    public static void main(String[] args) {  
        Vehicle v1 = new Vehicle("RC12345");  
        Vehicle v2 = new Vehicle("RC99999");  
        Vehicle v3 = new Vehicle("RC99999");  
        if(v1.equals(v3))  
            System.out.println(v1+", "+v3+" are same");  
        if(v2.equals(v3))  
            System.out.println(v2+", "+v3+" are same");  
    }  
}
```

Choose the correct option(s) to fill in place of CODE BLOCK so that the output is:

RC99999, RC99999 are same

**Options :**

```
if(obj instanceof Vehicle) {  
    if(this.regno == obj.regno)  
        return true;  
}  
6406531563833. ✘ return false;
```

6406531563834. ✘

```
if(obj instanceof Vehicle) {  
    Vehicle v = obj;  
    if(this.regno.equals(v.regno))  
        return true;  
}  
return false;
```

```
if(obj instanceof Vehicle) {  
    Vehicle v = obj;  
    if(this.regno == v.regno)  
        return true;  
}
```

6406531563835. ❌ return false;

```
if(obj instanceof Vehicle) {  
    Vehicle v = (Vehicle) obj;  
    if(this.regno.equals(v.regno))  
        return true;  
}
```

6406531563836. ✓ return false;

**Sub-Section Number :** 5

**Sub-Section Id :** 64065367892

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 150 Question Id : 640653470625 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 4 Selectable Option : 0**

**Question Label : Multiple Select Question**

Consider the code given below.

```
class Calculator{  
    public int add(int a, int b){  
        return a+b;  
    }  
}  
class SmartCalculator extends Calculator{  
    public int add(int a, int b, int c){  
        return a + b + c;  
    }  
    public void divide(){  
        System.out.println("Prints quotient and remainder");  
    }  
}  
public class User{  
    public static void main(String[] args){  
        Calculator c = new Calculator();  
        SmartCalculator sc = new SmartCalculator();  
        // LINE 1  
    }  
}
```

Choose the correct option(s) that can be filled in place of LINE 1 such that it does not generate any compile time error.

**Options :**

6406531563841. ✘ c.add(3,4,5);

6406531563842. ✓ sc.add(3,4);

6406531563843. ✘ c.divide();

6406531563844. ✓ sc.add(3,4,5);

**Question Number : 151 Question Id : 640653470628 Question Type : MSQ Is Question**

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

**Correct Marks : 4 Selectable Option : 0**

Question Label : Multiple Select Question

Consider the code given below.

```
class Developer{
    private String name;
    private String dept;

    //CODE BLOCK

    public void getDetails() {
        System.out.println(name+" "+dept);
    }
}

public class Test {
    public static void main(String[] args) {
        Developer obj = new Developer("XYZ", "Java");
        obj.getDetails();
    }
}
```

Choose the correct option(s) to fill in place of CODE BLOCK so that the output is:

XYZ Java

**Options :**

6406531563853. ✓ }  
public Developer(String name, String dept) {  
 this.name = name;  
 this.dept = dept;

6406531563854. ✗ }  
public Developer(String name, String dept) {  
 name = name;  
 dept = dept;

6406531563855. ✗ }  
public Developer(String name, String dept) {  
 name = this.name;  
 dept = this.dept;

6406531563856. ✓ }  
public Developer(String n, String d) {  
 name = n;  
 dept = d;

## AppDev2

<b>Section Id :</b>	64065330366
<b>Section Number :</b>	10
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	17
<b>Number of Questions to be attempted :</b>	17
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065367893
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 152 Question Id : 640653470636 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 "DIPLOMA LEVEL : MODERN APPLICATION DEVELOPMENT II"**

**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 :**

6406531563885. ✓ YES

6406531563886. ✗ NO

**Sub-Section Number :** 2

**Sub-Section Id :** 64065367894

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 153 Question Id : 640653470637 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statement(s) is/are false regarding javascript language?

**Options :**

6406531563887. ✗ The “undefined” and “null” are primitive data types.

6406531563888. ✓ Event capturing is the default behaviour for event propagation.

6406531563889. ✗ The language uses a call stack to execute statements of a program.

6406531563890. ✓ The “pass” is a keyword in the language.

**Question Number : 154 Question Id : 640653470652 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statement(s) is/are true?

**Options :**

6406531563947. ✓ The “v-show” directive has higher rendering cost than “v-if”.

6406531563948. ❌ The “v-if” directive has higher rendering cost than “v-show”.

6406531563949. ❌ The “v-show” directive has higher toggle cost than “v-if”.

6406531563950. ✓ The “v-if” directive has higher toggle cost than “v-show”.

**Sub-Section Number :** 3

**Sub-Section Id :** 64065367895

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 155 Question Id : 640653470638 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is the correct definition of an immediately invoked function expression (IIFE)?

**Options :**

6406531563891. ❌ let x = function () { return “IIFE” }

6406531563892. ❌ function () { return “IIFE” }

6406531563893. ✓ (function () { return “IIFE” } )()

6406531563894. ❌ function () { return “IIFE” }()

**Question Number : 156 Question Id : 640653470645 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the following two programs.

1)

```
var x = 7  
var x = 8  
console.log(x)
```

2)

```
let y = 9  
let y = 10  
console.log(y)
```

What will be the output of the first and second program, respectively?

**Options :**

6406531563919. ✘ 8, 10

6406531563920. ✘ Error: Identifier 'x' is already declared, Error: Identifier 'y' is already declared

6406531563921. ✓ 8, Error: Identifier 'y' is already declared

6406531563922. ✘ Error: Identifier 'x' is already declared, 10

**Sub-Section Number :** 4

**Sub-Section Id :** 64065367896

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 157 Question Id : 640653470639 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following is/are not higher order function(s) in javascript language?

**Options :**

6406531563895. ✓ call()

6406531563896. ✘ map()

6406531563897. ✓ slice()

6406531563898. ✘ find()

**Question Number : 158 Question Id : 640653470646 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statement(s) is/are true?

**Options :**

6406531563923. ✓ A variable declared using var can be re-declared and updated within its scope.

6406531563924. ✗ A variable declared using let can be re-declared and updated within its scope.

6406531563925. ✗ A variable declared using const can be re-declared, but cannot be updated within its scope.

6406531563926. ✓ A variable declared using let cannot be re-declared, but can be updated within its scope.

**Sub-Section Number :** 5

**Sub-Section Id :** 64065367897

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 159 Question Id : 640653470640 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the below javascript program, and predict the output, if executed.

```
var number1 = 10;

function do_something () {
    number1 = 20;

    function number1 () {
        console.log("Number is:", number1);
    }
}
do_something();

console.log("Number is:", number1);
```

**Options :**

6406531563899. ✘ Number is: 20

6406531563900. ✓ Number is: 10

6406531563901. ✘ Number is: undefined

6406531563902. ✘ Number is: null

**Question Number : 160 Question Id : 640653470641 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the below javascript program, and predict the output, if executed in a REPL environment.

```
var first = 10;
let obj1 = {
  first : 20,
  do_something : function () {
    console.log(first, this.first);
  }
}
let obj2 = {
  first : 30,
  do_something : () => {
    console.log(first, this.first);
  }
}
obj1.do_something();
obj2.do_something();
```

**Options :**

6406531563903. ✘ 10 20

10 30

6406531563904. ✓ 10 20

10 10

6406531563905. ✘ 10 20

10 undefined

6406531563906. ✘ 20 20

30 30

**Question Number : 161 Question Id : 640653470643 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following Vue application with markup “index.html” and javascript file “app.js”.

index.html:

```
<div id = "wrapper1">
  <div id = "wrapper2">
    <div id = "wrapper3">
      <p> Welcome to the {{ course_name }} course quiz exam !! </p>
    </div>
  </div>
</div>
<script src = "app.js"> </script>
```

app.js:

```
const obj1 = new Vue({
  el: '#wrapper1',
  data: {
    course_name: 'App Development I',
  },
})

const obj2 = new Vue({
  el: '#wrapper2',
  data: {
    course_name: 'App Development II',
  },
})

const obj3 = new Vue({
  el: '#wrapper3',
  data: {
    course_name: 'Python',
  },
})
```

Suppose if you open the file “index.html” in a browser, what will be rendered by the browser?

**Options :**

6406531563911. ✓ Welcome to the App Development I course quiz exam !!

6406531563912. ✗ Welcome to the App Development II course quiz exam !!

6406531563913. ✗ Welcome to the Python course quiz exam !!

6406531563914. ✗ Welcome to the course quiz exam !!

**Question Number : 162 Question Id : 640653470647 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following javascript program and predict the output.

```
function outer() {  
    let x = 7  
    try {  
        console.log(y)  
    } catch {  
        console.log('Y is not defined')  
    }  
  
    function inner() {  
        let y = 9  
        try {  
            console.log(x)  
        } catch {  
            console.log('X is not defined')  
        }  
    }  
    inner()  
}  
  
outer()
```

**Options :**

6406531563927. ✓ Y is not defined

7

6406531563928. ✗ 9

X is not defined

6406531563929. ✗ 7

9

6406531563930. ✗ Y is not defined

X is not defined

**Question Number : 163 Question Id : 640653470650 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following Vue application with markup “index.html” and javascript file “app.js”.

index.html:

```
<body>
  <div id="app">{{count}}</div>
  <script
src="https://cdn.jsdelivr.net/npm/vue@2/dist/vue.js"></script>
  <script src="app.js"></script>
</body>
```

app.js:

```
new Vue({
  el: '#app',
  data: {
    count: 1,
  },
  beforeCreate() {
    this.count += 4
  },
  created() {
    this.count += 2
  },
  mounted() {
    this.count += 3
  },
})
```

Suppose if you open the file “index.html” in a browser, what will be rendered inside the div element with ID “app”?

**Options :**

6406531563939. ✘ 9

6406531563940. ✘ 5

6406531563941. ✘ 10

6406531563942. ✓ 6

**Question Number : 164 Question Id : 640653470651 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following Vue application with markup “index.html” and javascript file “app.js”.

index.html:

```
<body>
  <div id="app"></div>
  <script
src="https://cdn.jsdelivr.net/npm/vue@2/dist/vue.js"></script>
  <script src="app.js"></script>
</body>
```

app.js:

```
const Like = {
  template: `<div><span id='like' code1 >{{likes}} {{emoji}}
</span></div>`,
  data() {
    return { emoji: '👍' }
  },
  props: ['likes'],
}

const Data = {
  template: `<div> This is data. </div>`,
}

const Post = {
  template: `<div><Data /><Like :likes='likes' @like='like' /></div>`,
  components: {
    Like,
    Data,
  },
  data() {
    return { likes: 1 }
  },
  methods: {
    like() {
      this.likes += 1
    },
  },
}
new Vue({
  el: '#app',
  template: `<div><Post /></div>`,
  components: {
    Post,
  },
})
```

Suppose a developer wants to create a feature that whenever a user clicks on the span element with ID 'like' in like component, it increases the "likes" data of Post component by 1. Which of the following code is best suited for "code1" placeholder?

**Options :**

6406531563943. ✘ @click="emit('like')"

6406531563944. ✘ click = "emit('like')"

6406531563945. ✓ @click="\$emit('like')"

6406531563946. ✘ click = "\$emit('like')"

**Sub-Section Number :** 6

**Sub-Section Id :** 64065367898

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 165 Question Id : 640653470642 Question Type : MCQ Is Question**

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

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider the below javascript program, and predict the output, if executed in a script and REPL environment.

```
var num = 50;

var obj = {
    num : 100,
    do_something : function() {
        console.log("First:", num, "Second:", this.num);
    }
}

obj.do_something.bind()();
```

**Options :**

6406531563907. ✘ For Script: First: 50 Second: 100

For REPL: First: 50 Second: 50

6406531563908. ✘ For Script: First: 50 Second: undefined

For REPL: First: 50 Second: 100

6406531563909. ✘ For Script: First: 50 Second: 100

For REPL: First: 50 Second: undefined

6406531563910. ✓ For Script: First: 50 Second: undefined

For REPL: First: 50 Second: 50

**Question Number : 166 Question Id : 640653470644 Question Type : MCQ Is Question**

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

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider the below javascript program, and predict how many times the text "Abhi" will be shown on the console, till the program execution is completed. Also, predict the minimum time the program will take to display the text "Abhi" 12 times on the console.

```
let j = 1;
let id = setInterval(() => {
    for (let i = 0; i < j; i++)
        console.log("Abhi");
    if (j > 4) clearInterval(id);
    else j++;
}, 500)
```

**Options :**

6406531563915. ✘ The text "Abhi" will be shown 10 times

The program will not display the text "Abhi" 12 times

6406531563916. ✘ The text "Abhi" will be shown 15 times

The program will take a minimum of 3 seconds to display the text "Abhi" 12 times

6406531563917. ✓ The text "Abhi" will be shown 15 times

The program will take a minimum of 2.5 seconds to display the text "Abhi" 12 times

6406531563918. ✘ The text "Abhi" will be shown 10 times

The program will take a minimum of 1.5 seconds to display the text "Abhi" 12 times

**Question Number : 167 Question Id : 640653470648 Question Type : MCQ Is Question**

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

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Predict the output of following javascript code.

```
function marks(sem1, sem2) {  
    const sem1Marks = sem1  
    const sem2Marks = sem2  
    return {  
        currentSem: () => {  
            return sem1Marks  
        },  
        cgpa: () => {  
            return (sem1Marks + sem2Marks) / 2  
        },  
    }  
  
    std1 = marks(70, 80)  
    try {  
        console.log(std1.currentSem(), std1.cgpa(), std1.sem1Marks)  
    } catch {  
        console.log('Something went wrong')  
    }  
}
```

**Options :**

6406531563931. ✘ Something went wrong

6406531563932. ✘ 70 75 70

6406531563933. ✓ 70 75 undefined

6406531563934. ✘ Undefined undefined undefined

**Question Number : 168 Question Id : 640653470649 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider the following Vue application with markup “index.html” and javascript file “app.js”.

Index.html:

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <style>
      .color1 {
        color: red;
      }
      .color2 {
        color: green;
      }
    </style>
  </head>
  <body>
    <div id="app">
      <span id="part1Id" :class="part1">{{flower.part1}}</span>
      <span id="part2Id" :class="part2">{{flower.part2}}</span>
      <button @click="changeFlower">Change Flower</button>
    </div>
    <script
src="https://cdn.jsdelivr.net/npm/vue@2/dist/vue.js"></script>
    <script src="app.js"></script>
  </body>
</html>
```

app.js:

```
new Vue({
  el: '#app',
  data: {
    flower: { part1: 'petal', part2: 'leaf' },
    classObj1: { color1: true, color2: false },
    classObj2: { color1: false, color2: true },
    isRose: false,
  },
  computed: {
    part1() {
      return this.isRose ? this.classObj1 : this.classObj2
    },
    part2() {
      return this.isRose ? this.classObj2 : this.classObj1
    },
  },
  methods: {
    changeFlower() {
      this.isRose = !this.isRose
    },
  },
})
```

What will be the text color of the element having ID “part1Id” and “part2Id”, respectively, when the user loads the application for the first time?

**Options :**

6406531563935. ✓ Green, Red

6406531563936. ✗ Red, Green

6406531563937. ✘ Red, Red

6406531563938. ✘ Green, Green

## MLT

<b>Section Id :</b>	64065330367
<b>Section Number :</b>	11
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	17
<b>Number of Questions to be attempted :</b>	17
<b>Section Marks :</b>	100
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065367899
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 169 Question Id : 640653470653 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 "DIPLOMA LEVEL : MACHINE LEARNING TECHNIQUES"**

**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 :**

6406531563951. ✓ YES

6406531563952. ✗ NO

**Sub-Section Number :** 2

**Sub-Section Id :** 64065367900

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 170 Question Id : 640653470654 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**

Standard-PCA is performed on a centered dataset in  $\mathbb{R}^3$ . Two principal components are given below:

$$\frac{1}{2} \cdot \begin{bmatrix} 1 \\ \sqrt{2} \\ -1 \end{bmatrix}, \quad \frac{1}{\sqrt{2}} \cdot \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$$

Which of the following could be the third?

**Options :**

$$\frac{1}{2} \cdot \begin{bmatrix} 1 \\ -\sqrt{2} \\ -1 \end{bmatrix}$$

6406531563953. ✓

$$\begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

6406531563954. ✗

$$\frac{1}{\sqrt{2}} \cdot \begin{bmatrix} -1 \\ 0 \\ 1 \end{bmatrix}$$

6406531563955. \*

$$\frac{1}{\sqrt{3}} \cdot \begin{bmatrix} \sqrt{2} \\ -1 \\ 0 \end{bmatrix}$$

6406531563956. \*

**Question Number : 171 Question Id : 640653470655 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 that 1000 data points belonging to  $d$ -dimensional space have a non-linear relationship.

We apply kernel PCA to reduce the dimension of the data points and take the first  $k$  principal components. Can the value of  $k$  be larger than  $d$ ?

**Options :**

6406531563957. ✓ Yes

6406531563958. \* No

**Question Number : 172 Question Id : 640653470656 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  $X$  be the data matrix of shape  $d \times n$  with  $d > n$  for a centered dataset. The eigenvector corresponding to the largest eigenvalue  $\lambda$  of  $X^T X$  is  $\alpha_1$ . What will be the first principal component of the dataset?

**Options :**

6406531563959. \*  $\alpha_1$

6406531563960. ✘  $\frac{\alpha_1}{\sqrt{\lambda}}$

6406531563961. ✘  $X\alpha_1$

6406531563962. ✓  $\frac{X\alpha_1}{\sqrt{\lambda}}$

**Question Number : 173 Question Id : 640653470657 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

Is the following statement true or false?

For any desired transformation  $\phi(x)$ , we can design a kernel function  $k(x_1, x_2)$  that will evaluate  $\phi(x_1)^T \phi(x_2)$ .

**Options :**

6406531563963. ✓ TRUE

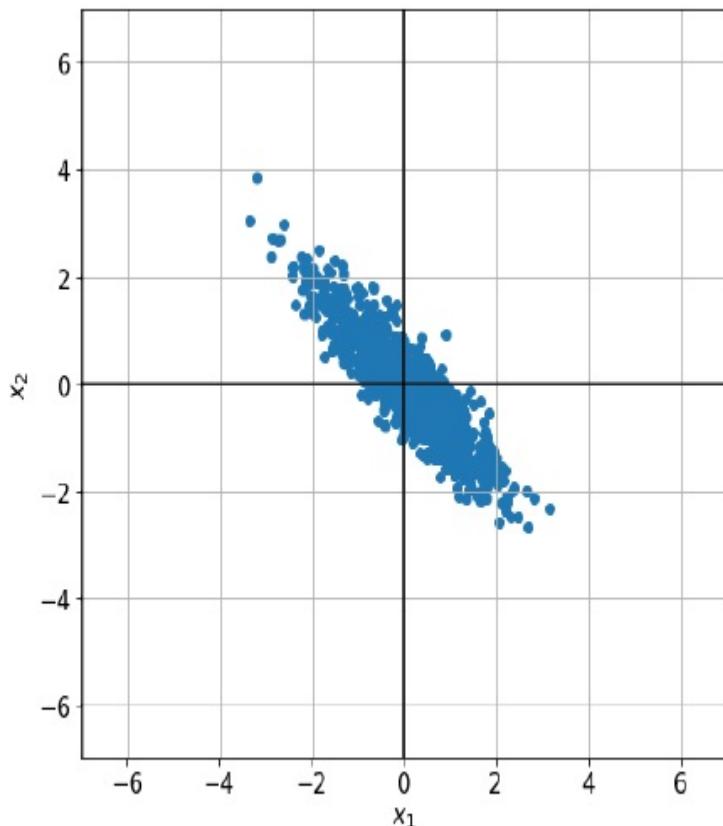
6406531563964. ✘ FALSE

**Question Number : 174 Question Id : 640653470658 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 centered dataset in  $\mathbb{R}^2$ :



Which of the following could be the first principal component? Recall that the first P.C is the most important one.

**Options :**

6406531563965. ✘  $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$

6406531563966. ✘  $\begin{bmatrix} 0 \\ 1 \end{bmatrix}$

6406531563967. ✘  $\frac{1}{\sqrt{2}} \cdot \begin{bmatrix} 1 \\ 1 \end{bmatrix}$

6406531563968. ✓  $\frac{1}{\sqrt{2}} \cdot \begin{bmatrix} -1 \\ 1 \end{bmatrix}$

**Sub-Section Number :**

3

**Sub-Section Id :**

64065367901

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

**Question Number : 175 Question Id : 640653470659 Question Type : MSQ Is Question**

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

**Correct Marks : 5 Selectable Option : 0**

Question Label : Multiple Select Question

In standard PCA, which of the following are correct formulations of the optimization problem? The dataset  $\{\mathbf{x}_1, \dots, \mathbf{x}_n\}$ , is centered, each point lies in  $\mathbb{R}^d$ , and  $\mathbf{C}$  is the covariance matrix.  $\mathbf{w} \in \mathbb{R}^d$  is the variable that we are optimizing over.

**Options :**

$$\min_{\mathbf{w}} \quad \frac{1}{n} \cdot \sum_{i=1}^n \|\mathbf{x}_i - (\mathbf{x}_i^T \mathbf{w}) \mathbf{w}\|^2$$

6406531563969. ✓ subject to  $\|\mathbf{w}\| = 1$

$$\max_{\mathbf{w}} \quad \mathbf{w}^T \mathbf{C} \mathbf{w}$$

6406531563970. ✓ subject to  $\|\mathbf{w}\| = 1$

$$\max_{\mathbf{w}} \quad \frac{1}{n} \cdot \sum_{i=1}^n \|\mathbf{x}_i - (\mathbf{x}_i^T \mathbf{w}) \mathbf{w}\|^2$$

6406531563971. ✘ subject to  $\|\mathbf{w}\| = 1$

$$\min_{\mathbf{w}} \quad \mathbf{w}^T \mathbf{C} \mathbf{w}$$

6406531563972. ✘ subject to  $\|\mathbf{w}\| = 1$

**Question Number : 176 Question Id : 640653470660 Question Type : MSQ Is Question**

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

**Correct Marks : 5 Selectable Option : 0****Question Label : Multiple Select Question**

Consider a GMM with 3 components that is used to model a dataset that has 100 points. The EM algorithm is run on this dataset to estimate the parameters of the GMM. After convergence, some of the values of  $\lambda_k^i$  for the specific point  $x_{10}$  are given below:

$$\lambda_1^{10} = 0.2, \quad \lambda_2^{10} = 0.5$$

Select all true statements.

**Options :**

If a point is picked randomly from the dataset of 100 points, then there is 20% chance that it comes from the first component.  
6406531563973. ❌

6406531563974. ✓  $\lambda_3^{10} = 0.3$

6406531563975. ❌  $\sum_{i=1}^{100} \lambda_3^i = 1$

6406531563976. ✓ There is a 50% chance that the point  $x_{10}$  comes from the second component.

**Question Number : 177 Question Id : 640653470661 Question Type : MSQ Is Question**

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

**Correct Marks : 5 Selectable Option : 0****Question Label : Multiple Select Question**

Consider a dataset with  $n$  points and a GMM with  $K$  components. If we fix  $\lambda$  and maximize for  $\theta$ , what is our estimate for the mean of the  $k^{th}$  component?

**Options :**

6406531563977. ✓ It is the weighted mean of the  $n$  points, where the weight for point  $i$  in component  $k$  is given by  $\lambda_k^i$

6406531563978. ❌ It is the mean of the  $n$  points.

$$\hat{\mu}_k = \frac{1}{n} \cdot \sum_{i=1}^n x_i$$

6406531563979. ✘

$$\hat{\mu}_k = \frac{\sum_{i=1}^n \lambda_k^i x_i}{\sum_{i=1}^n \lambda_k^i}$$

6406531563980. ✓

**Question Number : 178 Question Id : 640653470662 Question Type : MSQ Is Question**

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

**Correct Marks : 5 Selectable Option : 0**

Question Label : Multiple Select Question

With respect to the Lloyd's algorithm, choose the correct statements:

**Options :**

6406531563981. ✓ The partition configurations cannot repeat themselves.

6406531563982. ✘ After doing the reassessments (consider at least one point reassigned to the new cluster), we might get the same means for all clusters.

6406531563983. ✓ Objective function after making the re-assessments strictly reduces.

6406531563984. ✘ Objective function after making the re-assessments may increase.

6406531563985. ✓ A change in the objective function's value indicates that the partition configuration has changed.

6406531563986. ✘ For partitioning  $n$  data points across  $k$  partitions, Lloyd's algorithm takes  $k^n$  iterations to converge.

**Sub-Section Number :** 4

**Sub-Section Id :** 64065367902

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 179 Question Id : 640653470663 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

**Question Label : Short Answer Question**

Consider a dataset of 20 points where the  $i^{th}$  data-point is given by:

$$\mathbf{x}_i = a_i \cdot \begin{bmatrix} 1 \\ 1 \\ 0 \\ 2 \end{bmatrix} + b_i \cdot \begin{bmatrix} -1 \\ 1 \\ 3 \\ 0 \end{bmatrix}$$

where,  $a_i$  and  $b_i$  are real numbers such that  $\sum_{i=1}^{20} a_i = \sum_{i=1}^{20} b_i = 0$ . Standard PCA is performed on this dataset. If the top two principal components are retained and used to reconstruct the dataset, what is the reconstruction error?

**Hint:** Think about what happens in  $\mathbb{R}^2$  or  $\mathbb{R}^3$  for a similar situation and extend this idea to  $\mathbb{R}^4$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

0

**Question Number : 180 Question Id : 640653470664 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

**Question Label : Short Answer Question**

Consider the following prior for the parameter  $p$  of a Bernoulli distribution:

$$p \sim \text{Beta}(3, 2)$$

The dataset observed is as follows:

{1, 0, 1, 0, 1, 1, 1, 0, 0, 0, 1, 1, 1}

What is  $\hat{p}$ , a point estimate for the parameter of the Bernoulli distribution, if we use the expectation of the posterior as the method of estimation? Enter your answer correct to three decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.60 to 0.62

**Question Number : 181 Question Id : 640653470665 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Short Answer Question

A dataset containing 200 examples in three-dimensional space has been transformed into a higher-dimensional space using a polynomial kernel of degree two. What will be the dimension of the transformed feature space?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

10

**Sub-Section Number :**

5

**Sub-Section Id :** 64065367903

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653470666 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 : (182 to 183)**

Question Label : Comprehension

Consider a centered dataset in  $\mathbb{R}^{100}$  that has 1000 data-points. Call this dataset  $D_1$ .

Standard PCA is performed on  $D_1$  and the **scalar** projections of  $D_1$  on the top 5 principal components are computed. Call the resulting dataset  $D_2$ .

**NOTE:**  $D_2$  is only made up of the scalar projections. All the principal components are thrown out after computing the scalar projections and are not a part of  $D_2$ .

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 182 Question Id : 640653470667 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2.5**

Question Label : Short Answer Question

Each data-point in  $D_2$  belongs to  $\mathbb{R}^k$ . What is the value of  $k$ ?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

**Question Number : 183 Question Id : 640653470668 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2.5**

**Question Label : Short Answer Question**

If each real number occupies  
unit storage space in the  
memory, compute:

$$\frac{\text{size}(D_1)}{\text{size}(D_2)}$$

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

**20**

**Sub-Section Number : 6**

**Sub-Section Id : 64065367904**

**Question Shuffling Allowed : No**

**Is Section Default? : null**

**Question Id : 640653470669 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 : (184 to 185)**

**Question Label : Comprehension**

Assume that you have a dataset of five points  $\{x_1, x_2, x_3, x_4, x_5\}$ , all of which are non-negative.

You hypothesise that the data points are iid random variables with the following density:

$$f(x; \lambda) = \begin{cases} \lambda e^{-\lambda x}, & x \geq 0 \\ 0, & x < 0 \end{cases}$$

Based on the above data, answer the given subquestions.

### Sub questions

**Question Number : 184 Question Id : 640653470670 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 is the log-likelihood of this dataset under this distribution?

ln represents the natural logarithm or  $\log_e$ .

#### Options :

$$\prod_{i=1}^5 \lambda e^{-\lambda x_i}$$

6406531563992. \*

$$\sum_{i=1}^5 \lambda e^{-\lambda x_i}$$

6406531563993. \*

$$\sum_{i=1}^5 [\ln(\lambda) - \lambda x_i]$$

6406531563994. ✓

$$\prod_{i=1}^5 [\ln(\lambda) - \lambda x_i]$$

6406531563995. \*

$$\sum_{i=1}^5 [\ln(\lambda) - \lambda \ln(x_i)]$$

6406531563996. \*

**Question Number : 185 Question Id : 640653470671 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

**Question Label : Short Answer Question**

You are given the actual values of these observations:

$$x_1 = 1, \quad x_2 = 2, \quad x_3 = 3, \quad x_4 = 4, \quad x_5 = 5$$

What is the maximum likelihood estimate for  $\lambda$ ?

Enter your answer correct to three decimal places.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

0.32 to 0.34

**Sub-Section Number :** 7

**Sub-Section Id :** 64065367905

**Question Shuffling Allowed :** No

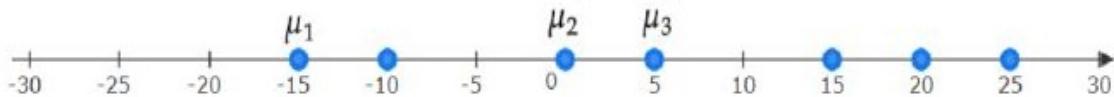
**Is Section Default? :** null

**Question Id : 640653470672 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 : (186 to 190)**

**Question Label : Comprehension**

Consider the following one-dimensional dataset of seven points that are distributed as follows:



$k$ -means algorithm with  $k = 3$  was run on the given data points.  $\mu_1$ ,  $\mu_2$ , and  $\mu_3$  are the initial cluster means.

Based on the above data, answer the given subquestions.

### Sub questions

**Question Number : 186 Question Id : 640653470673 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Short Answer Question

How many points belong to  
cluster 3 (mean  $\mu_3$ ) for the  
initial clusters?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

4

**Question Number : 187 Question Id : 640653470674 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Short Answer Question

What will be the mean  $\mu_3$  after  
1<sup>st</sup> iteration? Enter your answer  
correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

16.23 to 16.27

**Question Number : 188 Question Id : 640653470675 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Short Answer Question

How many points belong to  
cluster 2 (mean  $\mu_2$ ) after the  
1<sup>st</sup> iteration?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Question Number : 189 Question Id : 640653470676 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4**

Question Label : Short Answer Question

How many iterations will  
it take for the algorithm to  
converge with the given  
initial clusters?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Question Number :** 190 **Question Id :** 640653470677 **Question Type :** MCQ **Is Question**

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

**Correct Marks :** 4

Question Label : Multiple Choice Question

What will be the final cluster means?

**Options :**

6406531564002. ✘  $\mu_1 = -15, \mu_2 = 0, \mu_3 = 5$

6406531564003. ✘  $\mu_1 = -10, \mu_2 = 0, \mu_3 = 15$

6406531564004. ✘  $\mu_1 = -12.5, \mu_2 = 0, \mu_3 = 16.25$

6406531564005. ✘  $\mu_1 = -12.5, \mu_2 = 2.5, \mu_3 = 16.25$

6406531564006. ✓  $\mu_1 = -12.5, \mu_2 = 2.5, \mu_3 = 20$

**Sub-Section Number :** 8

**Sub-Section Id :** 64065367906

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id :** 640653470678 **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 : (191 to 192)**

Question Label : Comprehension

A k-means++ algorithm with  $k = 3$  was applied to following 2D points:

(0,0),(1,2),(3,1),(4,7),(-1,9),(4,-2)

(0,0) is chosen as the first cluster mean.

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 191 Question Id : 640653470679 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

Which point has the highest probability of being chosen as the 2<sup>nd</sup> cluster mean? Use the manhattan distance to compute the distances.

**Options :**

6406531564007. ✘ (3,1)

6406531564008. ✓ (4,7)

6406531564009. ✘ (-1,9)

6406531564010. ✘ (4,-2)

**Question Number : 192 Question Id : 640653470680 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

If the point with the highest score is chosen as the 2<sup>nd</sup> cluster mean( answer from previous

question ), Which point has the highest probability of being chosen as 3<sup>rd</sup> the cluster mean? Use the manhattan distance to compute the distances.

**Options :**

6406531564011. ✘ (3,1)

6406531564012. ✘ (4,7)

6406531564013. ✓ (-1,9)

6406531564014. ✘ (4,-2)

## MLP

<b>Section Id :</b>	64065330368
<b>Section Number :</b>	12
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	24
<b>Number of Questions to be attempted :</b>	24
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065367907
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 193 Question Id : 640653470681 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 "DIPLOMA LEVEL : MACHINE LEARNING PRACTICE"**

**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 :**

6406531564015. ✓ YES

6406531564016. ✗ NO

**Sub-Section Number :** 2

**Sub-Section Id :** 64065367908

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 194 Question Id : 640653470682 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Short Answer Question

[String Matching] Enter the sequence of steps to be followed, in general, in end to end machine learning project. Enter the answer as a 6-character string. For example, entering the answer as (without quotes) 'BADCFE' implies that the first step is B, followed by the second step A and so on.

- A. Select suitable model
- B. Train the model
- C. Pre-process the data
- D. Collect data
- E. Fine tune model
- F. Present your solution

**Response Type :** Alphanumeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Answers Case Sensitive :** No

**Text Areas :** PlainText

**Possible Answers :**

DCABEF

**Sub-Section Number :** 3

**Sub-Section Id :** 64065367909

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number :** 195 **Question Id :** 640653470690 **Question Type :** MCQ **Is Question**

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

**Correct Marks :** 1

Question Label : Multiple Choice Question

Which of the following APIs can be used to construct an ML pipeline for data preprocessing and modeling?

**Options :**

6406531564047. ❌ Pipeline

6406531564048. ❌ ColumnTransformer

6406531564049. ❌ FeatureUnion

6406531564050. ✓ All of these

**Question Number :** 196 **Question Id :** 640653470692 **Question Type :** MCQ **Is Question**

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

**Correct Marks :** 1

Question Label : Multiple Choice Question

Consider following data:

```
data = [{"age": 4, "height":96.0},  
        {"age": 1, "height":73.9},  
        {"age": 3, "height":88.9},  
        {"age": 2, "height":81.6}]
```

Which one of the following APIs can be used to extract features from the above data?

**Options :**

6406531564056. ✓ DictVectorizer

6406531564057. ✗ HashingVectorizer

6406531564058. ✗ FeatureHasher

**Question Number : 197 Question Id : 640653470693 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Consider following data:

$$X = \begin{bmatrix} 8 & 3 \\ np.nan & 8 \\ 3 & np.nan \\ 10 & 6 \\ 7 & 7 \end{bmatrix}$$

What will be the output of the following code? (Assume necessary imports)

```
si = SimpleImputer(strategy='mean')  
Xnew = si.fit_transform(X)  
print(f'{Xnew[1,0]}, {Xnew[2,1]}')
```

**Options :**

6406531564059. ✓ 7,6

6406531564060. ✗ 6,6

6406531564061. ✗ 6,7

6406531564062. ✘ 7,7

<b>Sub-Section Number :</b>	4
<b>Sub-Section Id :</b>	64065367910
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 198 Question Id : 640653470684 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Suppose that we load a data set that contains 1000 samples in a Pandas Dataframe. Each sample has 30 features. However, a few samples in the data set miss the values for all features. Therefore, those samples need to be dropped. Choose the method that removes such samples from the dataset?

**Options :**

6406531564022. ✘ drop(columns=['all'])

6406531564023. ✘ drop(how='all')

6406531564024. ✘ dropna()

6406531564025. ✓ dropna(how='all')

6406531564026. ✘ dropna.all()

**Question Number : 199 Question Id : 640653470685 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

The statement that each feature in the input data set has a (physical) meaning associated with it is

**Options :**

6406531564027. ✘ True, for all ML problems

6406531564028. ✓ True, for some ML problems

6406531564029. ✘ False, for all ML problems

6406531564030. ✘ can not be decided

**Question Number : 200 Question Id : 640653470687 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

A company collects 40000 samples (examples) to build a Machine Learning model for an application. They decide to use 30% of the total samples for testing (to be stored in the variable *trainset*) and the rest 70% for training (to be stored in the variable *trainset*). They also want to sample the same set of samples across multiple runs. Which of the following line (statement) achieves this task? Assume that all samples are stored in the variable **data**.

**Options :**

testset, trainset = train\_test\_split(data, test\_size=0.3,  
random\_state=42)

6406531564035. ✘

6406531564036. ✘ trainset, testset = train\_test\_split(data, test\_size=0.3)

trainset, testset = train\_test\_split(data, test\_size=0.3,  
random\_state=42)

6406531564037. ✓

6406531564038. ✘ testset, trainset = train\_test\_split(data, test\_size=0.3)

**Question Number : 201 Question Id : 640653470688 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following utilities of sklearn.datasets helps us to get the realworld data from the internet?

**Options :**

6406531564039. ✘ load\_

6406531564040. ✓ fetch\_

6406531564041. ✘ generate\_

6406531564042. ✘ get\_

**Question Number : 202 Question Id : 640653470691 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the following ML task/steps for a regression dataset:

1. Read the data from a file (named 'dataset.csv'). It has 7 columns. The last column is the target variable, the rest of them are numerical features.
2. Drop rows with missing values.
3. After removing samples with missing values split the data into training and test sets. Take about the first 80% of rows in the training set and the rest of them into the test set.
4. Train a simple linear regression model, with intercept, on the training set.
5. Report R2 score on the test set.

Which of the following code snippets correctly accomplishes the above task? Assume necessary imports.

**Options :**

```
data = pd.read_csv('dataset.csv')
data = data.dropna()
rows, cols = data.shape
data_train = data[:int(0.8*rows)]
data_test = data[int(0.8*rows):]
X_train = data_train[data.columns[:-1]]
y_train = data_train[data.columns[-1]]
X_test = data_test[data.columns[:-1]]
y_test = data_test[data.columns[-1]]  
  
model = LinearRegression().fit(X_train,y_train)
```

6406531564051. ✓

```
data = pd.read_csv('dataset.csv')
data = data.dropna()
rows, cols = data.shape
data_train = data[:int(0.2*rows)]
data_test = data[int(0.2*rows):]
X_train = data_train[data.columns[:-1]]
y_train = data_train[data.columns[-1]]
X_test = data_test[data.columns[:-1]]
y_test = data_test[data.columns[-1]]  
  
model = LinearRegression().fit(X_train,y_train)
```

6406531564052. ✘

```
data = pd.read_csv('dataset.csv')
data = data.dropna()
rows, cols = data.shape
data_train = data[:int(0.2*rows)]
data_test = data[int(0.2*rows):]
X_train = data_train[data.columns[:-1]]
y_train = data_train[data.columns[-1]]
X_test = data_test[data.columns[:-1]]
y_test = data_test[data.columns[-1]]  
  
model = LinearRegression().fit(X_test,y_test)
```

6406531564053. ✘

6406531564054. ✘

```

data = pd.read_csv('dataset.csv')
data = data.dropna()
rows, cols = data.shape
data_train = data[:int(0.8*rows)]
data_test = data[int(0.2*rows):]
X_train = data_train[data.columns[:-1]]
y_train = data_train[data.columns[-1]]
X_test = data_test[data.columns[:-1]]
y_test = data_test[data.columns[-1]]

model = LinearRegression().fit(X_train,y_test)
model.score(X_train, y_train)

data = pd.read_csv('dataset.csv')
rows, cols = data.shape
data_train = data[:int(0.8*rows)]
data_test = data[int(0.2*rows):]
X_train = data_train[data.columns[:-1]]
y_train = data_train[data.columns[-1]]
X_test = data_test[data.columns[:-1]]
y_test = data_test[data.columns[-1]]

model = LinearRegression().fit(X_train,y_test)
6406531564055. ✘ model.score(X_train, y_train)

```

**Question Number : 203 Question Id : 640653470698 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the following code where X\_train, y\_train is the training data. X\_test, y\_test is the test data.

```

from sklearn.linear_model import SGDRegressor
sgd= SGDRegressor(learning_rate='constant', eta0=1e-2)
sgd.fit(X_train, y_train)
sgd.predict(X_test)
score = sgd.score(X_test, y_test)

```

Which evaluation metric will be contained in the 'score'?

**Options :**

6406531564079. ✘ mean\_squared\_error

6406531564080. ✘ mean\_absolute\_error

6406531564081. ✓ R2\_score

6406531564082. ✘ Accuracy

**Question Number : 204 Question Id : 640653470700 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

How to make SGDRegressor stop after 1000 epochs?

**Options :**

6406531564087. ✘ 

```
from sklearn.linear_model import SGDRegressor
linear_regressor = SGDRegressor(max_epoch=1000)
```

6406531564088. ✘ 

```
from sklearn.linear_model import SGDRegressor
linear_regressor = SGDRegressor(stopping_criteria=1000)
```

6406531564089. ✓ 

```
from sklearn.linear_model import SGDRegressor
linear_regressor = SGDRegressor(max_iter=1000)
```

6406531564090. ✘ 

```
from sklearn.linear_model import SGDRegressor
linear_regressor = SGDRegressor(stop_after_iter=1000)
```

**Question Number : 205 Question Id : 640653470701 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Suppose we want to transform features in a dataset using polynomial transformation. The sklearn API provides the functionality in which of the following modules?

**Options :**

6406531564091. ❌ `sklearn.dataset`

6406531564092. ❌ `sklearn.model_selection`

6406531564093. ✓ `sklearn.preprocessing`

6406531564094. ❌ `sklearn.featureSelection`

6406531564095. ❌ `sklearn.featureExtraction`

**Sub-Section Number :** 5

**Sub-Section Id :** 64065367911

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 206 Question Id : 640653470694 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider following dataset:

HouseAge	AveRoom	Population	City	IncomeGroup
41.0	6.98	322.0	Delhi	Low
21.0	6.23	2401.0	Kolkata	High
52.0	8.28	496.0	Agra	Medium
52.0	NaN	558.0	Kolkata	Medium
52.0	6.28	565.0	Mumbai	Medium

Which one of the following code snippets will correctly preprocess above data? Assume necessary imports. The data is stored in a dataframe named X.

**Options :**

6406531564063. ✓

```
num_tranform = Pipeline(  
    steps=[("imputer", SimpleImputer(strategy="median")),  
          ("scaler", StandardScaler())]  
)  
cat_transfom = OneHotEncoder(handle_unknown="ignore")  
ordinal_encoder = OrdinalEncoder()  
preprocessor = ColumnTransformer(  
    transformers=[  
        ("num", num_tranform, ['HouseAge',  
                               'AveRoom',  
                               'Population']),  
        ("cat", cat_transfom, ['City']),  
        ("ord", ordinal_encoder, ['IncomeGroup'])  
    ]  
)  
  
preprocessor.fit_transform(X)  
  
num_tranform = Pipeline(  
    steps=[("scaler", StandardScaler())]  
)  
cat_transfom = OneHotEncoder(handle_unknown="ignore")  
ordinal_encoder = OrdinalEncoder()  
preprocessor = ColumnTransformer(  
    transformers=[  
        ("num", num_tranform, ['HouseAge',  
                               'AveRoom',  
                               'Population']),  
        ("cat", cat_transfom, ['City']),  
        ("ord", ordinal_encoder, ['IncomeGroup'])  
    ]  
)  
6406531564064. ✘ preprocessor.fit_transform(X)
```

6406531564065. ✘

```

num_tranform = Pipeline(
    steps=[("imputer", SimpleImputer(strategy="median")),
           ("scaler", StandardScaler())]
)
cat_transfom = OneHotEncoder(handle_unknown="ignore")
ordinal_encoder = OrdinalEncoder()
preprocessor = ColumnTransformer(
    transformers=[
        ("num", num_tranform, ['HouseAge',
                               'City',
                               'Population']),
        ("cat", cat_transfom, ['AveRoom']),
        ("ord", ordinal_encoder, ['IncomeGroup'])
    ]
)

```

preprocessor.fit\_transform(X)

```

num_tranform = Pipeline(
    steps=[("imputer", SimpleImputer(strategy="median")),
           ("scaler", StandardScaler())]
)
cat_transfom = OneHotEncoder(handle_unknown="ignore")
ordinal_encoder = OrdinalEncoder()
preprocessor = ColumnTransformer(
    transformers=[
        ("num", num_tranform, ['IncomeGroup',
                               'AveRoom',
                               'Population']),
        ("cat", cat_transfom, ['City']),
        ("ord", ordinal_encoder, ['HouseAge'])
    ]
)
preprocessor.fit_transform(X)

```

6406531564066. \*

**Question Number : 207 Question Id : 640653470695 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

For a dataset with 1000 data points and 100 features, the following code will generate how many models during execution?

**Note:** X is the feature matrix and y is the target vector.

```
from sklearn.model_selection import cross_val_score
from sklearn.model_selection import LeaveOneOut
from sklearn.linear_model import linear_regression
lin_reg = linear_regression()
loocv = LeaveOneOut()
score = cross_val_score(lin_reg, X, y, cv=loocv)
```

**Options :**

6406531564067. ✓ 1000

6406531564068. ✗ 100

6406531564069. ✗ 99

6406531564070. ✗ 999

**Question Number : 208 Question Id : 640653470696 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following cross-validation strategy:

```
cv = ShuffleSplit(n_splits=40, test_size=0.3, random_state=0)
```

Assume we apply this strategy to some data set. Which of the following options is/are correct?

**Options :**

6406531564071. ✗ Every data point will be used only once for training.

6406531564072. ✗ Every data point will be used only once for validation.

6406531564073. ❌ The code will result in an error as `n_splits * test_size` should be equal to 1.

6406531564074. ✓ None of these.

**Question Number : 209 Question Id : 640653470697 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following code is correct if we want the mean absolute error to be minimized during the computation of `cross_val_score`?

**Options :**

6406531564075. ❌ `cross_val_score(lin_reg, X, y, cv=5,  
performance='neg_mean_absolute_error')`

6406531564076. ❌ `cross_val_score(lin_reg, X, y, cv=5,  
performance='mean_absolute_error')`

6406531564077. ✓ `cross_val_score(lin_reg, X, y, cv=5,  
scoring='neg_mean_absolute_error')`

6406531564078. ❌ `cross_val_score(lin_reg, X, y, cv=5,  
scoring='mean_absolute_error')`

**Question Number : 210 Question Id : 640653470702 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

We know that applying polynomial transformation to the samples is often helpful. Assume we imported all the required modules.

```
X = np.random.randn(2,2)
poly = PolynomialFeatures(degree=2,
                           interaction_only=True,
                           include_bias=False)
poly_X= poly.fit_transform(X)
```

What is the shape of the variable poly\_X?

**Options :**

6406531564096. ✘ (2,2)

6406531564097. ✘ (2,6)

6406531564098. ✘ (6,2)

6406531564099. ✓ (2,3)

6406531564100. ✘ (3,2)

6406531564101. ✘ (2,5)

6406531564102. ✘ (5,2)

**Question Number : 211 Question Id : 640653470703 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

A team has built a dataset for a regression problem. It contains 1000 samples. Each sample  $\mathbf{x}$  is of size 2. All the features are binary, that is,  $x_i \in \{0, 1\}$ . The team decided to use polynomial feature transformation of degree 2 as follows,

```
X = np.random.randint(0,2,size=(10,2))
poly = PolynomialFeatures(degree=2)
poly_X= poly.fit_transform(X)
```

The transformed features are stored in the variable  $poly\_X$ . There are  $N$  redundant column(s) (they are the exact copy of some column) in the variable  $poly\_X$ . What is the value of  $N$ ?

**Options :**

6406531564103. ✘ 1

6406531564104. ✓ 2

6406531564105. ✘ 3

6406531564106. ✘ 4

6406531564107. ✘ 0

**Question Number : 212 Question Id : 640653470704 Question Type : MCQ Is Question****Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0****Correct Marks : 3**

Question Label : Multiple Choice Question

Consider a regression problem with L2 regularization. Suppose we instantiate the model as shown below,

```
from sklearn.linear_model import Ridge  
model = Ridge(alpha)
```

What is the range of 'alpha'?

**Options :**6406531564108. ✘  $(-\infty, \infty)$ 6406531564109. ✓  $(0, \infty)$ 6406531564110. ✘  $(0, 1)$ 

6406531564111. ✘ No range,a constant 1.0

**Sub-Section Number :**

6

**Sub-Section Id :**

64065367912

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

**Question Number : 213 Question Id : 640653470683 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

**Question Label : Multiple Select Question**

(Multiple Select) Consider a data set shown below. The data set was loaded using Pandas and stored in the variable 'data' as a data frame.

	fixed acidity	volatile acidity	citric acid	residual sugar	chlorides	free sulfur dioxide	total sulfur dioxide	sulfur density	pH	sulphates	alcohol	quality
0	7.4	0.70	0.00	1.9	0.076	11.0	34.0	0.9978	3.51	0.56	9.4	5
1	7.8	0.88	0.00	2.6	0.098	25.0	67.0	0.9968	3.20	0.68	9.8	5
2	7.8	0.76	0.04	2.3	0.092	15.0	54.0	0.9970	3.26	0.65	9.8	5
3	11.2	0.28	0.56	1.9	0.075	17.0	60.0	0.9980	3.16	0.58	9.8	6
4	7.4	0.70	0.00	1.9	0.076	11.0	34.0	0.9978	3.51	0.56	9.4	5

```
data_url = '''https://archive.ics.uci.edu/ml/machine-learning-databases/wine-quality/winequality-red.csv'''
data = pd.read_csv(data_url, sep=";")
```

Suppose that we want to get the value of 'chlorides' of the third sample (2nd by index). Which of the following lines of code does this?

**Options :**

6406531564018. ✓ data.chlorides[2]

6406531564019. ✓ data['chlorides'][2]

6406531564020. ✗ data[2][4]

6406531564021. ✓ data.iloc[2,4]

**Question Number : 214 Question Id : 640653470686 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

(MSQ) Suppose that we plot the histogram of numerical features in a data set. This reveals which of the following information?

**Options :**

6406531564031. ✓ Scale of the features

6406531564032. ✓ (left or right) Skew of the distribution

6406531564033. ✓ Modes in the distribution

6406531564034. ✓ Deduce total number of samples in the dataset

**Question Number : 215 Question Id : 640653470689 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Why is data preprocessing necessary?

**Options :**

6406531564043. ✓ While recording or noting down, the data collector forgot the values to be recorded and entered blanks.

6406531564044. ❌ Some columns have values only between 0 and 1.

6406531564045. ✓ The data is divided into multiple files and has to be combined.

6406531564046. ❌ The data has only numbers in all the columns.

**Question Number : 216 Question Id : 640653470699 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

[MSQ] Which of the following will produce constantly reducing learning rates?

**Options :**

6406531564083. ❌

```
from sklearn.linear_model import SGDRegressor  
linear_regressor = SGDRegressor(learning_rate='constant',  
                                eta0=1e-2)
```

```
from sklearn.linear_model import SGDRegressor  
linear_regressor = SGDRegressor(learning_rate='invscaling',  
                                eta0=1e-2,  
                                power_t = 0.25)
```

6406531564084. ✓

```
from sklearn.linear_model import SGDRegressor  
linear_regressor = SGDRegressor(learning_rate='adaptive',  
                                eta0=1e-2)
```

6406531564085. ✘

```
from sklearn.linear_model import SGDRegressor  
linear_regressor = SGDRegressor(learning_rate='optimal',  
                                eta0=1e-2)
```

6406531564086. ✓

## BDM

<b>Section Id :</b>	64065330369
<b>Section Number :</b>	13
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	8
<b>Number of Questions to be attempted :</b>	8
<b>Section Marks :</b>	15
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1

**Sub-Section Id :** 64065367913

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Number : 217 Question Id : 640653470705 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 "DIPLOMA LEVEL : BUSINESS DATA MANAGEMENT"**

**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 :**

6406531564112. ✓ YES

6406531564113. ✗ NO

**Sub-Section Number :** 2

**Sub-Section Id :** 64065367914

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653470706 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 : (218 to 219)**

Question Label : Comprehension

A local milk store orders 300 half-litre bottles of milk and 100 loaves of bread each week. The store

sells a bottle of milk for Rs. 20 and a loaf of bread for Rs 23. At the end of the first week, the store has sold 160 bottles of milk, while the loaves were sold out by mid-week which left customers leaving unhappy. With this information, answer the given subquestions.

### **Sub questions**

**Question Number : 218 Question Id : 640653470707 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

What economic situation is the store facing? Select all that apply.

#### **Options :**

6406531564114. ✓ Surplus of milk

6406531564115. ✗ Shortage of milk

6406531564116. ✗ Equilibrium of milk

6406531564117. ✗ Surplus of bread

6406531564118. ✓ Shortage of bread

6406531564119. ✗ Equilibrium of bread

6406531564120. ✗ Surplus of milk and bread

6406531564121. ✗ Shortage of milk and bread

6406531564122. ✗ Equilibrium of milk and bread

**Question Number : 219 Question Id : 640653470708 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Select all the statements that are TRUE

#### **Options :**

6406531564123. ✗ Decrease in selling price of bread will result in equilibrium with respect to bread sales

6406531564124. ✓ Increase in selling price of bread will result in equilibrium with respect to bread sales

6406531564125. ✘ Bread sales is already in equilibrium

6406531564126. ✓ Decrease in selling price of milk will result in equilibrium with respect to milk sales

6406531564127. ✘ Increase in selling price of milk will result in equilibrium with respect to milk sales

6406531564128. ✘ Milk sales is already in equilibrium

**Sub-Section Number :** 3

**Sub-Section Id :** 64065367915

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653470710 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 : (220 to 221)**

Question Label : Comprehension

**Consider this hypothetical example:** A local baker increased the price of their iconic loaf of bread from INR 23 per loaf to INR 25. This resulted in consumers buying only 500 loaves a week (while earlier, the sales was 800 loaves a week). In the same week, an international brand launched their flagship product in the local market, starloaf breakfast bread at a discounted price of INR 20. This promotional offer on starloaf increased its sales by a whopping 25% compared to other markets! To add to all the complexity, in the same week, the price of petrol increased by 3%, and that of diesel by 2.5%, resulting in a net decrease in fuel usage by 0.02% and a 1% increase in truck transport fares. Answer the given subquestions.

**Sub questions**

**Question Number : 220 Question Id : 640653470711 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

**Question Label :** Short Answer Question

Given all this data, calculate the price elasticity of demand of the local baker's bread loaf (round the answer to 2 decimal places and DO NOT use mid-point method). Give the absolute value of the answer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

4.29 to 4.40

**Question Number :** 221 **Question Id :** 640653470712 **Question Type :** MCQ **Is Question**

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

**Correct Marks :** 1

Question Label : Multiple Choice Question

The local baker's bread is:

**Options :**

6406531564135. ✘ Perfectly elastic

6406531564136. ✓ Elastic

6406531564137. ✘ Unitary

6406531564138. ✘ Inelastic

6406531564139. ✘ Perfectly inelastic

**Sub-Section Number :** 4

**Sub-Section Id :** 64065367916

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id :** 640653470714 **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 : (222 to 223)**

Question Label : Comprehension

The elasticity of demand for a commodity is estimated to be -2.5; then, an increase in price from INR 8 to INR 10 would \_\_\_(1)\_\_\_ the demand by \_\_\_(2)\_\_\_ % (round the answer to the second part by 1 decimal point)

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 222 Question Id : 640653470715 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Select the correct answer for Blank (1)

**Options :**

6406531564146. ❌ Increase

6406531564147. ✓ Decrease

**Question Number : 223 Question Id : 640653470716 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Short Answer Question

Enter the correct answer for Blank (2)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

62.5

<b>Sub-Section Number :</b>	5
<b>Sub-Section Id :</b>	64065367917
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 224 Question Id : 640653470709 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

A product X has no substitutes. Then (theoretically), the demand curve for the product X will be:

**Options :**

6406531564129. ✘ Horizontal

6406531564130. ✘ Inclined at 45 degrees

6406531564131. ✓ Vertical

6406531564132. ✘ Inclined at 45 degrees until the price reaches the competition, and then horizontal

6406531564133. ✘ Inclined at 45 degrees until the price reaches the competition, and then vertical

**Question Number : 225 Question Id : 640653470717 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

When marginal utility is zero, total utility is:

**Options :**

6406531564149. ✘ Increasing

6406531564150. ✘ Decreasing

6406531564151. ✓ Maximum

6406531564152. ✘ Minimum

**Sub-Section Number :** 6

**Sub-Section Id :** 64065367918

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 226 Question Id : 640653470713 Question Type : MSQ Is Question**

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

**Correct Marks : 1 Selectable Option : 0**

Question Label : Multiple Select Question

Which among the following variable(s), when changed, results in a movement along the Supply curve? Select multiple options if applicable.

**Options :**

6406531564140. ✓ Price of the item

6406531564141. ✘ Income

6406531564142. ✘ Prices of related goods

6406531564143. ✘ Expectations

6406531564144. ✘ Number of buyers

6406531564145. ✘ Tastes

**Sub-Section Number :** 7

**Sub-Section Id :** 64065367919

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 227 Question Id : 640653470718 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

If the current ratio is 2:1 and the Quick ratio is 1.5:1, then which of the following is/are true? (Select all that are applicable)

**Options :**

6406531564153. ✓ Current assets are 2 times the liability

6406531564154. ✗ Liability is 2 times the current assets

6406531564155. ✓ Stocks is 0.5 times the liability

6406531564156. ✗ Liability is 0.5 times Stocks

6406531564157. ✓ Current assets are greater than stocks

6406531564158. ✗ Stocks are greater than current assets

6406531564159. ✗ None of these

## Business Analytics

**Section Id :** 64065330370

**Section Number :** 14

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 5

**Number of Questions to be attempted :** 5

**Section Marks :** 20

**Display Number Panel :** Yes

**Group All Questions :** No

**Enable Mark as Answered Mark for Review and** Yes

**Clear Response :**

**Maximum Instruction Time :** 0

**Sub-Section Number :** 1

**Sub-Section Id :** 64065367920

**Question Shuffling Allowed :** No

**Is Section Default? :**

null

**Question Number : 228 Question Id : 640653470719 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 "DIPLOMA LEVEL : BUSINESS ANALYTICS"**

**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 :**

6406531564160. ✓ YES

6406531564161. ✗ NO

**Sub-Section Number :** 2

**Sub-Section Id :** 64065367921

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653470720 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 : (229 to 230)**

Question Label : Comprehension

A visualization expert (VE) having the data given in Table-1 needs to make a presentation to the company's top management. Table-1 specifies the number of units of products A and B sold in the last 12 months in a given market. Then answer the given subquestions.

Note to students: Please do not worry about the colour combinations. In TCS ion, the colour

representations may not appear accurately. Kindly use the “data labels” and “visualisation theory” to arrive at the appropriate answers.

Month	Sales for Product-A	Sales for Product-B
1	10	20
2	11	19
3	11	19
4	12	17
5	12	16
6	14	16
7	16	12
8	17	12
9	17	11
10	17	9
11	18	6
12	20	6

Table-1

### Sub questions

**Question Number : 229 Question Id : 640653470721 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

If the aim is to highlight the behaviour of the product sales in the past year, then which of the following visualizations would be best suited?

**Options :**



6406531564162. ✓



6406531564163. ✗

6406531564164. ✗ None of these

**Question Number : 230 Question Id : 640653470722 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

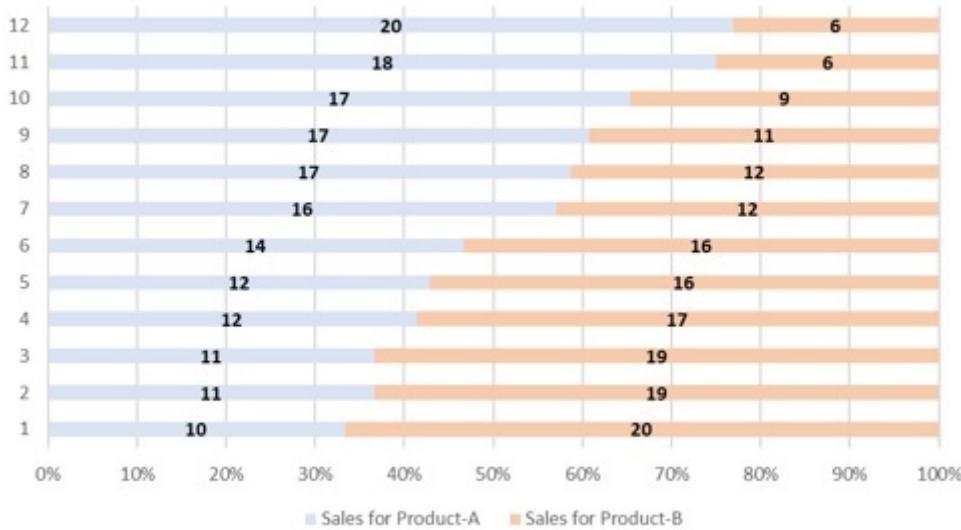
Question Label : Multiple Choice Question

If the aim is to highlight the market share of the products in the past year, then which of the following visualizations would be best suited?

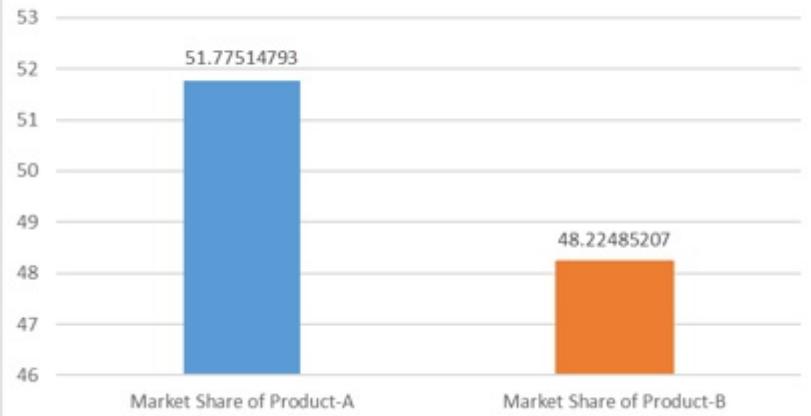
**Options :**

6406531564165. ✗

### Proportion of Product Sales in the last 12 Months

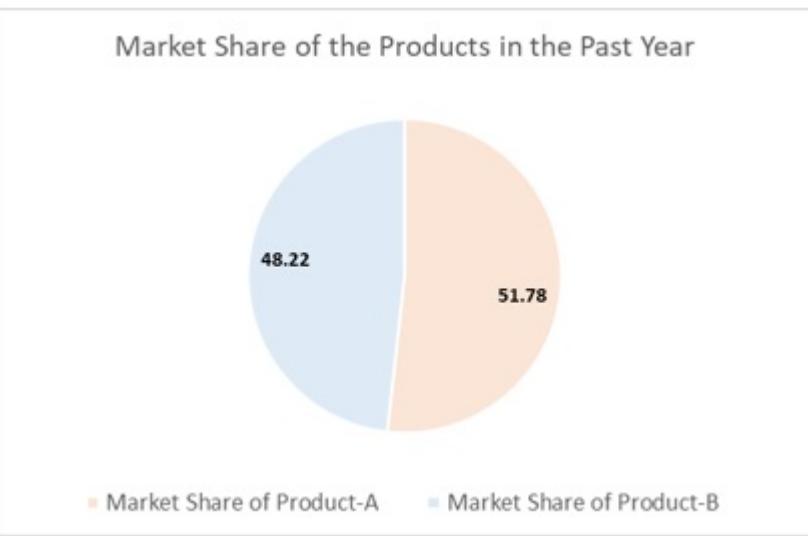


### Market Share of Products in the Past Year



6406531564166. ❌

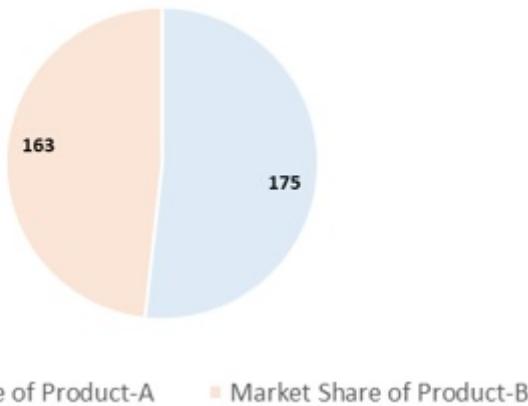
### Market Share of the Products in the Past Year



6406531564167. ✅

6406531564168. ❌

Market Share of the Products in the Past Year



**Sub-Section Number :**

3

**Sub-Section Id :**

64065367922

**Question Shuffling Allowed :**

No

**Is Section Default? :**

null

**Question Id : 640653470723 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 : (231 to 236)**

Question Label : Comprehension

A company sells two products (A and B) in two different marketplaces. In the first marketplace, the sales are made at the Forenoon (FN). In the second marketplace, sales are made during the Afternoon (AN). Table-2 provides the data on the sales in the two marketplaces for the two products in the first 10 days on January 2023. Using this data, answer the given subquestions.

Date	Time of Day	Number of units of Product A Sold	Number of units of Product B Sold
01-01-2023	FN	31	30
02-01-2023	FN	21	41
03-01-2023	FN	16	45
04-01-2023	FN	7	56
05-01-2023	FN	13	49
06-01-2023	FN	8	40
07-01-2023	FN	8	42
08-01-2023	FN	21	44
09-01-2023	FN	13	55
10-01-2023	FN	7	42
01-01-2023	AN	31	30
02-01-2023	AN	21	41
03-01-2023	AN	16	52
04-01-2023	AN	7	57
05-01-2023	AN	13	49
06-01-2023	AN	8	55
07-01-2023	AN	8	57
08-01-2023	AN	21	44
09-01-2023	AN	13	52
10-01-2023	AN	7	62

Table-2

### Sub questions

**Question Number : 231 Question Id : 640653470724 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Short Answer Question

If the total sales of both products (A&B) on any given day are expected to be uniformly distributed across both marketplaces, then what is the expected total sales on any given day? (*Note: If your answer is in decimal, enter it rounded to two decimal places. For example, if your answer is "10.256", enter it as "10.26"*)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas :** PlainText

**Possible Answers :**

123

**Question Number :** 232 **Question Id :** 640653470725 **Question Type :** SA **Calculator :** None

**Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Correct Marks :** 3

**Question Label :** Short Answer Question

To test the hypothesis that **the total sales of both products (A&B) are uniformly distributed across both marketplaces (FN&AN)**, a chi-square goodness-of-fit test is conducted. If the days are taken as the buckets, then what is the value of the computed test statistic? (*Note: If your answer is in decimal, enter it rounded to two decimal places. For example, if your answer is "10.256", enter it as "10.26"*)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

3.45 to 3.55

**Question Number :** 233 **Question Id :** 640653470726 **Question Type :** MSQ Is Question

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

**Correct Marks :** 1 **Selectable Option :** 0

**Question Label :** Multiple Select Question

In the Goodness-of-Fit test, if the computed test statistic is greater than the tabulated value of the test statistic at a given significance level, then (choose all that is applicable)

**Options :**

6406531564171. ❖ Reject the null hypothesis and conclude that there is strong evidence that the data does not come from a population with a specified distribution

6406531564172. ✓ At the specified significance level, reject the null hypothesis and conclude that there is strong evidence that the data does not come from a population with a specified distribution

6406531564173. ✗ Do not reject the null hypothesis and conclude that there is strong evidence that the data does not come from a population with a specified distribution

6406531564174. ✗ At the specified significance level, do not reject the null hypothesis and conclude that there is strong evidence that the data does not come from a population with a specified distribution

6406531564175. ✗ None of these

**Question Number : 234 Question Id : 640653470727 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Short Answer Question

In the Goodness-of-Fit test, if the days are taken as the buckets, what is the number of degrees of freedom **if the total sales of both products (A&B) across both markets (FN&AN) is assumed to be normally distributed?** (*Note: If your answer is in decimal, enter it rounded to two decimal places. For example, if your answer is "10.256", enter it as "10.26"*)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

7

**Question Number : 235 Question Id : 640653470728 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Short Answer Question

The question of whether sales of products A and B are independent across the different markets is

being checked. Then what is the value of the computed test statistic? (Note: If your answer is in decimal, enter it rounded to two decimal places. For example, if your answer is "10.256", enter it as "10.26"]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.73 to 0.77

**Question Number :** 236 **Question Id :** 640653470729 **Question Type :** SA **Calculator :** None

**Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Correct Marks :** 1

**Question Label :** Short Answer Question

The question of whether sales of products A and B are independent across the different markets is being checked. Then what is the number of degrees of freedom for the test?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

**Sub-Section Number :** 4

**Sub-Section Id :** 64065367923

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id :** 640653470730 **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 : (237 to 238)**

Question Label : Comprehension

The linear demand response for product-A is modelled as a simple linear regression represented as  $D(P) = 1500 - 20*P$ , where  $D(P)$  is the demand at price-P. Then, answer the given subquestions.

**Sub questions**

**Question Number : 237 Question Id : 640653470731 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Short Answer Question

What is the elasticity of the demand-response curve when the price is Rs. 50? (*Note: If your answer is in decimal, enter it rounded to two decimal places. For example, if your answer is "10.256", enter it as "10.26"*)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

2

**Question Number : 238 Question Id : 640653470732 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Short Answer Question

What is the satiating price for the demand-response curve? (*Note: If your answer is in decimal, enter it rounded to two decimal places. For example, if your answer is "10.256", enter it as "10.26"*)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

75

**Question Id : 640653470733 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 : (239 to 241)**

Question Label : Comprehension

You want to apply for a student visa to country X. You can do this through any one of the two application centres, "A" or "B". To determine which application centre to choose, you collect data. Currently, the embassy has decided to receive 65% of the applications from centre A, and 35% from centre B. Historically, 70% of the applications from centre A have been granted the visa, and 80% of the applications from centre B have been granted the visa. Then answer the given subquestions.

**Sub questions**

**Question Number : 239 Question Id : 640653470734 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Short Answer Question

What is your probability of applying for a student visa through centre A and it is granted?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.45 to 0.47

**Question Number : 240 Question Id : 640653470735 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Short Answer Question

What is your probability of applying for a student visa through centre B and it is granted?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

0.27 to 0.29

**Question Number : 241 Question Id : 640653470736 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Say you find someone who had applied for a student visa in the past, and the application was rejected. However, that person (someone) has not told you which application centre was chosen to submit the application. Then which application centre will you choose, given this additional information?

**Options :**

6406531564183. ✘ Centre A

6406531564184. ✓ Centre B

## System Commands

**Section Id :**

64065330371

<b>Section Number :</b>	15
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	16
<b>Number of Questions to be attempted :</b>	16
<b>Section Marks :</b>	100
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065367924
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 242 Question Id : 640653470737 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 "DIPLOMA LEVEL : SYSTEM COMMANDS"**

**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 :**

6406531564185. ✓ YES

6406531564186. ✗ NO

<b>Sub-Section Number :</b>	2
<b>Sub-Section Id :</b>	64065367925
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 243 Question Id : 640653470738 Question Type : MCQ Is Question**

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

**Correct Marks : 6**

Question Label : Multiple Choice Question

```
ALPHA="A"  
GAMMA="G"  
echo "$ALPHA$BETA$GAMMA"
```

Select the output from the above script.

**Options :**

6406531564187. ✘ ALPHABETAGAMMA

6406531564188. ✘ ABG

6406531564189. ✘ ABETAG

6406531564190. ✓ AG

**Question Number : 244 Question Id : 640653470740 Question Type : MCQ Is Question**

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

**Correct Marks : 6**

Question Label : Multiple Choice Question

Select the missing command.

```
$ touch a
$ echo 5 > a
$ ** MISSING COMMAND **
$ cat a b
5
apples
```

**Options :**

6406531564192. ✘ touch b

6406531564193. ✘ echo b

6406531564194. ✓ echo apples > b

6406531564195. ✘ echo apples

**Question Number : 245 Question Id : 640653470747 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 6**

Question Label : Multiple Choice Question

Choose the line that modified the contents inside the file backup.sh

```
cat backup.sh | cut -d " " -f 1
echo -n >> backup.sh
echo hello world > backup.sh
cp backup.sh backup.2023.sh
```

**Options :**

6406531564217. ✘ cat backup.sh | cut -d " " -f 1

6406531564218. ✘ echo -n >> backup.sh

6406531564219. ✓ echo hello world > backup.sh

6406531564220. ✘ cp backup.sh backup.2023.sh

**Question Number : 246 Question Id : 640653470748 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 6**

Question Label : Multiple Choice Question

A college student uses a pen drive to store files. The pen drive is always mounted on his system at `/mount` as a separate file system. His pen drive contains lots of files and directories. He wants to create a link to the directory `/mount/bio/phase-2/project-312` inside his home directory. What link can the student use?

**Options :**

6406531564221. ✓ soft link

6406531564222. ✗ hard link

6406531564223. ✗ either soft link or hard link

6406531564224. ✗ links will not work for this requirement

**Sub-Section Number :** 3

**Sub-Section Id :** 64065367926

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 247 Question Id : 640653470739 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 6**

Question Label : Short Answer Question

```
a=12  
b=56  
c=$((a + b))  
d=$((a + c))
```

What will be the value of `d` at the end of execution?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

80

**Question Number :** 248 **Question Id :** 640653470745 **Question Type :** SA **Calculator :** None

**Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Correct Marks :** 6

Question Label : Short Answer Question

How many files will be created at the end of execution by the below script?

```
touch a b c d  
touch a e d  
echo $RANDOM >> b
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

5

**Sub-Section Number :** 4

**Sub-Section Id :** 64065367927

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number :** 249 **Question Id :** 640653470741 **Question Type :** MCQ **Is Question**

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

**Correct Marks :** 7

Question Label : Multiple Choice Question

When will the script /home/rohit/premodel.sh get executed.

```
5 0 * 8 * /home/rohit/premodel.sh
```

Hint: Below is the description of the sequence in the cron job command. It tells at what date/time periodically the job needs to be executed.

*	*	*	*	*	<Command(s) with argument>
					Command or Script to Execute
				Day of the Week(0-6)	
		Month of the Year(1-12)			
	Day of the Month(1-31)				
Hour(0-23)					
Min(0-59)					

### Options :

6406531564196. ✓ Everyday at 00:05 in August

6406531564197. ✗ Everyday at 05:00 in August

6406531564198. ✗ Everyday at 08:00 in May

6406531564199. ✗ Everyday at 08:05 in May

**Question Number : 250 Question Id : 640653470742 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 7**

Question Label : Multiple Choice Question

Select the regex to extract only the value of "id" from the below HTML file names as index.html

```
<html>
  <head>
    <title>My Site</title>
  </head>
  <body>
    <div class="container" id="container-secondary">
      <button id="load-preview-button">Load</button>
      <button id="play-video-button">Play</button>
    </div>
  </body>
</html>
```

Hint: -o option in grep prints only the matched regular expression.

```
grep "button" index.html
button
button
button
button
button
button
button
```

#### Options :

6406531564200. ✓ grep 'id=".\*' -o index.html | cut -d' "' -f2

6406531564201. ✗ cat index.html | grep 'id=".\*' | cut -d' "' -f2

6406531564202. ✗ grep 'id=".\*' -o index.html

6406531564203. ✗ grep 'id=".\*' -o index.html | cut -d' "' -f1

**Question Number : 251 Question Id : 640653470743 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 7**

Question Label : Multiple Choice Question

Choose the regular expression that match with **ONLY** the five digit palindrome. Basic Regular Expression (BRE) is used.

**Options :**

6406531564204. ❌ ^.....\$

6406531564205. ❌ ^.{5}\$

6406531564206. ✓ ^\(([0-9])\)([0-9])[0-9]\2\1\$

6406531564207. ❌ ^\(.\\)\(.\\).\2\1\$

**Question Number : 252 Question Id : 640653470750 Question Type : MCQ Is Question**

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

**Correct Marks : 7**

Question Label : Multiple Choice Question

Select the standard input that prints "MATCH" as output.

```
read str
pat='^@.*#'

if [[ "$str" =~ "$pat" ]]; then
    echo MATCH
else
    echo NOT MATCH
fi
```

**Options :**

6406531564226. ❌ !@#\$

6406531564227. ❌ arch

6406531564228. ✓ @#

6406531564229. ✖ #@

<b>Sub-Section Number :</b>	5
<b>Sub-Section Id :</b>	64065367928
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 253 Question Id : 640653470744 Question Type : MSQ Is Question**

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

**Correct Marks : 8 Selectable Option : 0**

Question Label : Multiple Select Question

(+91|0)?[6-9] [[:digit:]]{9}

What will be the matched case(s) from the above regular expression. Assume that the regular expression is using Extended Regular Expression Engine (ERE). [MSQ]

**Options :**

6406531564208. ✖ Any ten digit mobile number

6406531564209. ✓ Any ten digit mobile number starting with 6, 7, 8 or 9

6406531564210. ✓ Any ten digit mobile number starting with 6, 7, 8 or 9 with 0 as prefix

6406531564211. ✓ Any ten digit mobile number starting with 6, 7, 8 or 9 with +91 as prefix

**Question Number : 254 Question Id : 640653470746 Question Type : MSQ Is Question**

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

**Correct Marks : 8 Selectable Option : 0**

Question Label : Multiple Select Question

Choose the type of user(s) who can write to the file traceback.txt using the console output given below. [MSQ]

```
$ ls -l  
-rw-rw-r-- 1 abdul student 6977 Aug 8 19:14 traceback.txt
```

**Options :**

6406531564213. ✓ abdul

6406531564214. ✓ ankit who belong to the group "student"

6406531564215. ✗ catherine who do not belong to the group "student"

6406531564216. ✗ jina who belong to the group "abdul"

**Sub-Section Number :** 6

**Sub-Section Id :** 64065367929

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 255 Question Id : 640653470749 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 5**

Question Label : Short Answer Question

Enter the number `A` that will print the output "SUCCESS"

```
[ "$A" -gt 10 ] &&  
[ "$A" -lt 15 ] &&  
[ "$(( A % 3 ))" -eq 0 ] &&  
echo SUCCESS
```

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

<b>Sub-Section Number :</b>	7
<b>Sub-Section Id :</b>	64065367930
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 256 Question Id : 640653470751 Question Type : MSQ Is Question**

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

**Correct Marks : 9 Selectable Option : 0**

Question Label : Multiple Select Question

The files inside the directory is given below.

```
-rw-rw-r-- 1 meena meena      2 Nov 30 09:53 docker_notes.txt
-rwxrwxr-x 1 meena meena 2901 Nov 18 13:47 emacs_notes.txt
drwxrwxr-x 11 meena meena   4096 Jul 27 17:24 vim
-rw-rw-r-- 1 meena meena   1709 Nov 18 13:47 vim_notes.txt
drw-rw-r-- 1 meena meena   4096 Nov 18 13:47 x
drw-rw-r-- 1 meena meena   4096 Nov 18 13:47 y
drw-rw-r-- 1 meena meena   4096 Nov 18 13:47 z
```

Select the file(s) that will be printed in the output. [MSQ]

```
for file in *; do
    # -f returns exit status 0 when the operand is a file
    [ -f $file ] && echo $file
done
```

**Options :**

6406531564230. ✓ docker\_notes.txt

6406531564231. ✓ emacs\_notes.txt

6406531564232. ✓ vim\_notes.txt

6406531564233. ✗ x

6406531564234. ✗ y

6406531564235. ✗ z

**Sub-Section Number :**

8

**Sub-Section Id :** 64065367931

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 257 Question Id : 640653470752 Question Type : MSQ Is Question**

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

**Correct Marks : 6 Selectable Option : 0**

Question Label : Multiple Select Question

```
while read line; do
    echo $line
done < pattern.txt
```

Select the equivalent command for the above script.

**Options :**

6406531564236. ✓ cat pattern.txt

6406531564237. ✗ cat pattern.txt | cat > pattern.txt

6406531564238. ✗ cat > pattern.txt

6406531564239. ✓ grep . pattern.txt