Indian Institute of Technology, Madras - Centre for Continuing Education

Notations :

1.Options shown in green color and with ✔ icon are correct.

2.Options shown in red color and with ✖ icon are incorrect.

Question Paper Name :	IIT M DIPLOMA AN3 EXAM QPD3 02 Apr 2023
Subject Name :	2023 Apr2: IIT M DIPLOMA AN3 EXAM QPD3
Creation Date :	2023-03-29 17:02:19
Duration :	180
Total Marks :	700
Display Marks:	Yes
Share Answer Key With Delivery Engine :	Yes
Actual Answer Key :	Yes
Calculator :	Scientific
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console?	Yes
Change Font Color :	No
Change Background Color :	No

Change Theme :	No
Help Button :	No
Show Reports :	No
Show Progress Bar :	No

Group I

Group Number :	1
Group Id :	64065312270
Group Maximum Duration :	0
Group Minimum Duration :	90
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	700
Is this Group for Examiner? :	No
Examiner permission :	Cant View
Show Progress Bar? :	No
Revisit allowed for group Instructions? :	Yes
Maximum Instruction Time :	0
Minimum Instruction Time :	0
Group Time In :	Minutes
Navigate To Group Summary From Last Question? :	No
Disable Submit Button During Assessment? :	No
Section Selection Time? :	0
No of Optional sections to be attempted :	0

Maths2

Section Id :	64065333943
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	9
Number of Questions to be attempted :	9
Section Marks :	25
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 :	64065373992
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 1 Question Id : 640653521243 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 2"

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 :

6406531737332. ✔ YES

6406531737333. ✖ NO

Sub-Section Number : 2

Sub-Section Id : 64065373993

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 2 Question Id : 640653521258 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 vector space $V = \left\{ \begin{pmatrix} a & b \\ a & b \end{pmatrix} \mid a, b \in \mathbb{R} \right\}$ and $T : \mathbb{R}^3 \to V$ defined by $T(x, y, z) = \begin{pmatrix} x+y & x+y+z \\ x+y & x+y+z \end{pmatrix}$. Choose the correct option.

Options :

6406531737354. ✔ *T* is onto but not one-one

6406531737355. ✖ *T* is one-one but not onto.

6406531737356. ✖ *T* is both one-one and onto

6406531737357. ✖ *T* is neither one-one nor onto.

Sub-Section Number : 3

Sub-Section Id : 64065373994

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 3 Question Id : 640653521259 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

Let *A* be an $n \times n$ orthogonal matrix. Choose the correct option(s).

Options :

6406531737358. ✔ A is invertible.

6406531737359. ✔ $\det(A) = \pm 1$.

6406531737360. ✖ $\det(A)$ may be zero.

6406531737361. ✖ Nullity of A may be 1.

Sub-Section Number : 4

Sub-Section Id : 64065373995

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 4 Question Id : 640653521245 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 options is/are true?

Options :

6406531737335. ✔ If the rows of a 3×4 matrix A are linearly independent, then AA^T is an invertible matrix.

6406531737336. ✔ If the columns of a 4 × 3 matrix A are linearly independent, then A^TA is an invertible matrix.

6406531737337. ✖ If the rows of a 3 × 4 matrix A are linearly independent, then A^TA is an invertible matrix.

6406531737338. ✖ If the columns of a 4 × 3 matrix A are linearly independent, then AA^T is an invertible matrix.

Question Number : 5 Question Id : 640653521254 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

An inner product on a vector space V is a function $\langle \cdot, \cdot \rangle : V \times V \to \mathbb{R}$ satisfying the following conditions:

Condition 1: $\langle v, v \rangle > 0$ for all $v \in V \setminus \{0\}$; $\langle v, v \rangle = 0$ if and only if $v = 0$.

Condition 2: $\langle v_1 + v_2, v_3 \rangle = \langle v_1, v_3 \rangle + \langle v_2, v_3 \rangle$, $\forall v_1, v_2, v_3 \in V$.

Condition 3: $\langle v_1, v_2 \rangle = \langle v_2, v_1 \rangle$, $\forall v_1, v_2 \in V$.

Condition 4: $\langle cv_1, v_2 \rangle = c\langle v_1, v_2 \rangle$, $\forall v_1, v_2 \in V$.

Let $V = \mathbb{R}^2$ and consider the function defined as:

$$\langle \cdot, \cdot \rangle : V \times V \to \mathbb{R}$$
$$\langle (x_1, x_2), (y_1, y_2) \rangle = x_1 y_1 - x_2 y_1 + x_2 y_2.$$

Which of the following is/are satisfied by the above function?

Options :

6406531737348. ✔ Condition 1 is satisfied.

6406531737349. ✔ Condition 2 is satisfied.

6406531737350. ✖ Condition 3 is satisfied.

6406531737351. ✔ Condition 4 is satisfied.

Sub-Section Number :	5
Sub-Section Id :	64065373996
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 6 Question Id : 640653521244 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 $V = \left\{ \begin{pmatrix} a & b \\ c & d \end{pmatrix} \in M_{2\times 2}(\mathbb{R}) : a + b = c + d \right\}$ and $T : V \to \mathbb{R}^2$ be a linear transformation.

If T is onto, what is the dimension of the kernel of T?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Sub-Section Number : 6

Sub-Section Id : 64065373997

Question Shuffling Allowed : No

Is Section Default? : null

Question Id : 640653521255 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 : (7 to 8)

Question Label : Comprehension

Let W be the subspace of $\mathbb{R}^3$ with the standard inner product, spanned by the ordered set $\beta = \{(1, -1, 0), (0, 1, 1)\}$.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 7 Question Id : 640653521256 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 $\{\frac{w_1}{\|w_1\|}, \frac{w_2}{\|w_2\|}\}$ denotes the orthonormal basis of W obtained by applying the Gram Schmidt process on β, what is $2\|w_2\|^2$?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 8 Question Id : 640653521257 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

Let P_W denote the projection of $\mathbb{R}^3$ onto W. If $P_W(1,0,1) = (a,b,c)$, what is $a+b+c$?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Sub-Section Number :	7
Sub-Section Id :	64065373998
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653521251 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 : (9 to 10)

Question Label : Comprehension

Let $T : \mathbb{R}^2 \to \mathbb{R}^3$ be a linear transformation defined by $T(x,y) = (x+y, x-y, 3x+y)$.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 9 Question Id : 640653521252 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 $A = \begin{pmatrix} a & b \\ c & d \\ e & f \end{pmatrix}$ denotes the matrix of T with respect to $\{(1,1),(1,-1)\}$ for $\mathbb{R}^2$ and $\{(1,1,1),(1,1,0),(-1,0,0)\}$ for $\mathbb{R}^3$, then what is $a+d+e$?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Question Number : 10 Question Id : 640653521253 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

Let B denote the matrix of T with respect to the standard ordered bases for $\mathbb{R}^2$ and $\mathbb{R}^3$. Choose the correct option(s).

Options :

6406531737344. ✔ *A* is equivalent to *B*.

6406531737345. ✖ *A* is not equivalent to *B*.

6406531737346. ✔ There exist two invertible matrices *C* and *D* such that *BD* = *CA*.

6406531737347. ✖ There are no matrices *C* and *D* such that *BD* = *CA*.

Sub-Section Number : 8

Sub-Section Id : 64065373999

Question Shuffling Allowed : No

Is Section Default? : null

Question Id : 640653521246 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 14)

Question Label : Comprehension

Consider the system of linear equations $AX = b$,

where $A = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & -1 & 1 \end{pmatrix}$, $X = \begin{pmatrix} x \\ y \\ z \end{pmatrix}$ and $b = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$.

Let L denote the set of all solutions of the above system.

Clearly, L forms an affine space. Let W denote the subspace corresponding to L. Answer the given sub questions.

Sub questions

Question Number : 11 Question Id : 640653521247 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 nullity of A?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 12 Question Id : 640653521248 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 dimension of L?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 13 Question Id : 640653521249 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

Define $T : W \to \mathbb{R}^2$ by $T(x, y, z) = (0, x - z)$.

What is the rank of T?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 14 Question Id : 640653521250 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

If the $m \times n$ matrix B is the matrix of T with respect to some basis for W and the standard ordered basis for $\mathbb{R}^2$, then what is $m + n$?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Statistics2

Section Id :	64065333944
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	Yes

Clear Response :

Maximum Instruction Time : 0

Sub-Section Number : 1

Sub-Section Id : 64065374000

Question Shuffling Allowed : No

Is Section Default? : null

Question Number : 15 Question Id : 640653521260 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 2"

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 :

6406531737362. ✔ YES

6406531737363. ✖ NO

Question Number : 16 Question Id : 640653521261 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 ($F_X(x)$)	$E[X]$	$\mathrm{Var}(X)$
Uniform(A) $A=\{a,a+1,\ldots,b\}$	$\frac{1}{n}$, $x=k$ $n=b-a+1$ $k=a,a+1,\ldots,b$	$\begin{cases}0 & x<0\\ \frac{k-a+1}{n} & k\le x<k+1\\ & k=a,a+1,\ldots,b-1,b\\ 1 & x\ge n\end{cases}$	$\frac{a+b}{2}$	$\frac{n^2-1}{12}$
Bernoulli(p)	$\begin{cases}p & x=1\\ 1-p & x=0\end{cases}$	$\begin{cases}0 & x<0\\ 1-p & 0\le x<1\\ 1 & x\ge 1\end{cases}$	p	$p(1-p)$
Binomial(n,p)	${}^nC_k p^k(1-p)^{n-k}$, $k=0,1,\ldots,n$	$\begin{cases}0 & x<0\\ \sum_{i=0}^{k}{}^nC_i p^i(1-p)^{n-i} & k\le x<k+1\\ & k=0,1,\ldots,n\\ 1 & x\ge n\end{cases}$	np	$np(1-p)$
Geometric(p)	$(1-p)^{k-1}p$, $k=1,\ldots,\infty$	$\begin{cases}0 & x<0\\ 1-(1-p)^k & k\le x<k+1\\ & k=1,\ldots,\infty\end{cases}$	$\frac{1}{p}$	$\frac{1-p}{p^2}$
Poisson(λ)	$\frac{e^{-\lambda}\lambda^k}{k!}$, $k=0,1,\ldots,\infty$	$\begin{cases}0 & x<0\\ e^{-\lambda}\sum_{i=0}^{k}\frac{\lambda^i}{i!} & k\le x<k+1\\ & k=0,1,\ldots,\infty\end{cases}$	λ	λ

Continuous random variables:

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

1. **Markov's inequality:** Let X be a discrete random variable taking non-negative values with a finite mean μ. Then,
$$P(X \ge c) \le \frac{\mu}{c}$$

2. **Chebyshev's inequality:** Let X be a discrete random variable with a finite mean μ and a finite variance σ^2. Then,
$$P(|\ X - \mu\ | \ge k\sigma) \le \frac{1}{k^2}$$

3. **Weak Law of Large numbers:** Let $X_1, X_2, \ldots, X_n \sim$ iid X with $E[X] = \mu, \text{Var}(X) = \sigma^2$.

   Define sample mean $\overline{X} = \frac{X_1 + X_2 + \ldots + X_n}{n}$. Then,
$$P(|\overline{X} - \mu| > \delta) \le \frac{\sigma^2}{n\delta^2}$$

4. **Using CLT to approximate probability:** Let $X_1, X_2, \ldots, X_n \sim$ iid X with $E[X] = \mu, \text{Var}(X) = \sigma^2$.

   Define $Y = X_1 + X_2 + \ldots + X_n$. Then,
$$\frac{Y - n\mu}{\sqrt{n}\sigma} \approx \text{Normal}(0, 1).$$

5. Use the following values of F_Z if required:
   $F_Z(\frac{-5}{6}) = 0.20,\ F_Z(\frac{5}{6}) = 0.80,\ F_Z(2) = 0.977,\ F_Z(-2) = 0.023,\ F_Z(1) = 0.84,$
   $F_Z(\frac{2}{3}) = 0.75,\ F_Z(\frac{-2}{3}) = 0.25,\ F_Z(\frac{5}{2}) = 0.994,\ F_Z(\frac{5}{6}) = 0.797$

6. $\int x^n dx = \frac{x^{n+1}}{n+1}$.

Options :

6406531737364. ✔ Useful Data has been mentioned above.

6406531737365. ✖ This data attachment is just for a reference & not for an evaluation.

Sub-Section Number : 2

Sub-Section Id : 64065374001

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 17 Question Id : 640653521265 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 $(X,Y) \sim \text{Uniform}(D)$, where $D = \{(x,y) : 2 < x+y < 4, x > 0, y > 0\}$. Find $P(Y < 2)$.

Options :

6406531737374. ✖ $\frac{1}{3}$

6406531737375. ✔ $\frac{2}{3}$

6406531737376. ✖ $\frac{1}{4}$

6406531737377. ✖ $\frac{3}{4}$

Question Number : 18 Question Id : 640653521268 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 $X_1, X_2, \ldots, X_n$ be i.i.d. X with mean $\mu = 0$ and variance $\sigma^2 = 1$. Using Chebyshev's inequality, what should be the minimum value of n such that the probability that the sample mean $\frac{X_1 + X_2 + \cdots + X_n}{n}$ lies between -0.5 and 0.5 is at least 0.95?

Options :

6406531737380. ✖ 40

6406531737381. ✔ 80

6406531737382. ✖ 100

6406531737383. ✖ 95

Sub-Section Number : 3

Sub-Section Id : 64065374002

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 19 Question Id : 640653521266 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 probability density function of a continuous random variable X is given by

$$f(x) = \begin{cases} \frac{6x+1}{10}, & \text{if } 1 \leq x \leq 2 \\ 0, & \text{otherwise} \end{cases}$$

Find the value of $E[X]$. 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 :

1.53 to 1.57

Question Number : 20 Question Id : 640653521267 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 $X_1, X_2, X_3, X_4 \sim$ i.i.d. Bernoulli$\left(\frac{2}{3}\right)$. Define a random variable $Y = 2X_1 + 3X_2 + 4X_3 + 5X_4$. Find Var$(Y)$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

12

Sub-Section Number :	4
Sub-Section Id :	64065374003
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653521262 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 : (21 to 22)

Question Label : Comprehension

Suppose a fair die is thrown twice independently. Let a random variable *X* denote the number obtained on the first die and a random variable Y denote the number obtained on the second die. Define *Z* =| *7* − X − Y |.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 21 Question Id : 640653521263 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

Find the range of *Z*.

Options :

6406531737366. ✔ $T_Z = \{0, 1, 2, 3, 4, 5\}$

6406531737367. ✖ $T_Z = \{1, 2, 3, 4, 5\}$

6406531737368. ✖ $T_Z = \{1, 2, 3, 4, 5, 6\}$

6406531737369. ✖ $T_Z = \{0, 1, 2, 3, 4, 5, 6\}$

Question Number : 22 Question Id : 640653521264 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 value of $P(0 < Z < 3)$.

Options :

6406531737370. ✖ $\frac{5}{18}$

6406531737371. ✖ $\frac{5}{6}$

6406531737372. ✔ $\frac{1}{2}$

6406531737373. ✖ $\frac{2}{3}$

Sub-Section Number :	5
Sub-Section Id :	64065374004
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653521269 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

Kunal throws a dart onto a circular board. Let a random variable *X* denote the distance from the center to the point where the dart hits the board. Suppose the PDF of *X* is

$$f_X(x) = \begin{cases} kx(1-x), & 0 \le x \le 1, \\ 0, & \text{otherwise.} \end{cases}$$

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 23 Question Id : 640653521270 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 value of *k*.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

6

Question Number : 24 Question Id : 640653521271 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 the value of $P(|X - 0.5| \leq 0.25)$. 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 :

0.66 to 0.72

Question Id : 640653521272 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

30% of the total candidates in a competitive exam were boys and 70% were girls. The distribution of the marks of the boys is Normal(60,36) and the distribution of the marks of the girls is Normal(55,49).

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 25 Question Id : 640653521273 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 PDF of the marks of a candidate chosen uniformly at random.

Options :

6406531737386. ✔

$$\frac{1}{20\sqrt{2\pi}}\left(\exp\left(\frac{-(y-60)^2}{72}\right)+2\exp\left(\frac{-(y-55)^2}{98}\right)\right)$$

6406531737387. ✖ $$\frac{1}{20\sqrt{2\pi}}\left(2\exp\left(\frac{-(y-60)^2}{36}\right)+\exp\left(\frac{-(y-55)^2}{49}\right)\right)$$

6406531737388. ✖ $$\frac{7}{60\sqrt{2\pi}}\exp\left(\frac{-(y-60)^2}{72}\right)+\frac{3}{70\sqrt{2\pi}}\exp\left(\frac{-(y-55)^2}{98}\right)$$

6406531737389. ✖ $$\frac{1}{2\sqrt{2\pi}}\left(\frac{1}{6}\exp\left(\frac{-(y-60)^2}{72}\right)+\frac{1}{7}\exp\left(\frac{-(y-55)^2}{98}\right)\right)$$

Question Number : 26 Question Id : 640653521274 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

If a randomly selected candidate got 60 marks, what is the probability that the selected candidate is a boy?

Options :

6406531737390. ✖ $$\frac{2}{2+\exp\left(\frac{-25}{49}\right)}$$

6406531737391. ✖ $$\frac{2}{2+\exp\left(\frac{-25}{98}\right)}$$

6406531737392. ✖ $$\frac{1}{20\sqrt{2\pi}}$$

6406531737393. ✔

$$\frac{1}{1+2\exp\left(\frac{-25}{98}\right)}$$

Question Id : 640653521275 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

At a particular petrol pump, petrol is stocked in a bulk tank each week. Let a random variable *X* denote the proportion of the tank's capacity that is stocked in a given week, and let *Y* denote the proportion of the tank's capacity that is sold in the same week. The petrol pump cannot sell more than what was stocked in a given week. Assume the joint density function of *X* and *Y* is given by

$$f_{XY}(x,y)=\begin{cases}cxy, & \text{if } 0\le y\le x\le 2,\\ 0, & \text{otherwise.}\end{cases}$$

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 27 Question Id : 640653521276 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 value of *c*. 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 :

0.48 to 0.52

Question Number : 28 Question Id : 640653521277 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 the probability that the amount of petrol sold in a given week is less than half the amount stocked in that week. 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

Question Id : 640653521278 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

In a manufacturing company, each machine produces 600 bottles daily. If a bottle is selected uniformly at random, then the probability that the bottle is of good quality is 60%.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 29 Question Id : 640653521279 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 a sample of 20 bottles is selected for a quality inspection. Let a random variable *X* denote the total number of bottles that are of bad quality in the selected sample. Which of the following is true?

Options :

6406531737396. ✖ $X \sim \text{Binomial}(600, 0.6)$

6406531737397. ✖ $X \sim \text{Binomial}(20, 0.6)$

6406531737398. ✔ $X \sim \text{Binomial}(20, 0.4)$

6406531737399. ✖ $X \sim \text{Binomial}(600, 0.4)$

Question Number : 30 Question Id : 640653521280 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

Using the Central Limit Theorem, find the approximate probability that a machine will produce more than 370 bottles that are of good quality on a particular day. 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 :

0.17 to 0.23

Question Id : 640653521281 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

Let X be a random variable with PMF as follows:

x	0	1	2
$f_X(x)$	1/4	1/2	1/4

Suppose $X_1, X_2 \sim$ i.i.d. X. Define a random variable $Y = X_1 + X_2$.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 31 Question Id : 640653521282 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 option*(s)* is (are) true about the moment generating function of the random variable *Y* ?

Options :

6406531737401. ✔ $M_Y(\lambda) = M_{X_1}(\lambda) \times M_{X_2}(\lambda)$

6406531737402. ✖ $M_Y(\lambda) = M_{X_1}(\lambda) + M_{X_2}(\lambda)$

6406531737403. ✖ $M_Y(\lambda) = \frac{1}{2} + e^{\lambda} + \frac{1}{2}e^{2\lambda}$

6406531737404. ✖ $M_Y(\lambda) = \frac{1}{16} + \frac{1}{8}e^{\lambda} + \frac{3}{8}e^{2\lambda} + \frac{3}{8}e^{3\lambda} + \frac{1}{16}e^{4\lambda}$

6406531737405. ✔ $$M_Y(\lambda) = \frac{1}{16} + \frac{1}{4}e^{\lambda} + \frac{3}{8}e^{2\lambda} + \frac{1}{4}e^{3\lambda} + \frac{1}{16}e^{4\lambda}$$

Question Number : 32 Question Id : 640653521283 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 expected value of Y .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

CT

Section Id :	64065333945
Section Number :	3
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
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 : 64065374005

Question Shuffling Allowed : No

Is Section Default? : null

Question Number : 33 Question Id : 640653521284 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 :

6406531737407. ✔ YES

6406531737408. ✖ NO

Question Number : 34 Question Id : 640653521285 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

Scores

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

Words

SeqNo	Word	PartOfSpeech	LetterCount
0	It	Pronoun	2
■ ■ ■			
64	cane.	Noun	4

Library

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

Options :

6406531737409. ✔ Useful Data has been mentioned above.

6406531737410. ✖ This data attachment is just for a reference & not for an evaluation.

Sub-Section Number : 2

Sub-Section Id : 64065374006

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 35 Question Id : 640653521286 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 **Y** be a card in the "Shopping Bills" dataset. Consider the following procedure.

```
Procedure findSomething(Y)
    D = {}
    foreach Z in Y.ItemList{
        if(isKey(D, Z.Category)){
            return(Z.Category)
        }
        D[Z.Category] = True
    }
    return("None")
End findSomething
```

What will **findSomething(X)** return where **X** represents the card given below.

SV Stores — Akshaya 3

Item	Category	Qty	Price	Cost
Face Wash	Toiletries	1	89	89
Shampoo	Toiletries	1	140	140
Onions	Vegetables/Food	1	98	98
Bananas	Fruits/Food	4	8	32
Milk	Dairy/Food	1	24	24
Biscuits	Packed/Food	2	22	44
Maggi	Packed/Food	1	85	85
Horlicks	Packed/Food	1	270	270
Chips	Packed/Food	1	20	20
Chocolates	Packed/Food	4	10	40
Cereal	Packed/Food	1	220	220
Handwash	Toiletries	1	139	139
Air freshener	Toiletries	2	70	140
				1341

Options :

6406531737411. ✖ "None"

6406531737412. ✔ "Toiletries"

6406531737413. ✖ "Packed/Food"

6406531737414. ✖ "Dairy/Food"

Question Number : 36 Question Id : 640653521287 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 pseudocode. At the end of the execution of the following pseudocode, if **flag** has valueTrue, then choose the possible value of **L** from the given choices.

```
flag = False
position = 0
foreach element in L{
    if((position == 1) and (element == 'y')){
        flag = True
    }
    position = position + 1
}
```

Options :

6406531737415. ✔ ['z', 'y']

6406531737416. ✖ ['y', 'x', 'z']

6406531737417. ✖ ['y']

6406531737418. ✖ ['z', 'x', 'y']

Sub-Section Number :	3
Sub-Section Id :	64065374007
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 37 Question Id : 640653521288 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 procedure, where **L1** and **L2** are two non-empty lists.

```
Procedure findSomething(L1, L2)
    if(length(L1) != length(L2)){
        return(False)
    }
    while(length(L1 > 0)){
        if(first(L1) != last(L2)){
            return(False)
        }
        L1 = rest(L1)
        L2 = init(L2)
    }
    return(True)
End findSomething
```

findSomething(L1, L2) will return True when

Options :

6406531737419. ✔ all the elements of both lists **L1** and **L2** are same but arranged in the reverse order.

6406531737420. ✖ both lists **L1** and **L2** are same.

6406531737421. ✖ all the elements of list **L1** are present in **L2** where **length(L2) > length(L1)**.

6406531737422. ✖ all the elements of list **L2** are present in **L1** where **length(L1) > length(L2)**.

Sub-Section Number :	4
Sub-Section Id :	64065374008
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 38 Question Id : 640653521289 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 following pseudocode is executed using the "Words" dataset and **explode(W)** returns the list of letters in the word **W**. For example **explode**("common") will return ['c', 'o', 'm', 'm', 'o', 'n']. At the

end of the execution, **count** stores the number of words with at least two consecutive occurrences of the same letter. Choose the correct code fragment to complete the pseudocode.

```
count = 0, letterList = []
while(Table 1 has more rows){
    Read the first row X in Table 1
    letterList = explode(X.Word)
    count = count + consecute(letterList)
    Move X to Table 2
}

Procedure consecute(L)
    lastLetter = first(L)
    restList = rest(L)
    ********************
    ** Fill the code **
    ********************
End consecute
```

Options :

```
foreach letter in restList{
    if(letter == lastLetter){
        return(1)
    }
    lastLetter = letter
}
return(0)
```

6406531737423. ✔

```
foreach letter in restList{
    if(letter == lastLetter){
        return(1)
    }
    return(0)
    lastLetter = letter
}
```

6406531737424. ✖

6406531737425. ✖

```
foreach letter in restList{
    if(letter != lastLetter){
        return(0)
    }
    lastLetter = letter
}
return(1)
```

```
foreach letter in restList{
    if(letter != lastLetter){
        return(0)
    }
    return(1)
    lastLetter = letter
}
```

6406531737426. ✖

Question Number : 39 Question Id : 640653521290 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 following pseudocode is executed using the "Words" dataset. Assume that the rows in Table 1 are arranged in increasing order of sequence number from top to bottom. What will **L** store at the end of the execution?

```
L = []
A = "None"
Read the first row X in Table 1
A = X.PartOfSpeech
Move X to Table 2
while(Table 1 has more rows){
    Read the first row Y in Table 1
    if(Y.PartOfSpeech == "Noun"){
        if(A == "Adjective"){
            L = L ++ [Y.Word]
        }
    }
    A = Y.PartOfSpeech
    Move Y to Table 2
}
```

Options :

6406531737427. ✔ Number of nouns that appear immediately after an adjective

6406531737428. ✖ Number of adjectives that appear immediately after a noun

6406531737429. ✖ Number of sentences in which at least one noun appears immediately after an adjective

6406531737430. ✖ Number of sentences in which at least one adjective appears immediately after a noun

Sub-Section Number :	5
Sub-Section Id :	64065374009
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 40 Question Id : 640653521291 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 **X** be a row from the "Words" dataset. Procedure **isRich(X)** should return True if the number of distinct vowels is less than the number of distinct consonants in **X**.*Word*. But the code 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  Procedure isRich(X)
2      vDict = {}, wDict = {}
3      i = 1
4      while(i <= X.LetterCount){
5          A = ith letter in X.Word
6          if(A is a vowel){
7              vDict[A] = True
8          }
9          wDict[A] = True
10         i = i + 1
11     }
12     if(length(keys(vDict)) < length(keys(wDict))){
13         return(True)
14     }
15     return(True)
16 End isRich
```

The return value of **isRich(Y)** will be True if

Options :

6406531737431. ✖ Line 2: **vDict** is initialized incorrectly

6406531737432. ✖ Line 10: **i** is updated incorrectly.

6406531737433. ✔ Line 12: Incorrect conditional statement to return True.

6406531737434. ✔ Line 15: return(True) should be replaced by return(False)

6406531737435. ✖ No error

Question Number : 41 Question Id : 640653521292 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 procedure given below, where **aList** is a non-empty list of real numbers.

```
procedure cumulative(aList)
    sum = 0, cumuList = []
    foreach element in aList{
        sum = sum + element
        cumuList = cumuList ++ [sum]
    }
    return(cumuList)
end cumulative
```

At the end of the execution, which of the following option(s) would be correct? It is a Multiple Select Question (MSQ).

Options :

6406531737436. ✔ The first element of both the lists, **cumuList** and **aList**, will be same.

6406531737437. ✖ Number of elements in **cumuList** will be one lesser than that of **aList**.

6406531737438. ✖ **cumuList** is a list of numbers in increasing order.

6406531737439. ✔ Number of elements in both lists, **cumuList** and **aList**, will be same.

Sub-Section Number :	6
Sub-Section Id :	64065374010
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 42 Question Id : 640653521293 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 "Olympics" dataset. At the end of the execution, **medalDict** stores a dictionary with player's name as key mapped to another dictionary. The nested dictionary stores the medal type as key mapped to a list of years in which the player won that medal. For example if player Xyz has won a silver medal in 2006, a gold medal in 2008, and another silver medal in 2011, then

medalDict = {"Xyz" : {"Silver" : [2006, 2011], "Gold" : [2008]}, ... }

Assume that every player has a distinct name. 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  medalDict = {}
2  while(Table 1 has more rows){
3      Read the first row X in Table 1
4      if(isKey(medalDict, X.Name)){
5          if(iskey(medalDict[X.Name], X.Medal)){
6              medalDict[X.Name][X.Medal] = [X.Year]
7          }
8          else{
9              medalDict[X.Name][X.Medal] = [X.Year]
10         }
11     }
12     else{
13         medalDict[X.Name][X.Medal] = [X.Year]
14     }
15     Move X to Table 2
16 }
```

Options :

6406531737440. ✖ Line 1: Incorrect initialization of **medalDict**

6406531737441. ✔ Line 6: The current statement should be replaced by

```
medalDict[X.Name][X.Medal] = medalDict[X.Name][X.Medal] ++ [X.Year]
```

6406531737442. ✖ Line 9: The current statement should be replaced by

```
medalDict[X.Name][X.Medal] = medalDict[X.Name][X.Medal] ++ [X.Year]
```

6406531737443. ✔ Line 13: The current statement should be replaced by

```
medalDict[X.Name] = {X.Medal : [X.Year]}
```

6406531737444. ✖ No Mistakes

Sub-Section Number : 7

Sub-Section Id : 64065374011

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 43 Question Id : 640653521294 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

Consider the procedure **doSomething** given below. If **C** = [3, 4, 1, 9, 5, 3, 1, 9] and **B** = **doSomething(C)**, what would be the value of **first(B)**?

```
1  Procedure doSomething(A)
2      outList = [last(A)]
3      foreach X in A{
4          if(X != last(outList)){
5              outList = [X] ++ outList
6          }
7      }
8      return(outList)
9  End doSomething
```

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 : 64065374012

Question Shuffling Allowed : Yes

Is Section Default? :	null

Question Number : 44 Question Id : 640653521295 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 pseudocode where **Y** is a row in the "Words" table. At the end of the execution, what will be the value of **length(keys(alphaDict))** if **Y**.*Word* is "think"?

```
alphaDict = {'t':2, 'e':1}
alphaDict = updateDict(Y, alphaDict)

Procedure updateDict(Z, Dict)
    i = 1
    while(i <= Z.LetterCount){
        x = ith letter of Z.Word
        if(not isKey(Dict, x)){
            Dict[x] = 1
        }
        else{
            Dict[x] = Dict[x] + 1
        }
        i = i + 1
    }
    return(Dict)
End updateDict
```

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

6

Sub-Section Number :	9
Sub-Section Id :	64065374013
Question Shuffling Allowed :	No

Is Section Default? : null

Question Id : 640653521296 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 : (45 to 46)

Question Label : Comprehension

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

```
count = 0, flag = True
while(Table 1 has more rows){
    Read the first row X in Table 1
    ********************
    ** Fill the code **
    ********************
    Move X to Table 2
}
```

Answer the given subquestions.

Sub questions

Question Number : 45 Question Id : 640653521297 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 **count** represent at the end of the execution if the missing code is filled by

```
if(X.Word ends with full stop){
    if(X.Word == "Noun"){
        count = count + 1
    }
}
```

Options :

6406531737447. ✖ Total number of nouns in the dataset

6406531737448. ✖ Number of sentences which start with a noun

6406531737449. ✖ Number of sentences having at least one noun

6406531737450. ✔ Number of sentences which end with a noun

Question Number : 46 Question Id : 640653521298 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 **count** represent at the end of the execution if the missing code is filled by

```
if(flag and X.PartOfSpeech == "Noun"){
    count = count + 1
}
flag = False
if(X.Word ends with full stop){
    flag = True
}
```

Options :

6406531737451. ✖ Total number of nouns in the dataset

6406531737452. ✔ Number of sentences which start with a noun

6406531737453. ✖ Number of sentences having at least one noun

6406531737454. ✖ Number of sentences which end with a noun

Sub-Section Number :	10
Sub-Section Id :	64065374014
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653521299 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 “Shopping Bills” dataset.

```
D = { }
while(Pile 1 has more cards){
    Read the top card X in Pile 1
    foreach Y in X.ItemList{
        if(isKey(D, Y.Category)){
            if(isKey(D[Y.Category], Y.ItemName)){
                D[Y.Category][Y.ItemName] = D[Y.Category][Y.ItemName] ++
[Y.Price]
            }
            else{
                D[Y.Category][Y.ItemName] = [Y.Price]
            }
        }
        else{
            D[Y.Category] = {Y.ItemName : [Y.Price]}
        }
    }
    Move card X to Pile 2
}
```

Answer the given subquestions.

Sub questions

Question Number : 47 Question Id : 640653521300 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 each value **D[j][k]** represent at the end of the execution?

Options :

6406531737455. ✖ Price of item **j** of category **k** across all bills

6406531737456. ✖ Price of item **k** of category **j** across all bills

6406531737457. ✖ List of prices of item **j** of category **k** across all bills

6406531737458. ✔ List of prices of item **k** of category **j** across all bills

Question Number : 48 Question Id : 640653521301 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 dictionary **D** created in the previous question, what will the value of **L** represent at the end of the execution of the following pseudocode?

```
A = 0, L = []
foreach i in keys(D){
    foreach j in keys(D[i]){
        B = findRange(D[i][j])
        if(B == A){
            L = L ++ [j]
        }
        if(B > A){
            A = B
            L = [j]
        }
    }
}

Procedure findRange(Y)
    p = first(Y), q = first(Y)
    foreach k in Y{
        if(k > p){
            p = k
        }
        if(k < q){
            q = k
        }
    }
    return(p - q)
End findRange
```

Options :

6406531737459. ✖ List of items for which the difference between the highest and lowest price is the same

6406531737460. ✔ List of items for which the difference between the highest and lowest price is

maximum

6406531737461. ✖ List of items for which the difference between the highest and lowest price is minimum

6406531737462. ✖ List of items with same price in all shops

DBMS

Section Id :	64065333946
Section Number :	4
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 Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065374015
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 49 Question Id : 640653521302 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 :

6406531737463. ✔ YES

6406531737464. ✖ NO

Sub-Section Number :	2
Sub-Section Id :	64065374016
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 50 Question Id : 640653521303 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

Consider the table **instructor** in the **university** database as shown in Table 1.

id	name	dept_name	salary
10101	Srinivasan	Comp. Sci.	65000
12121	Wu	Finance	90000
15151	Mozart	Music	40000
32343	El Said	History	60000
33456	Gold	Physics	87000
76766	Crick	Biology	72000
98345	Kim	Elec. Eng.	80000

Table 1: **instructor**

Based on the given **instructor** table, what will be the output of the Python code given below?

```
import psycopg2
def connectDb(dbname, username, pwd, address, portnum):
    try:

            connection = psycopg2.connect(database = dbname,
                                  user = username,
                                  password = pwd,
                                  host = address,
                                  port = portnum)
            cursor = connection.cursor()
            query = '''select salary from instructor
            where dept_name like '%y%' order by salary DESC;'''
            cursor.execute(query)
            result = cursor.fetchmany(1)
            for row in result:
                sal=row[0]
                print(sal)

            cursor.close()

        except (Exception, psycopg2.DatabaseError) as error:
            print(error)
        finally:
            connection.close()
    connectDb("university", "postgres", "root", "127.0.0.1", "5432")
```

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

87000

Question Number : 51 Question Id : 640653521307 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

Consider a complete binary search tree that consists of 31 elements. What is the minimum height of the given binary search tree?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

Sub-Section Number :	3
Sub-Section Id :	64065374017
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653521304 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 : (52 to 53)

Question Label : Comprehension

Consider a magnetic disk with 32 platters, 2 surfaces/platter, 4096 tracks/surface, 1024 sectors/track, and 1024 bytes/sector. The disk rotates with 2000 revolutions per minute.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 52 Question Id : 640653521305 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 is the minimum number of bits required for addressing all the tracks?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

18

Question Number : 53 Question Id : 640653521306 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 that the rotational speed of the disk is 2000 revolutions per minute and the seek time is 5ms, what will be the disk access time?

Consider disk access time= seek time + rotational latency.

Options :

6406531737467. ✖ 20 sec

6406531737468. ✖ 35 ms

6406531737469. ✔ 20 ms

6406531737470. ✖ 35 sec

Sub-Section Number : 4

Sub-Section Id : 64065374018

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 54 Question Id : 640653521310 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 relation schema **student_info**$(roll\_no, name, subject, marks)$ with $(roll\_no, name)$ as candidate key. Which among the following functional dependencies violates the Third Normal Form (3NF)?

Options :

6406531737477. ✖ $roll\_no, name \rightarrow marks$

6406531737478. ✖ $roll\_no, name \rightarrow subject$

6406531737479. ✖ $roll\_no \rightarrow name$

6406531737480. ✔ $subject \rightarrow marks$

Sub-Section Number : 5

Sub-Section Id : 64065374019

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 55 Question Id : 640653521308 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

Consider the tree as shown in Figure 1.

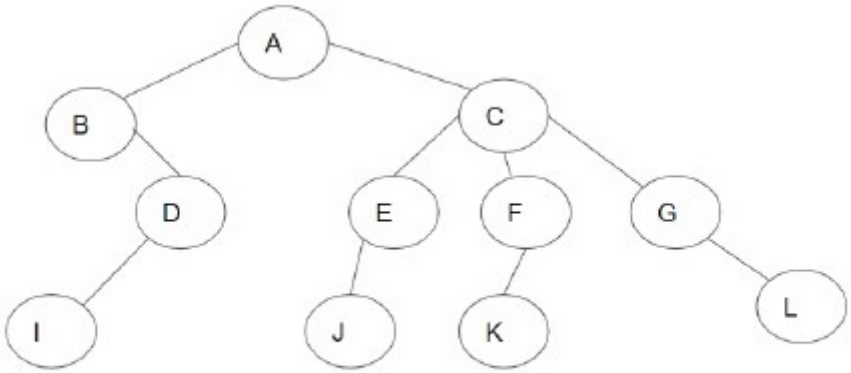


Figure 1: Tree

What is the arity of the given tree?

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 :	64065374020
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 56 Question Id : 640653521309 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 relational schema $\mathbf{R}(A, B, C, D)$ with the following set of functional dependencies

$$\mathcal{F} = \{A \rightarrow B, B \rightarrow C, C \rightarrow D, D \rightarrow A\}$$

If $\mathbf{R}$ is decomposed into $\mathbf{R1}$(A,B), $\mathbf{R2}$(B,C) and $\mathbf{R3}$(C,D), then which of the following options is true?

Options :

6406531737473. ✖ Not lossless decomposition but dependency preserving

6406531737474. ✖ A lossless decomposition but not dependency preserving

6406531737475. ✖ Neither a lossless decomposition nor a dependency preserving one

6406531737476. ✔ A lossless decomposition as well as a dependency preserving one

Question Number : 57 Question Id : 640653521311 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 relational schema $\mathrm{R}(U, V, W, X, Y, Z)$ where the domain of every attribute consists of atomic values. The set of functional dependencies for the relation R is given as follows:

$\mathcal{F} = \{UV \rightarrow W, W \rightarrow X, X \rightarrow VY, Y \rightarrow Z, Z \rightarrow U\ \}$

What is the highest normal form of the given relation R?

Options :

6406531737481. ✖ 1NF

6406531737482. ✖ 2NF

6406531737483. ✔ 3NF

6406531737484. ✖ BCNF

Question Number : 58 Question Id : 640653521313 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 relational schema **movie**(*m_id, title, year, producer_id, producer_name, director_id, rating*) with the following set of functional dependencies.

$\mathcal{F} = \{$
$m\_id \rightarrow title,$
$title \rightarrow producer\_id, producer\_name,$
$producer\_id \rightarrow producer\_name,$
$m\_id \rightarrow producer\_id, director\_id,$
$m\_id, title \rightarrow rating, year$
$\}$

Identify the number of candidate keys along with the total number of super keys for the above relation **movie**.

Options :

6406531737489. ✖ candidate keys = 2, super keys = 32

6406531737490. ✖ candidate keys = 1, super keys = 2

6406531737491. ✔ candidate keys = 1, super keys = 64

6406531737492. ✖ candidate keys = 2, super keys = 16

Question Number : 59 Question Id : 640653521315 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 relational schema **Customer** (*c_id, purchased_item, store_id, store_name*).
A customer can purchase multiple items and from multiple stores. However, store_id determines the store_name, i.e., $store\_id \rightarrow store\_name$.
Identify the most appropriate 4NF decomposition of the given schema.

Options :

6406531737497. ✖ $\mathbf{R1}(c\_id, store\_id)$, $\mathbf{R2}(c\_id, purchased\_item, store\_name)$.

6406531737498. ✖ $\mathbf{R1}(store\_id, store\_name)$, $\mathbf{R2}(c\_id, purchased\_item)$.

6406531737499. ✔ $\mathbf{R1}(store\_id, store\_name)$, $\mathbf{R2}(c\_id, store\_id)$, and $\mathbf{R3}(c\_id, purchased\_item)$.

6406531737500. ✖ $\mathbf{R1}(store\_id, store\_name)$, $\mathbf{R2}(store\_id, c\_id, purchased\_item)$.

Question Number : 60 Question Id : 640653521318 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 following instance of the relational schema **R** given in Figure 2.

A	B	C	D	E
2	5	3	4	6
6	7	2	4	c
a	7	3	4	7
b	5	2	4	d

Figure 2: An instance of relation R

Identify the correct values of a, b, c and d such that $B \rightarrow E$ and $D \rightarrow\rightarrow AC$ holds true.

Options :

6406531737510. ✖ a=6, b=2, c=6, d=7

6406531737511. ✖ a=7, b=6, c=7, d=6

6406531737512. ✖ a=4, b=7, c=6, d=7

6406531737513. ✔ a=2, b=6, c=7, d=6

Sub-Section Number : 7

Sub-Section Id : 64065374021

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 61 Question Id : 640653521312 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 relational schema $\mathbf{R}(A, B, C, D, E, F)$ with the following sets of functional dependencies:

$\mathbf{X} = \{BC \rightarrow D, D \rightarrow E, AF \rightarrow BE, E \rightarrow CF\}$
$\mathbf{Y} = \{C \rightarrow BE, D \rightarrow A, AF \rightarrow BC, E \rightarrow BF\}$

Which among the following statements is/are incorrect?

Options :

6406531737485. ✔ X covers Y

6406531737486. ✖ Y doesn't cover X

6406531737487. ✔ Y covers X

6406531737488. ✖ Neither X covers Y nor Y covers X

Sub-Section Number :	8
Sub-Section Id :	64065374022
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 62 Question Id : 640653521314 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 **Contacts**(*name, age, aadhar_no, address, mobile_no*) with the multivalued dependency ($aadhar\_no \twoheadrightarrow name, address$). Identify the correct rule from the following options (which can be applied once), such that ($aadhar\_no \twoheadrightarrow age, mobile\_no$) holds.

Options :

6406531737493. ✖ Augmentation

6406531737494. ✖ Transitivity

6406531737495. ✖ Replication

6406531737496. ✔ Complementation

Question Number : 63 Question Id : 640653521316 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 Flask functions serves as a decorator for telling the application which URL should be used to call the associated function?

Options :

6406531737501. ✔ route()

6406531737502. ✖ run()

6406531737503. ✖ cursor()

6406531737504. ✖ connect()

Question Number : 64 Question Id : 640653521319 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 relation **Student** as shown in Figure 3.

name	department	roll_no
Ashna	Civil Engg.	CE001
Surbhi	Comp. Sci.	CS780
Nil	Mechanical Engg.	ME312
Komal	Civil Engg.	CE112
Madhur	Comp. Sci.	CS458
Ramesh	Comp. Sci.	CS321

Figure 3: **Student** relation

Choose the correct updated relation **Student**, when the following query is executed.

```
DELETE FROM Student
WHERE department = 'Civil Engg.' OR 1 = 1
```

Options :

Output:

name	department	roll_no
Ashna	Civil Engg.	CE001
Surbhi	Comp. Sci.	CS780
Nil	Mechanical Engg.	ME312
Komal	Civil Engg.	CE112
Madhur	Comp. Sci.	CS458
Ramesh	Comp. Sci.	CS321

6406531737514. ✖

Output:

name	department	roll_no
Surbhi	Comp. Sci.	CS780
Nil	Mechanical Engg.	ME312
Madhur	Comp. Sci.	CS458
Ramesh	Comp. Sci.	CS321

6406531737515. ✖

Output:

name	department	roll_no

6406531737516. ✔

Output:

name	department	roll_no
Ashna	Civil Engg.	CE001
Komal	Civil Engg.	CE112

6406531737517. ✖

Sub-Section Number : 9

Sub-Section Id : 64065374023

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 65 Question Id : 640653521317 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 a relational schema $\mathrm{R}\,(P, Q, R, S, T, U, V)$ with the following set of functional dependencies:

$$F = \{T \to V, PR \to V, PQSU \to RT, RST \to U, Q \to S, PSUV \to TQ\}.$$

From the following options, identify the extraneous attribute(s) according to the given set of functional dependencies.

Options :

6406531737505. ✖ *Q* in *PQSU* → RT

6406531737506. ✔ *T* in *PSUV* → TQ

6406531737507. ✖ *R* in *RST* → U

6406531737508. ✔ *S* in *PQSU* → RT

6406531737509. ✖ *U* in *PSUV* → *TQ*

PDSA

Section Id :	64065333947
Section Number :	5
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 Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065374024
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 66 Question Id : 640653521320 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 :

6406531737518. ✔ YES

6406531737519. ✖ NO

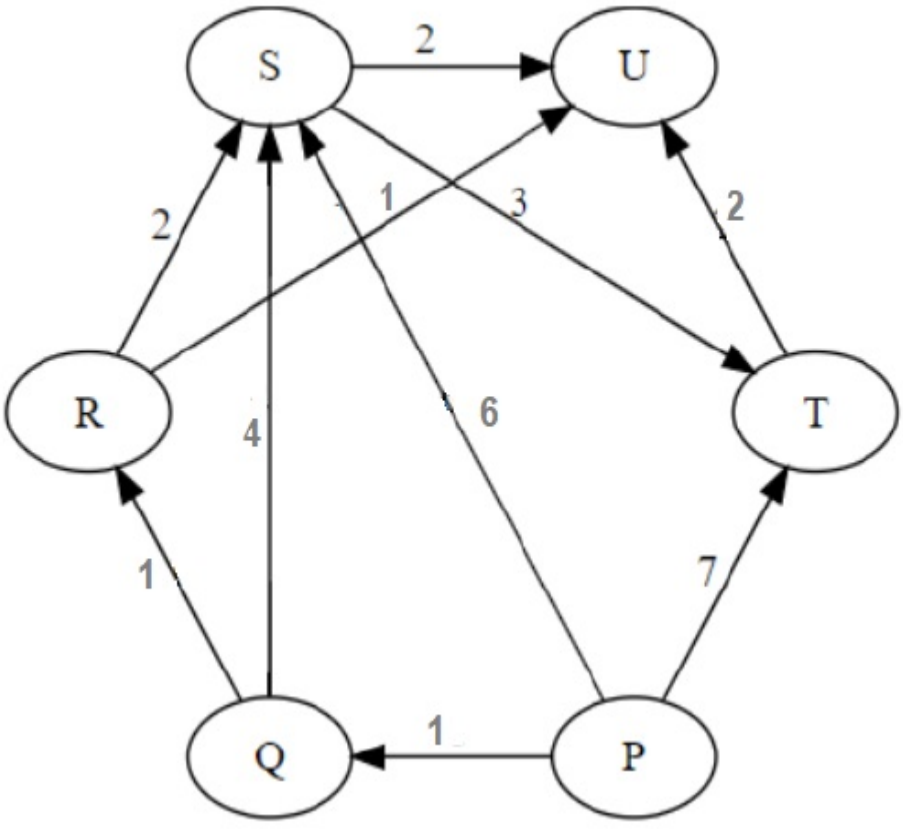
Sub-Section Number :	2
Sub-Section Id :	64065374025
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 67 Question Id : 640653521321 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

In the given graph, if we try to find the shortest path from node P to all other nodes using **Dijkstra's algorithm**, in what order do the nodes get included in the visited set?



Options :

6406531737520. ✖ P, Q, R, S, T, U

6406531737521. ✖ P, Q, R, U, T, S

6406531737522. ✖ P, Q, T, R, U, S

6406531737523. ✔ P, Q, R, U, S, T

Question Number : 68 Question Id : 640653521322 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 statements is/are true?

I. Given a graph where all edges have positive weights, the shortest path produced by Dijkstra's and Bellman Ford algorithm may be different, but the path weight would be the same.
II. Given a weighted graph where the weights of all edges are unique, there is always a unique shortest path from a source to a destination in such a graph.

Options :

6406531737524. ✔ Only (I)

6406531737525. ✖ Only (II)

6406531737526. ✖ Both (I) and (II)

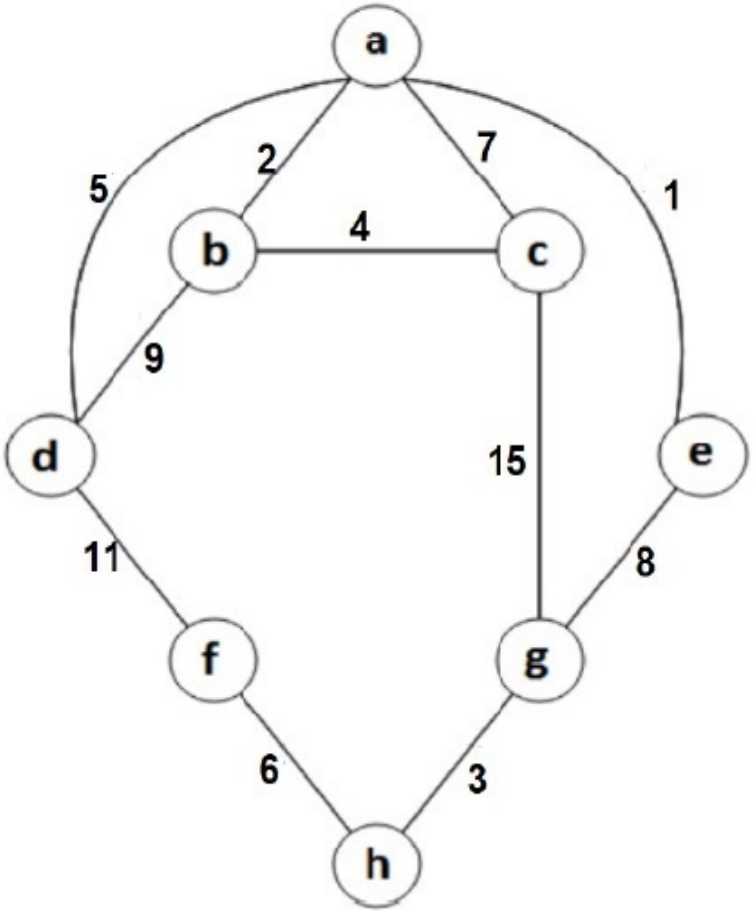
6406531737527. ✖ None of these

Question Number : 69 Question Id : 640653521323 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 the undirected, weighted graph given below, which of the following sequences of edges represents a correct execution of **Prim's algorithm** started with vertex `a` to construct a Minimum Spanning Tree?



Options :

6406531737528. ✖ (a, e), (a, b), (b, c), (a, d), (g, h), (f, h), (e, g)

6406531737529. ✔ (a, e), (a, b), (b, c), (a, d), (e, g), (g, h), (f, h)

6406531737530. ✖ (a, e), (a, b), (g, h), (b, c), (a, d), (f, h), (e, g)

6406531737531. ✖ (a, e), (a, b), (g, h), (b, c), (a, d), (f, h), (a, c)

Question Number : 70 Question Id : 640653521325 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 binary **min-heap** operation has the highest time complexity? Consider the size of min-heap is `n` and implemented using an array.

Options :

6406531737537. ✖ Inserting a new element

6406531737538. ✖ Deleting the minimum element

6406531737539. ✔ Merging with another min-heap of size n

6406531737540. ✖ Update the value at the known index

Question Number : 71 Question Id : 640653521326 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 **max-heap** with 37 distinct elements implemented using array A with index 0 to 36. The smallest element be always situated at any position in between ___.

Options :

6406531737541. ✖ A[16] and A[36] (both inclusive)

6406531737542. ✔ A[18] and A[36] (both inclusive)

6406531737543. ✖ A[32] and A[36] (both inclusive)

6406531737544. ✖ A[31] and A[36] (both inclusive)

Question Number : 72 Question Id : 640653521327 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 statements is **true** about the worst case time complexity of searching operation in binary search tree of size `n`?

Options :

6406531737545. ✖ $O(n)$ whether the tree is balanced or unbalanced.

6406531737546. ✖ $O(n)$ if the tree is balanced, $O(logn)$ otherwise.

6406531737547. ✖ $O(logn)$ whether the tree is balanced or unbalanced.

6406531737548. ✔ $O(\log n)$ if the tree is balanced, $O(n)$ otherwise.

Question Number : 73 Question Id : 640653521329 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 problem scenario where n Meetings $M_1, M_2, \ldots, M_n$ are to be conducted in a single available meeting room. Each meeting has `start_time` and `end_time`. If any meeting finishes at time `T`, then other meetings can be started at time `T` or afterward.

To find the maximum number of meetings that can be held in the meeting room without conflicts, Which of the following greedy strategy would always work correctly?

Options :

6406531737550. ✖ Always choose the meeting whose `start_time` is the earliest.

6406531737551. ✖ Always choose the meeting spanning the shortest interval.

6406531737552. ✖ Always choose the meeting that overlaps the minimum number of other meetings.

6406531737553. ✔ Always choose the meeting whose `end_time` is the earliest.

Question Number : 74 Question Id : 640653521332 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 minimum and maximum number of nodes possible in an AVL tree of height `7`?
Consider that the height of the empty tree is 0.

Options :

6406531737556. ✖ 33, 63

6406531737557. ✔ 33, 127

6406531737558. ✖ 7, 127

6406531737559. ✖ 7, 63

Sub-Section Number : 3

Sub-Section Id : 64065374026

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 75 Question Id : 640653521335 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

	Recurrence Relation		Complexity
A	$T(n) = 2T(n/4) + O(n)$	1	$O(\log n)$
B	$T(n) = 3T(n/3) + O(n)$	2	$O(n)$
C	$T(n) = 9T(n/3) + O(n)$	3	$O(n \log n)$
D	$T(n) = T(n/2) + O(1)$	4	$O(n^2)$

Note- Consider the base Case for each recurrence: $T(1) = 1$

Select the correct match of recurrence relation with corresponding complexity.

Options :

6406531737565. ✖ A-2, B-4, C-3, D-1

6406531737566. ✔ A-2, B-3, C-4, D-1

6406531737567. ✖ A-2, B-3, C-1, D-4

6406531737568. ✖ A-3, B-2, C-4, D-1

Sub-Section Number : 4

Sub-Section Id : 64065374027

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 76 Question Id : 640653521324 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 algorithm on a connected, weighted, and undirected graph with `n` vertices and `m` edges.

- Sort the edges as `[E1, E2, . . . , Em]` in decreasing order of weight.
- Consider each edge `Ej` in sorted order.
- If this edge `Ej` is part of any cycle of the graph, then delete it. Otherwise, keep it in the resulting graph.

Which of the following statements is/are true?

Options :

6406531737532. ✔ Exactly `m - n + 1` edges will be deleted.

6406531737533. ✖ At most, `n - 1` edges will be deleted.

6406531737534. ✔ After processing all `m` edges, the resulting graph is connected.

6406531737535. ✔ What remains at the end is a minimum cost spanning tree.

6406531737536. ✖ After processing all `m` edges, the resulting graph has exactly `n` edges.

Question Number : 77 Question Id : 640653521334 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 is **true** for searching the k^{th} smallest element in an unsorted array of size n, where all elements are distinct?

Options :

6406531737561. ✔ Using Quick Select strategy, the worst-case running time will be $O(n^2)$.

6406531737562. ✖ Using a max-heap of size k, the worst-case running time will be $O(k)$.

6406531737563. ✔ Using Fast Select (Quick Select using MoM for pivot selection) strategy, the worst-case running time will be $O(n)$.

6406531737564. ✖ Using Fast Select (Quick Select using MoM for pivot selection) strategy, the worst-case running time will be $O(n * k)$.

Sub-Section Number :	5
Sub-Section Id :	64065374028
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 78 Question Id : 640653521328 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 post-order traversal of a binary search tree is `1, 3, 4, 5, 2, 7, 8, 6`. The height of a tree is the number of nodes in the longest path from the root to any leaf (including root and leaf node). The height of the binary search tree is ___.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

5

Question Number : 79 Question Id : 640653521330 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 4 items (one unit for each) with their weights and value.

Item No.	Weight(W)	Value(V)
1	7	28
2	10	60
3	2	24
4	4	28

The task is to pick a subset of these items such that their total weight should be lesser or equal to 13 (maximum weight capacity C <= 13) and their total value is maximized. Consider that each item has only one unit and it can not be split.

V_{opt} = The total value of items picked by an optimal algorithm.

V_{greedy} = The total value of items picked by one greedy approach that sorts the item by `value(v)` to `weight(w)` ratio in descending order and picks them greedily starting from the first item in the ordered list (pick the item if the total weight of that item is less than or equal to the remaining capacity, otherwise, skip that item).

The value of $V_{opt} - V_{greedy}$ is _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

Question Number : 80 Question Id : 640653521331 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

A networking company uses Huffman coding compression technique to encode the message before transmitting it over the network. An entire message is created using characters from the set S = {A, B, C, D, E, F}. The probability of occurrence of each character is given in the table below.

Character	A	B	C	D	E	F
Frequencies	0.12	0.28	0.06	0.16	0.14	0.24

How many bits(0 or 1) are required to transmit the message `ABCDEF` over the network?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

16

Question Number : 81 Question Id : 640653521333 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 `L` be an integer list of length `n`. The number of **inversions** is the number of the different pairs `(i, j)` where:

- `0 <= i < j < n`
- `L[i] > L[j]`

The total number of **inversions** for `L = [9, 8, 7, 6, 5, 4, 3, 2, 1]` is _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

36

AppDev1

Section Id :	64065333948
Section Number :	6
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	17
Number of Questions to be attempted :	17
Section Marks :	50
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 :	64065374029
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 82 Question Id : 640653521336 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 1"

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 :

6406531737569. ✔ YES

6406531737570. ✖ NO

Sub-Section Number :	2
Sub-Section Id :	64065374030
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 83 Question Id : 640653521337 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 of an application to work with different input modalities beyond keyboard highlights which of the following accessibility principle?

Options :

6406531737571. ✖ Perceivable

6406531737572. ✔ Operable

6406531737573. ✖ Understandable

6406531737574. ✖ Robust

Question Number : 84 Question Id : 640653521343 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 about the term “stateless” in the client-server model?

Options :

6406531737595. ✖ The server responds to the client based on the previous state.

6406531737596. ✔ Server is not required to maintain any state of client or session during transactions between client and server.

6406531737597. ✖ The server uses FTP protocol to respond to the client's request.

6406531737598. ✖ Server use the URL to convey information to the client.

Question Number : 85 Question Id : 640653521349 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 encoding techniques occupies the most space to store 1500 lines with approximately 3000 alphanumeric characters (including space)?

Options :

6406531737619. ✔ UCS-4

6406531737620. ✖ UCS-2

6406531737621. ✖ ASCII

6406531737622. ✖ Original 7 bit ASCII

Sub-Section Number :	3
Sub-Section Id :	64065374031
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 86 Question Id : 640653521345 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 true about Asynchronous Updates?

Options :

6406531737603. ✔ It is first necessary to load the main page, then load the additional data in the background.

6406531737604. ✖ In every request, load the entire web page.

6406531737605. ✔ User experience is improved due to quick response.

6406531737606. ✖ As a result of asynchronous updates, server load has increased.

Sub-Section Number :	4
Sub-Section Id :	64065374032
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 87 Question Id : 640653521338 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 flask view functions will return a 404 error for the URL:
`http://127.0.0.1:5000/details/1001/Michael` ?

Options :

6406531737575. ✖

```
@app.route('/details/<int:id>/<string:name>')
def show(id, name):
    details = {'student_id': id, 'student_name': name}
    return details
```

6406531737576. ✖

```
@app.route('/details/<string:id>/<string:name>')
def show(id, name):
    details = {'student_id': id, 'student_name': name}
    return details
```

6406531737577. ✖

```
@app.route('/details/<id>/<name>')
def show(id, name):
    details = {'student_id': id, 'student_name': name}
    return details
```

6406531737578. ✔ None of these.

Question Number : 88 Question Id : 640653521339 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 view function.

```
@app.route('/weather', methods = ['GET', 'POST'])
def show_weather():
    val = request.args
    details = {
                'City': val['city'],
                'State': val['state'],
                'Temperature(F)': val['temp']
            }
    return details
```

If this flask app is running locally on http://127.0.0.1:5000, which of the following URLs will be handled by the controller correctly and return the weather details for a particular city?

Options :

6406531737579. ✖

```
http://127.0.0.1:5000/weather/Denver/Colorado/29
```

6406531737580. ✖

```
http://127.0.0.1:5000/Denver/Colorado/29
```

6406531737581. ✖
```
http://127.0.0.1:5000?endpoint=weather&city=Denver&state=Colorado
&temp=29
```

6406531737582. ✔
```
http://127.0.0.1:5000/weather?city=Denver&state=Colorado&temp=29
```

Question Number : 89 Question Id : 640653521341 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 time function A such that, $T_A(N) = (\frac{k}{l})^N$ where, k and l are parameters and $k \alpha l$. Then what will the time complexity of the time function A if N is the number of inputs?

Options :

6406531737587. ✖ Quadratic

6406531737588. ✖ Logarithmic

6406531737589. ✔ Exponential

6406531737590. ✖ Linear

Question Number : 90 Question Id : 640653521346 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 Users table.

Users

Email	Password
1@abc.com	P1Wd
2@abc.com	P2Wd
3@abc.com	P3Wd

Which of the following syntax is correct for creating a unique index in the Users table using Email column called email_index?

Options :

6406531737607. ✖
```
CREATE UNIQUE INDEX AS email_index Users(Email);
```

6406531737608. ✔
```
CREATE UNIQUE INDEX email_index ON Users(Email);
```

6406531737609. ✖
```
CREATE email_index ON Users(Email) CONSTRAINTS UNIQUE INDEX;
```

6406531737610. ✖
```
CREATE UNIQUE INDEX email_index ON Email(Users);
```

Question Number : 91 Question Id : 640653521348 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 two statements:

Statement 1: A process of authentication involves verifying the identity of someone or something.

Statement 2: To control access to systems or data, the authorization process is used.

Options :

6406531737615. ✖ Statement 1 is correct and statement 2 is incorrect.

6406531737616. ✖ Statement 1 is incorrect and statement 2 is correct.

6406531737617. ✔ Both statement 1 and statement 2 are correct.

6406531737618. ✖ Both statement 1 and statement 2 are incorrect.

Question Number : 92 Question Id : 640653521350 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 output of the following Python program on the terminal.

```
from jinja2 import Template

template = """{% for s in students %}
                student_name:{{s.name}}
                student_mark1:{{s.m1}}
                student_mark2:{{s.m2}}
              {% endfor %}
           """
stud = Template(template)

s1=[ {"name": "venu", "m1":76, "m2":88},{"name":"renu","m2":92},
     {"name":"seenu","m1":44},{"name":"ragu"} ]

print(stud.render(students=s1))
```

Options :

```
student_name:venu
student_mark1:76
student_mark2:88
```

6406531737623. ✖

```
student_name:venu
student_mark1:76
student_mark2:88

student_name:renu
student_mark2:92

student_name:seenu
student_mark1:44
student_name:ragu
```

6406531737624. ✖

```
name:venu
m1:76
m2:88

name:renu
m2:92

name:seenu
m1:44

name:ragu
```

6406531737625. ✖

```
student_name:venu
student_mark1:76
student_mark2:88

student_name:renu
student_mark1:
student_mark2:92

student_name:seenu
student_mark1:44
student_mark2:

student_name:ragu
student_mark1:
student_mark2:
```

6406531737626. ✔

Sub-Section Number :	5
Sub-Section Id :	64065374033
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 93 Question Id : 640653521347 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 flask application:

```
from flask import Flask, request
app = Flask(__name__)

@app.route('/get_value')
def get_value():
    val1 = request.args.get("val1")
    return "The value is "+ val1

if __name__ == '__main__':
    app.run(host= '127.0.0.1', port = 5000, debug = True)
```

Which of the following route(s) will return `The value is 10` in the browser?

Options :

6406531737611. ✖ http://127.0.0.1:5000?val1=10

6406531737612. ✖ http://127.0.0.1:5000/get_value?10

6406531737613. ✔ http://127.0.0.1:5000/get_value?val1=10

6406531737614. ✔ http://127.0.0.1:5000/get_value?val1=10&val2=10

Question Number : 94 Question Id : 640653521351 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 code.

```
from flask import Flask
from flask_restful import Resource, Api

app = Flask(__name__)
api = Api(app)

Size_list = {1: "Nano", 2: "Macro", 3: "Micro"}

class size_list(Resource):
  def get(self):
     return size_list

class size(Resource):
  def get(self, f_id):
    return size_list[f_id]

api.add_resource(size_list, '/')
api.add_resource(size, '/<int:f_id>')

if __name__ == '__main__':
  app.run(debug=True)
```

If this flask application is running locally on “http://127.0.0.1:5000”, then which of the following statements is/are true about the code snippet given above?

Options :

6406531737627. ✖ On the URL, “http://127.0.0.1:5000/”, the browser will show ‘page not found’ error.

6406531737628. ✔ On the URL, “http://127.0.0.1:5000/”, the browser will render. { "1": "Nano", "2": "Macro", "3": "Micro"}

6406531737629. ✖ On the URL, “http://127.0.0.1:5000/3”, the browser will render "Macro"

6406531737630. ✔ On the URL, “http://127.0.0.1:5000/2”, the browser will render "Macro"

Sub-Section Number :	6
Sub-Section Id :	64065374034
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 95 Question Id : 640653521340 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

Which of the following is a valid JSON?

Options :

6406531737583. ✖

```
{
    "name": "Harvard",
    "brands": ("Rolex", "Porsche"),
    "max":42
}
```

6406531737584. ✖

```
{
    "Cities":["Mumbai", "Chennai"],
    "stable": True,
    "Objects":{"beverage":"Tea","drinks":"Soft drinks"}
}
```

6406531737585. ✔

```
{
    "Type": "Invitro",
    "Success_rate": "31.56",
    "Metal": "Aluminium"
}
```

6406531737586. ✖

```
{
    "Cars": ["Audi X8", "Volvo S60", "Jeep"],
    "failures": None,
    "imported": true,
}
```

Question Number : 96 Question Id : 640653521342 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

The lens of an HDD can read data on the rotating disk with the speed of 48,000 bits per second. The disk is designed such that 800 bits pass under the lens for every revolution of the disk, what should be the maximum speed of disk so that the lens does not miss any data?

Options :

6406531737591. ✖ 60 RPM

6406531737592. ✖ 100 RPM

6406531737593. ✔ 3600 RPM

6406531737594. ✖ 6000 RPM

Question Number : 97 Question Id : 640653521344 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 python file app.py:

```python
from flask import Flask, jsonify, request
from flask_restful import Resource, Api

app = Flask(__name__)
api = Api(app)

class Hi(Resource):
    def get(self):
        return jsonify({'message': 'Say, Hi'})

    def post(self, name):
        message = 'Say, Hi ' + name
        return jsonify({'message': message})

class Bye(Resource):
    def get(self):
        return jsonify({'message': 'Say, Bye'})

    def post(self, name):
        message = 'Say, Bye ' + name
        return jsonify({'message': message})

api.add_resource(Hi,'/','/<string:name>')
api.add_resource(Bye, '/bye/','/bye/<string:name>')

if __name__ == '__main__':
    app.run(debug = True)
```

Assuming app.py is running locally, what will be the output if the command:
`curl http://127.0.0.1:5000/ -H "Content-type:application/json" -X GET`
Is run on a new terminal?

Options :

```
{
  "message": "Say, Hi"
}
```

6406531737599. ✔

```
{
  "message": "Say, Hi Leo"
}
```

6406531737600. ✖

6406531737601. ✖

```
{
    "message": "Say, Bye"
}
```

6406531737602. ✖

```
{
    "message": "Say, Bye Leo"
}
```

Question Number : 98 Question Id : 640653521352 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 table "stud" given below. The model class "Student" corresponds to table "stud" in the SQLite database.

ID	First_name	Last_name	Email
1	Ram	Kumar	kumar@gmail.com
2	Raj	Kumar	raj@gmail.com
3	Ravi	Kumar	ravi@gmail.com
4	Anil		anil@gmail.com
5	Bala	vignesh	bala@gmail.com
6	Raj	madhan	madhan@gmail.com

What will be the output of the flask_sqlalchemy command given below?

```
>>> user1= Student.query.filter_by(First_name="Raj").first()
>>> user1.First_name= "Ragu"
>>> db.session.commit()
>>> s1 = Student.query.all()
>>> for stud in s1:
        print(stud.First_name)
```

Options :

6406531737631. ✖

```
Ram
Raj
Ravi
Anil
Bala
Raj
```

```
Ram
Ragu
Ravi
Anil
Bala
Ragu
```

6406531737632. ✖

```
Ram
Ragu
Ravi
Anil
Bala
Raj
```

6406531737633. ✔

```
Ragu
Raj
```

6406531737634. ✖

MLF

Section Id :	64065333949
Section Number :	7
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 Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065374035
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 99 Question Id : 640653521353 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 :

6406531737635. ✔ YES

6406531737636. ✖ NO

Sub-Section Number :	2
Sub-Section Id :	64065374036
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 100 Question Id : 640653521358 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

Find the rank one approximation of the matrix $A = \begin{bmatrix} 2 & 0 \\ 0 & -3 \\ 0 & 0 \end{bmatrix}$ corresponding to its largest eigenvalue.

Options :

6406531737655. ✖ $\begin{bmatrix} 4 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$

6406531737656. ✖ $\begin{bmatrix} 0 & 0 \\ 0 & 3 \\ 0 & 0 \end{bmatrix}$

6406531737657. ✖ $\begin{bmatrix} 0 & 0 \\ 0 & -9 \\ 0 & 0 \end{bmatrix}$

6406531737658. ✔ $\begin{bmatrix} 0 & 0 \\ 0 & -3 \\ 0 & 0 \end{bmatrix}$

Question Number : 101 Question Id : 640653521365 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

For the dataset $D = \{x_1, x_2, x_3, \ldots, x_n\}$, the matrix

$$C = \frac{1}{n}\sum_{i=1}^{n} x_i {x_i}^T$$

is called the covariance matrix

Options :

6406531737679. ✖ always.

6406531737680. ✖ only when the dataset is centered.

6406531737681. ✖ only when the dataset has the maximum variance.

6406531737682. ✔ Both when the dataset is centered and when the dataset has the maximum variance are correct

Sub-Section Number :	3
Sub-Section Id :	64065374037
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 102 Question Id : 640653521357 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 $A = \begin{bmatrix} 1 & -i & -1 \\ i & -1 & -i \\ -1 & i & -1 \end{bmatrix}$. What is the unitary diagonalization of A?

Options :

6406531737651. ✔ $\begin{bmatrix} -2/\sqrt{6} & 1/\sqrt{3} & 0 \\ -i/\sqrt{6} & -i/\sqrt{3} & i/\sqrt{2} \\ 1/\sqrt{6} & 1/\sqrt{3} & 1/\sqrt{2} \end{bmatrix} \begin{bmatrix} 2 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -2 \end{bmatrix} \begin{bmatrix} -2/\sqrt{6} & i/\sqrt{6} & 1/\sqrt{6} \\ 1/\sqrt{3} & i/\sqrt{3} & 1/\sqrt{3} \\ 0 & -i/\sqrt{2} & 1/\sqrt{2} \end{bmatrix}$

6406531737652. ✖ $\begin{bmatrix} -2/\sqrt{6} & 1/\sqrt{3} & 0 \\ -1/\sqrt{6} & -i/\sqrt{3} & i/\sqrt{2} \\ i/\sqrt{6} & 1/\sqrt{3} & 1/\sqrt{2} \end{bmatrix} \begin{bmatrix} -2 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -2 \end{bmatrix} \begin{bmatrix} -2/\sqrt{6} & -1/\sqrt{6} & i/\sqrt{6} \\ 1/\sqrt{3} & -i/\sqrt{3} & 1/\sqrt{3} \\ 0 & i/\sqrt{2} & 1/\sqrt{2} \end{bmatrix}$

6406531737653. ✖ $\begin{bmatrix} -2/\sqrt{6} & 1/\sqrt{3} & 0 \\ -1/\sqrt{6} & -i/\sqrt{3} & i/\sqrt{2} \\ i/\sqrt{6} & 1/\sqrt{3} & 1/\sqrt{2} \end{bmatrix} \begin{bmatrix} -2 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 2 \end{bmatrix} \begin{bmatrix} -2/\sqrt{6} & -1/\sqrt{6} & i/\sqrt{6} \\ 1/\sqrt{3} & -i/\sqrt{3} & 1/\sqrt{3} \\ 0 & i/\sqrt{2} & 1/\sqrt{2} \end{bmatrix}$

6406531737654. ✖ $\begin{bmatrix} -1/\sqrt{2} & 1/\sqrt{3} & 0 \\ 0 & -i/\sqrt{3} & i/\sqrt{2} \\ i/\sqrt{2} & 1/\sqrt{3} & 1/\sqrt{2} \end{bmatrix} \begin{bmatrix} -2 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 2 \end{bmatrix} \begin{bmatrix} -1/\sqrt{2} & 0 & i/\sqrt{2} \\ 1/\sqrt{3} & -i/\sqrt{3} & 1/\sqrt{3} \\ 0 & i/\sqrt{2} & 1/\sqrt{2} \end{bmatrix}$

Sub-Section Number : 4

Sub-Section Id : 64065374038

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 103 Question Id : 640653521363 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 $f(x, y) = x^2y^2 - 2x - 2y$. Which among the following options are correct?

Options :

6406531737671. ✖ (0, 0) is a stationary point of *f*.

6406531737672. ✔ (1, 1) is a stationary point of *f*.

6406531737673. ✖ *f* attains the minimum at (0, 0).

6406531737674. ✖ *f* attains the minimum at (1, 1).

Sub-Section Number : 5

Sub-Section Id : 64065374039

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 104 Question Id : 640653521354 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

Given three unitary matrices *A,B, and C,* which of the following statements is/are true?

Options :

6406531737637. ✔ *ABC* is always a unitary matrix.

6406531737638. ✖ *A* + *B* is a Hermitian matrix.

6406531737639. ✔ *AB,BC, and AC* are unitary matrices.

6406531737640. ✖ *ABC* may not be a unitary matrix.

Question Number : 105 Question Id : 640653521355 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

What can be the eigenvalues for a matrix that is both unitary as well as Hermitian?

Options :

6406531737641. ✖ 0

6406531737642. ✔ 1

6406531737643. ✔ -1

6406531737644. ✖ i

6406531737645. ✖ 2

6406531737646. ✖ -2

Question Number : 106 Question Id : 640653521362 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

Let A be a $n \times n$ positive definite matrix. Then which among the following statements are correct?

Options :

6406531737667. ✔ A^{-1} is positive definite

6406531737668. ✔ $A + B$ is positive definite, if B is positive definite.

6406531737669. ✖ $\text{Rank}(A) = n - 1$

6406531737670. ✔ A^2 is positive definite.

Question Number : 107 Question Id : 640653521364 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 limitations of PCA?

Options :

6406531737675. ✖ PCA does work well for non-linearly correlated data.

6406531737676. ✔ PCA always consider the low variance components in the data as noise and recommend us to throw away those components. But, sometimes those components play a major role in a supervised learning task.

6406531737677. ✔ If the variables are correlated, PCA can achieve dimension reduction. If not, PCA just orders them according to their variances.

6406531737678. ✔ PCA always finds orthogonal principal components. Sometimes, our data demands non-orthogonal principal components to represent the data.

Sub-Section Number :	6
Sub-Section Id :	64065374040
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 108 Question Id : 640653521356 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 both Hermitian and unitary?

Options :

6406531737647. ✔ $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$

6406531737648. ✔ $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix}$

6406531737649. ✖ $\begin{bmatrix} 1 & -1 & 0 \\ -1 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix}$

6406531737650. ✔ $\begin{bmatrix} 0 & -1 & 0 \\ -1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

Sub-Section Number :	7
Sub-Section Id :	64065374041
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 109 Question Id : 640653521366 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

$$x_1 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}, x_2 = \begin{bmatrix} 2 \\ 3 \end{bmatrix}, x_3 = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$$

$$C = \frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x_i})(x_i - \bar{x_i})^T$$

Here $\bar{x_i} = \dfrac{x_1 + x_2 + x_3}{3}$

What is the sum of the eigenvalues of the covariance matrix C corresponding to the given data points x_1, x_2, x_3? Enter the answer correct to two decimals accuracy.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

1.32 to 1.36

Question Number : 110 Question Id : 640653521367 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

Consider the data points

$$x_1 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}, x_2 = \begin{bmatrix} 0 \\ 0 \end{bmatrix}, x_3 = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$$

If we are projecting this dataset onto the first principal component, then what is the projected variance? Enter the answer correct to two decimals accuracy.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

0.9 to 1.4

Question Number : 111 Question Id : 640653521370 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

If $f(20) = 1, f'(20) = 10$, and $f''(20) = 5$, then what is second order approximate value of $f(10)$? Enter the answer as integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

151

Sub-Section Number :	8
Sub-Section Id :	64065374042
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 112 Question Id : 640653521368 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 maximum area of rectangle than can be inscribed in an ellipse of the equation $\frac{x^2}{2} + y^2 = 1$? Enter the answer correct to 2 decimals accuracy.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

2.6 to 3

Question Number : 113 Question Id : 640653521369 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 value of the function $f(x_1, x_2, x_3) = x_1^2 + x_2^2 + x_3^2 - 2x_1x_2 - 2x_2x_3 - 2x_3x_1$ evaluated at the point obtained after one step of gradient descent where the current iterate is $(1, 1, 1)$? Assume $\eta = 1$. Enter the answer as integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

-3

Sub-Section Number :	9
Sub-Section Id :	64065374043
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653521359 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 : (114 to 115)

Question Label : Comprehension

Consider a matrix $A = \begin{bmatrix} 2 & b \\ b & 8 \end{bmatrix}$. Answer the given subquestions:

Sub questions

Question Number : 114 Question Id : 640653521360 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

For what value of b is the matrix A positive definite?

Options :

6406531737659. ✖ $b < 4$

6406531737660. ✖ $b > -4$

6406531737661. ✖ $b > 4$ and $b < -4$

6406531737662. ✔ $-4 < b < 4$

Question Number : 115 Question Id : 640653521361 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 minimum value of $\frac{1}{2}(2x^2 + 2bxy + 8y^2) - x$ for b in the range defined in the previous question.

Options :

6406531737663. ✔ $\frac{4}{b^2 - 16}$

6406531737664. ✖ $\frac{-4}{b^2-16}$

6406531737665. ✖ $\frac{8}{b^2-16}$

6406531737666. ✖ $\frac{-8}{b^2-16}$

Java

Section Id :	64065333950
Section Number :	8
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 Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065374044
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 116 Question Id : 640653521371 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 :

6406531737688. ✔ YES

6406531737689. ✖ NO

Sub-Section Number :	2
Sub-Section Id :	64065374045
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 117 Question Id : 640653521372 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 Java code given below.

```
abstract class CloudProviders{
    public abstract void storage();
}
class Azure extends CloudProviders{
    public void storage() {
         System.out.println("Azure storage");
    }
}
class AWS extends CloudProviders{
    public void storage() {
        System.out.println("AWS storage");
    }
}
class StorageList{
    private Object[] sArr = {new Azure(), new AWS()};
    public void getStorage(){
        for(int i = 0; i < sArr.length; i++){
            //LINE 1
        }
    }
}
public class Test{
    public static void main(String[] args) {
        StorageList sList = new StorageList();
        sList.getStorage();
    }
}
```

Identify the appropriate option to fill in place of `LINE 1` such that the output is

```
Azure storage
AWS storage
```

Options :

6406531737690. ✔ `((CloudProviders)sArr[i]).storage();`

6406531737691. ✖ `sArr[i].storage();`

6406531737692. ✖ `((Azure)sArr[i]).storage();`

6406531737693. ✖ `((AWS)sArr[i]).storage();`

Question Number : 118 Question Id : 640653521373 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 Java code given below.

```
public class ArrayOperations{
    public <T> int countElement(T[] arr, T ele){
        // Counts the number of occurrences of ele in arr
    }
    public <T extends Comparable> void sort(T[] arr){
        // Sorts arr
   }
}
```

How does class `ArrayOperations` look after type erasure?

Options :

```
public class ArrayOperations{
    public int countElement(Object[] arr, Object ele){
        // Counts the number of occurrences of ele in arr
    }
    public void sort(Object[] arr){
        // Sorts arr
   }
}
```

6406531737694. ✖

```
public class ArrayOperations{
    public int countElement(Object[] arr, Object ele){
        // Counts the number of occurrences of ele in arr
    }
    public void sort(Comparable[] arr){
        // Sorts arr
   }
}
```

6406531737695. ✔

6406531737696. ✖

```
public class ArrayOperations{
    public int countElement(Object[] arr, Object ele){
        // Counts the number of occurrences of ele in arr
    }
    public void sort(T[] arr){
        // Sorts arr
   }
}
```

```
public class ArrayOperations{
    public int countElement(T[] arr, T ele){
        // Counts the number of occurrences of ele in arr
    }
    public void sort(T[] arr){
        // Sorts arr
   }
}
```

6406531737697. ✖

Question Number : 119 Question Id : 640653521375 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 {
    String name;
    // Constructor
    public String toString(){
        return name;
    }
}

class Manager extends Employee implements Cloneable {
    int nteam;
    // Constructor
    public Manager clone() throws CloneNotSupportedException{
        return (Manager)super.clone();
    }
    public String toString(){
        return (super.toString() + ": " + nteam);
    }
}
public class Test {
    public static void main(String[] args) throws CloneNotSupportedException{
        Manager m1 = new Manager("Hari", 4);
        Manager m2 = m1.clone();
        m2.name = "Reena";
        m2.nteam = 10;
        System.out.println(m1 + "\n" + m2);
    }
}
```

What will the output be?

Options :

6406531737702. ✖
```
Hari: 10
Reena: 10
```

6406531737703. ✔
```
Hari: 4
Reena: 10
```

6406531737704. ✖
```
Hari: 4
Reena: 4
```

```
Reena: 10
Reena: 10
```

6406531737705.

Question Number : 120 Question Id : 640653521378 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 Java code given below that takes as input the points obtained by teams in the matches they have played, and computes the total points obtained by each team. You may make use of the method description given below.

`getOrDefault(Object key, V defaultValue)`: Returns the value to which the specified `key` is mapped, or `defaultValue` if this map contains no mapping for the key.

```
import java.util.*;
class Team{
    String name, year;
    int points;
    // Constructor
}
public class MapTest{
    public static void printTeams(ArrayList<Team> tL) {
        var map = new LinkedHashMap<String, Integer>();
        Team tm = null;
        for(Team t:tL) {
            map.put(t.name, map.getOrDefault(t.name, 0)+t.points);
        }
        for (Map.Entry<String, Integer> e:map.entrySet()) {
            System.out.println(e.getKey()+" = "+e.getValue());
        }
    }
    public static void main(String[] args) {
        ArrayList<Team> tList = new ArrayList<Team>();
        tList.add(new Team("CSK", "2008", 14));
        tList.add(new Team("RCB", "2008", 8));
        tList.add(new Team("RCB", "2009", 14));
        tList.add(new Team("CSK", "2009", 12));
        printTeams(tList);
    }
}
```

What will the output be?

Options :

6406531737714. ✔
```
CSK = 26
RCB = 22
```

6406531737715. ✖
```
RCB = 22
CSK = 26
```

6406531737716. ✖
```
RCB = 14
CSK = 12
```

6406531737717. ✖
```
CSK = 12
RCB = 14
```

Question Number : 121 Question Id : 640653521379 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 Java code.

```
import java.util.stream.*;
public class Test{
    public static void main(String[] args){
      Integer[] a = {12, 10, 13, 16};
      Stream.of(a)
            .map((i) -> i - 8).filter((i) -> i% 2 == 0)
            .forEach((x) -> System.out.println(x));
    }
}
```

What will the output be?

Options :

6406531737718. ✖
```
12
10
16
```

6406531737719. ✖ $\begin{matrix}4\\8\end{matrix}$

6406531737720. ✖ $\begin{matrix}12\\16\end{matrix}$

6406531737721. ✔ $\begin{matrix}4\\2\\8\end{matrix}$

Question Number : 122 Question Id : 640653521380 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 DaysException extends Exception{
    public DaysException(String str) {
        super(str);
    }
}
class HR{
    final static int no_of_hours = 20;
    public double getHoursPerDay(int no_of_days) {
        double hpd = 0.0;
        try {
            hpd = no_of_hours/no_of_days;
        }
        catch(ArithmeticException e) {
            e.initCause(new DaysException("No of days should not be 0"));
            throw e;
        }
        return hpd;
    }
}
public class ChainedException {
    public static void main(String[] args) {
        HR h = new HR();
        try {
            System.out.println(h.getHoursPerDay(0));
        }
        catch(ArithmeticException e) {
            System.out.println(e.getCause().getMessage());
        }
    }
}
```

Choose the correct option.

Options :

6406531737722. ✔ This program generates the output:
`No of days should not be 0`

6406531737723. ✖ This program generates the output:
`/ by zero`
`No of days should not be 0`

6406531737724. ✖

This program generates the output:

```
No of days should not be 0
/ by zero
```

This program generates the output:

```
/ by zero
```

6406531737725.

Question Number : 123 Question Id : 640653521381 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 Java code given below.

```
import java.util.*;
public class QueueTest {
    public static void main(String[] args) {
        var queue = new ArrayDeque<Integer>();
        queue.add(23);
        queue.add(12);
        queue.add(43);
        while(queue.size() > 0) {
            System.out.println(queue.peek()+":"+queue.poll());
        }
    }
}
```

What will the output be?
You may make use of the descriptions of the methods given below. These are methods inside type Deque.
`poll()`: Retrieves and removes the head of the queue represented by this deque (in other words, the first element of this deque), or returns null if this deque is empty.
`peek()`: Retrieves, but does not remove, the head of the queue represented by this deque (in other words, the first element of this deque), or returns null if this deque is empty.

Options :

6406531737726.

```
23:23
12:12
43:43
null:null
```

6406531737727. ✖
```
43:43
12:12
23:23
```

6406531737728. ✔
```
23:23
12:12
43:43
```

6406531737729. ✖
```
23:12
12:43
43:null
```

Question Number : 124 Question Id : 640653521382 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 Java code given below.

```
import java.util.*;
class Employee{
    String name;
    int no_of_leaves;
    //Constructor to initialize the instance variables
    //Method toString() to return name of the employee
}
public class IteratorTest {
    public static boolean property(int x) {
        if(x < 15)
            return true;
        return false;
    }
    public static void printAppraisalEmpList(List<Employee> eList){
        Iterator<Employee> it = eList.iterator();
        while (it.hasNext()) {
            Employee e = it.next();
            if(property(e.no_of_leaves))
                System.out.println(e);
            else
                it.remove(); // LINE 1
        }
    }
    public static void main(String[] args) {
        var list = new ArrayList<Employee>();
        list.add(new Employee("ABC", 15));
        list.add(new Employee("XYZ", 9));
        list.add(new Employee("PQR", 1));
        list.add(new Employee("MNO", 20));
        printAppraisalEmpList(list);
    }
}
```

Choose the correct option.

Options :

6406531737730. ✖ This program generates the output:
ABC
MNO

6406531737731. ✔ This program generates the output:
XYZ
PQR

6406531737732. ✖ LINE 1 generates the compilation error because method `remove()` is not defined in the `Iterator` interface.

6406531737733. ✖ LINE 1 should be replaced with `eList.remove(e);` to generate the output:

```
XYZ
PQR
```

Question Number : 125 Question Id : 640653521385 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 Java code given below.

```
public class SetTest {
    public static void main(String[] args) {
        var set1 = new HashSet<String>();
        set1.add("India");
        set1.add("Sri Lanka");
        set1.add("Bangladesh");
        set1.add("Australia");
        var set2 = new TreeSet<String>(set1);

        Iterator<String> it1 = set1.iterator();
        Iterator<String> it2 = set2.iterator();

        while(it1.hasNext())
            System.out.println(it1.next());

        while(it2.hasNext())
            System.out.println(it2.next());
    }
}
```

Choose the correct option.

Options :

6406531737742. ✖ `it1` will visit elements of `set1` in sorted order.
`it2` will visit elements of `set2` in sorted order.

6406531737743. ✖ it1 will visit elements of set1 in the order in which they were inserted
it2 will visit elements of set2 in sorted order.

6406531737744. ✔ it1 will visit elements of set1 in unspecified order.
it2 will visit elements of set2 in sorted order.

6406531737745. ✖ it1 will visit elements of set1 in the order in which they were inserted.
it2 will visit elements of set2 in unspecified order.

Question Number : 126 Question Id : 640653521386 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

A. `throw`	I. Lists the types of exceptions that a method might throw
B. `throws`	II. Used to throw an exception object explicitly
C. `finally`	III. Executes only if exception is raised
D. `catch`	IV. Executes irrespective of whether the exception is raised or not

Options :

6406531737746. ✔
```
A---> II
B--> I
C--> IV
D--> III
```

6406531737747. ✖
```
A---> I
B--> II
C--> IV
D--> III
```

6406531737748. ✖
```
A---> II
B--> I
C--> III
D--> IV
```

A---> I
B--> II
C--> III
D--> IV

6406531737749.

Sub-Section Number : 3

Sub-Section Id : 64065374046

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 127 Question Id : 640653521374 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 Java code given below that prints the sum of elements of a list. From among the options, identify the appropriate function header for function elementSum that takes as input a list of numbers, and prints the sum of the elements of the list.

```
import java.util.*;
class Test {
    // FUNCTION HEADER for function elementSum
    {
        // Prints the sum of elements of list
    }
    public static void main(String[] args) {
        List<Integer> l = new ArrayList<>();
        l.add(12);
        l.add(23);

        List<Float> l1 = new ArrayList<>();
        l1.add(12.2f);
        l1.add(23.4f);

        elementSum(l);
        elementSum(l1);
    }
}
```

Choose the correct option(s).

Options :

6406531737698. ✖ `public static void elementSum(List<Number> lst)`

6406531737699. ✔ `public static <T extends Number> void elementSum(List<T> lst)`

6406531737700. ✔ `public static void elementSum(List<? extends Number> lst)`

6406531737701. ✖ `public static void elementSum(List<Double> lst)`

Question Number : 128 Question Id : 640653521376 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 Java code given below that prints the highest tax among a set of given Taxable objects. From among the options, identify the appropriate function header for function printTax that takes as input an array of Taxable objects and prints the highest tax.

```
import java.util.*;
interface Taxable {
    public abstract double findTax();
}
class Employee implements Taxable{
    double salary;
    // Constructor
    // method findTax() that returns tax of Employee which is 10% of salary
}
class Manager extends Employee{
    // Constructor
}
public class Test{
    // LINE 1: FUNCTION HEADER
    {
        // invokes method findTax()
        // to print the value of highest tax
    }

    public static void main(String[] args) {
        Taxable[] t = {new Employee(400), new Manager(3000)};
        printTax(t);
    }
}
```

Choose the correct option(s).

Options :

6406531737706. ✖ `public static void printTax(<?> t)`

6406531737707. ✔ `public static <T extends Taxable> void printTax(T[] c)`

6406531737708. ✖ `public static <T extends Manager> void printTax(T[] c)`

6406531737709. ✔ `public static void printTax(Taxable[] c)`

Question Number : 129 Question Id : 640653521377 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 Java code given below that should print the names of students whose total is between 255 and 360 (both inclusive).

```
import java.util.*;
class Student{
    String name;
    double total;
    public Student(String name, double total) {
        this.name = name;
        this.total = total;
    }
}
public class Test {
    public static void main(String[] args) {
        List<Student> sList = new ArrayList<Student>();
        sList.add(new Student("s1", 360));
        sList.add(new Student("s2", 400));
        sList.add(new Student("s3", 200));
        sList.add(new Student("s4", 255));
        //CODE BLOCK
    }
}
```

Choose the correct option(s) to fill in place of `CODE BLOCK` to obtain the right answer.

Options :

6406531737710. ✖

```
sList.stream()
    .map(i -> i.total >= 255 && i.total <= 360)
    .forEach(s->System.out.println(s.name));
```

6406531737711. ✔

```
sList.stream()
    .filter(i -> i.total >= 255 && i.total <= 360)
    .forEach(s->System.out.println(s.name));
```

6406531737712. ✔

```
sList.stream()
    .filter(i -> i.total >= 255)
    .filter(i -> i.total <= 360)
    .forEach(s->System.out.println(s.name));
```

```
sList.stream()
    .filter(i -> i.total >= 255)
    .map(i -> i.total <= 360)
    .forEach(s->System.out.println(s.name));
```

6406531737713. ✖

Sub-Section Number : 4

Sub-Section Id : 64065374047

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 130 Question Id : 640653521383 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 Java code given below.

```
class Customer{
    private String name, aadhar, pan;

    //Constructor to initialize the instance variables

    public void getDetails() {
        String msg = ""PAN/Aadhar required"";
        System.out.println(name);
        assert aadhar.length() == 12 || pan.length() == 10: msg; //LINE 1
        if(aadhar.length() == 12)
            System.out.println(aadhar);
        if(pan.length() == 10)
            System.out.println(pan);
    }
}
public class AssertionTest {
    public static void main(String[] args) {
        Customer c1 = new Customer("Shreyas Iyer", "","BXBPB1123D");
        Customer c2 = new Customer("Venkatesh Iyer", "209005091129","");
        c1.getDetails(); // LINE 2
        c2.getDetails(); // LINE 3
    }
}
```

Choose the correct option when the program is executed as:
`java -ea AssertionTest`

Options :

6406531737734. ✖ LINE 1 generates a compilation error, because you cannot write multiple conditions in a single assert statement.

6406531737735. ✖ LINE 1 throws AssertionError when LINE 2 is executed.

6406531737736. ✖ LINE 1 throws AssertionError when LINE 3 is executed.

6406531737737. ✔ This program generates the output:

```
Shreyas Iyer
BXBPB1123D
Venkatesh Iyer
209005091129
```

Question Number : 131 Question Id : 640653521384 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 Java code given below.

```
import java.util.*;
class LocationException extends Exception{
    public LocationException(String str) {
        super(str);
    }
}
class Fresher{
    String name, pre_location;
    //Constructor to initialize the instance variables
}
class Kipro{
    Map<String, String> map = new HashMap<String, String>();
    public Kipro() {
        map.put("Hyderabad", "100 fresher jobs");
        map.put("Chennai", "175 fresher jobs");
    }
    void recruit(Fresher f) throws LocationException {
        if(map.get(f.pre_location) == null)
            throw new LocationException("No jobs");
        else
            System.out.println(map.get(f.pre_location));
    }
}
public class ExceptionTest {
    public static void main(String[] args) {
        Fresher f1 = new Fresher("ABC", "Hyderabad");
        Fresher f2 = new Fresher("XYZ", "Bangalore");
        Kipro k = new Kipro();
        try {
            k.recruit(f1);
            k.recruit(f2);
        }
        catch (LocationException e) {
            System.out.println(e.getMessage());
        }
    }
}
```

Choose the correct option.

Options :

6406531737738. ✖

This program generates the output:

```
No jobs
100 fresher jobs
```

6406531737739. ✔

This program generates the output:

```
100 fresher jobs
No jobs
```

6406531737740. ✖

This program generates the output:

```
No jobs
175 fresher jobs
```

6406531737741. ✖

The program terminates due to unhandled exception(s).

AppDev2

Section Id :	64065333951
Section Number :	9
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	17
Number of Questions to be attempted :	17
Section Marks :	50
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 :	64065374048

Question Shuffling Allowed : No

Is Section Default? : null

Question Number : 132 Question Id : 640653521387 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 2"

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 :

6406531737750. ✔ YES

6406531737751. ✖ NO

Sub-Section Number : 2

Sub-Section Id : 64065374049

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 133 Question Id : 640653521391 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

Fill in code1 & code2, which can be used in Vuex Store to update the "below_average" state variable with the objects of those students who have scored less than 55 marks.

```
const store= new Vuex.Store({
    state:{
        student_total:0,
        students:[
                    {
                        name : 'Akshay',
                        marks : 52
                    },
                    {
                        name : 'Vishwajeet',
                        marks : 78
                    },
                    {
                        name : 'Sonali',
                        marks : 43
                    }
                ],
        below_average:[]
    },

    code1:{
        belowAverageStudents(state){
                        code2
                    },
            }
})
```

Options :

code1: mutations
code2: students.forEach(student=>{
if(student.marks < 55)
below_average.push(student)
})

6406531737764. ✖

6406531737765. ✖

```
code1: actions
code2: state.students.forEach(student=>{
                    if(student.mark < 55)
                        below_average.toppers.push(student)
                    })
```

```
code1: actions
code2: context.students.forEach(student=>{
                        if(student.marks < 55)
                            context.below_average.push(student)
                        })
```

6406531737766. ✖

```
code1: mutations
code2: state.students.forEach(student=>{
                        if(student.marks < 55)
                            state.below_average.push(student)
                        })
```

6406531737767. ✔

Question Number : 134 Question Id : 640653521393 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 statements is false regarding PWAs and SPAs in the context of web?

Options :

6406531737772. ✖ A PWA is a web application that can be installed to a device's home screen.

6406531737773. ✔ An SPA is a web application that allows a user to interact with the app as usual even when offline.

6406531737774. ✖ A PWA must have service workers installed on the client.

6406531737775. ✖ YouTube is an example of a PWA.

Question Number : 135 Question Id : 640653521398 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 below javascript code.

```
async function customFetch(url) {
  try {
    console.log(url)
    const res = await fetch(url)
    if (!res.ok) {
      throw new Error(`HTTP Error: ${res.status}`)
    }
    try {
      const data = await res.json()
      console.log(data)
    } catch {
      throw new Error('Data is not JSON serializable')
    }
  } catch {
    throw new Error('Network Error')
  }
}
customFetch('https://example.com/api/users/23').catch((err) => {
  console.error(err)
})
```

Suppose the API URL "https://example.com/api/users/23" throws a 404 error.
What will be logged on to the console, except the URL?

Options :

6406531737792. ✖ HTTP Error: 404

6406531737793. ✖ Data is not JSON serializable

6406531737794. ✔ Network Error

6406531737795. ✖ None of these

Sub-Section Number :	3
Sub-Section Id :	64065374050
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 136 Question Id : 640653521390 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 = "app">
    <my-comp>
        <template v-slot:first = "slotProps">
            This is from {{slotProps.user.name1}} template
        </template>

        <template v-slot:default = "slotProps">
            This is from {{slotProps.user.name3}} template
        </template>

        <template v-slot:second = "slotProps">
            This is from {{slotProps.user.name2}} template
        </template>
    </my-comp>
</div>
<script src = "app.js"> </script>
```

app.js:

```
Vue.component("myComp", {
    template : `<div>
                    <p>
                        <slot v-bind:user="user">
                        </slot>
                    </p>

                    <p>
                        <slot name = "first" v-bind:user="user">
                        </slot>
                    </p>
                </div>
               `,
    data : function () {
        return {
            user : {
                'name1' : "Abhi's",
                'name2' : "Dev's",
                'name3' : "Sonali's",
            }
        }
    }
})

const app = new Vue({
    el : "#app",
})
```

Options :

6406531737760. ✖ This is from template

This is from template

6406531737761. ✖ This is from Abhi’s template

This is from Dev’s template

This is from Sonali’s template

6406531737762. ✖ This is from Abhi’s template

This is from Sonali’s template

6406531737763. ✔ This is from Sonali’s template

This is from Abhi’s template

Question Number : 137 Question Id : 640653521395 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, if executed.

```
var x = 20;

const y = {
    x : 40,
    func : function(x) {
        console.log("Value is:", x)
    }
}

const z = {
    x : 40,
    func : () => {
        console.log("Value is:", x)
        y.func.call(this)
    }
}

z.func.apply(y)
```

Options :

6406531737780. ✖ Value is: 40

Value is: undefined

6406531737781. ✖ Value is: 40

Value is: 20

6406531737782. ✖ Value is: 20

Value is: 40

6406531737783. ✔ Value is: 20

Value is: undefined

Question Number : 138 Question Id : 640653521396 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 code, and predict the output, if executed?

```
const runScored = (score) => {
  score > 100 ? true : false
}

const teamSelector = (run) => {
  return new Promise((res, rej) => {
    if (runScored(run)) {
      res('In the team')
    } else {
      rej('Out of the team')
    }
  })
}

teamSelector(100)
  .then((res) => {
    console.log(res)
  })
  .catch((res) => {
    console.log(res)
  })
```

Options :

6406531737784. ✖ In the team

6406531737785. ✔ Out of the team

6406531737786. ✖ Will throw an error

6406531737787. ✖ None of these

Question Number : 139 Question Id : 640653521397 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 code, and predict the output, if executed?

```
const proGen = (t) => {
  return new Promise((res, rej) => {
    setTimeout(() => {
      if (t > 5) {
        rej('Disqualified')
      } else {
        res('Qualified')
      }
    }, t * 1000)
  })
}

async function decider() {
  const res1 = await proGen(3)
  console.log(res1)
  const res2 = await proGen(6)
  console.log(res2)
  console.log('Decision Over')
}
decider().catch((data) => {
  console.log(data)
})
console.log('Decision Started')
```

Options :

6406531737788. ✖ Decision Started

Qualified

Disqualified

Decision Over

6406531737789. ✖ Qualified

Disqualified

Decision Over

6406531737790. ✔ Decision Started

Qualified

Disqualified

6406531737791. ✖ None of these

Question Number : 140 Question Id : 640653521399 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 code.

```
async function customFetch(url) {
  try {
    console.log(url)
    const res = await fetch(url)
    if (!res.ok) {
      throw new Error(`HTTP Error: ${res.status}`)
    }
    try {
      const data = await res.json()
      console.log(data)
    } catch {
      throw new Error('Data is not JSON serializable')
    }
  } catch {
    throw new Error('Network Error')
  }
}
customFetch('https://example.com/api/users/23').catch((err) => {
  console.error(err)
})
```

Suppose the API URL "https://example.com/api/users/23" returns a valid HTML output.

What will be logged on to console, except the URL?

Options :

6406531737796. ✖ HTTP Error: 404

6406531737797. ✖ Data is not JSON serializable

6406531737798. ✔ Network Error

6406531737799. ✖ None of these

Question Number : 141 Question Id : 640653521400 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 app with markup “index.html” and javascript file “app.js”.

index.html:

```
  <body>
    <div id="app">
      <router-view></router-view>
    </div>
    <script
src="https://cdn.jsdelivr.net/npm/vue@2/dist/vue.js"></script>
    <script
src="https://unpkg.com/vue-router@3/dist/vue-router.js"></script>
    <script src="app.js"></script>
  </body>
```

app.js:

```
const Home = { template: `<div> Hello World </div>` }
const Error = { template: `<div> Page Not Found</div>` }
const Profile = {
  template: `<div>
                <div v-if='user'>
                    Name: {{user.name}}, State: {{user.state}}
                </div>
                <div v-else>
                    Unknown User
                </div>
            </div>`,
  data() {
    return {
      users: [
        { id: '1', name: 'Narendra', state: 'UP' },
        { id: '2', name: 'Abhishek', state: 'Delhi' },
      ],
    }
  },
```

```
  computed: {
    user() {
      user = this.users.find((usr) => {
        return usr.id == this.$route.params.id
      })
      return user
    },
  },
}

const routes = [
  { path: '/', component: Home },
  { path: '/profile/:id', component: Profile },
  { path: '*', component: Error },
]

const router = new VueRouter({
  routes,
})

new Vue({
  el: '#app',
  router,
})
```

Suppose the application is running on port 8080. What will be rendered inside router-view for the URL "http://127.0.0.1:8080/#/profile"?

Options :

6406531737800. ✔ Page Not Found

6406531737801. ✖ Name: Narendra, State: UP

6406531737802. ✖ Name: Abhishek, State: Delhi

6406531737803. ✖ Unknown User

Question Number : 142 Question Id : 640653521403 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 application with markup “index.html” and javascript file “app.js”.

index.html:

```
<body>
    <div id="app">
      <router-view></router-view>
    </div>
    <script
src="https://cdn.jsdelivr.net/npm/vue@2/dist/vue.js"></script>
    <script
src="https://unpkg.com/vue-router@3/dist/vue-router.js"></script>
    <script src="app.js"></script>
  </body>
```

app.js:

```
const Home = { template: `<div> Hello World </div>` }
const DetailsError = { template: `<div> Details not found </div>` }
const PersonalInfo = {
  template: `<div>
                Name: {{user?user.name:'Unknown'}},
                State: {{user?user.state:'Unknown'}}
            </div>`,
  data() {
    return {
      users: [
        { id: '1', name: 'Narendra', state: 'UP' },
        { id: '2', name: 'Abhishek', state: 'Delhi' },
      ],
    }
  },
  computed: {
    user() {
      user = this.users.find((usr) => {
        return usr.id == this.$route.params.id
      })
      return user
```

```
    },
  },
}
const ProfessionalInfo = {
  template: `<div> This is professional Info </div>`,
}
const Profile = {
  template: `<div>
  <div>Welcome User</div>
  <div><router-view></router-view></div>
  </div>`,
}

const routes = [
  { path: '/', component: Home },
  {
    path: '/profile/:id',
    component: Profile,
    children: [
      {
        path: 'personal',
        component: PersonalInfo,
      },
      {
        path: 'professional',
        component: ProfessionalInfo,
      },
      { path: '*', component: DetailsError },
    ],
  },
]

const router = new VueRouter({
  routes,
})
new Vue({
  el: '#app',
  router,
})
```

Suppose the application is running on port 8080. What will be rendered inside the router-view component of div element with ID "app", when a user visits the URL "http://127.0.0.1:8080/#/profile/2/personal"?

Options :

6406531737812. ✖ Welcome User

Name: Unknown, State: Unknown

6406531737813. ✖ Welcome User

Name: Narendra, State: UP

6406531737814. ✔ Welcome User

Name: Abhishek, State: Delhi

6406531737815. ✖ None of these

Sub-Section Number :	4
Sub-Section Id :	64065374051
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 143 Question Id : 640653521389 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:

```
<div id = "app">
    <input v-model = "data" />
    <p> Number of refreshes: {{refreshes}} </p>
    <button @click = "do_something"> Click Me</button>
</div>
<script src = "app.js"> </script>
```

app.js:

```
const a = new Vue({
    el : '#app',
    data : {
        data : "",
        refreshes : 0,
    },
    methods: {
        do_something() {
            if (isNaN(this.refreshes)) this.refreshes = 0;
            if (this.data.length % 2) {
                sessionStorage.data = "prefix" + this.data;
                sessionStorage.refreshes = this.refreshes * 2 + 1;
            }
            else {
                sessionStorage.data = this.data + "suffix";
                sessionStorage.refreshes = this.refreshes * 2 - 1;
            }
        }
    },
    mounted : function () {
        if (sessionStorage.data) {
            this.data = "suffix" + sessionStorage.data.slice(1, 5);
            this.refreshes = Number(sessionStorage.refreshes) % 3 - 1;
        }
        else {
            this.data = sessionStorage.data + "prefix";
            this.refreshes = Number(sessionStorage.refreshes) % 3 + 1;
        }
        if (isNaN(this.refreshes)) this.refreshes = 2;
        sessionStorage.data = this.data;
        sessionStorage.refreshes = this.refreshes;
    }
})
```

Say you open the file “index.html” in the browser, and enter the text “study” in the text box shown (after removing the existing text from the input box, if any). After that, you refresh the page twice. What be the text shown in the text input box, and the value of the “refreshes” placeholder, respectively?

Options :

6406531737756. ✖ suffixndef, 0

6406531737757. ✖ suffixndef, -1

6406531737758. ✔ suffixuffi, 0

6406531737759. ✖ suffixuffi, -1

Question Number : 144 Question Id : 640653521394 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 javascript program, and predict the output, if executed.

```
async function test(x) {
   let a = await new Promise(r => r(4 && x || 9)).catch(e => e);
   let b = await new Promise((res, rej) => {
       if (a > 2) res(8 || a && 5);
       else rej(5 && a);
   }).catch(e => e);
   console.log(a, b);
   return (5 && a)
}
test(7).then(
rej => console.log("Promise rejected with the answer", rej),
res => console.log("Promise resolved with the answer", res)
).then(data => {
    console.log("New value:", data);
    return "Promise"
}).catch(e => {
    throw new Error("Error 1")
}).finally(data => {
    console.log("New Value:", data);
    return "15"
}).then(data => console.log("New Value:", data)
).finally(() => console.log("End of Program"));
```

Options :

6406531737776. ✖ 7 8

Promise rejected with the answer 8

New value: undefined

New Value: Promise

New Value: 15

End of Program

6406531737777. ✖ End of Program

7 8

Promise rejected with the answer 7

New value: undefined

New Value: undefined

New Value: Promise

6406531737778. ✔ 7 8

Promise rejected with the answer 7

New value: undefined

New Value: undefined

New Value: Promise

End of Program

6406531737779. ✖ 7 8

Promise rejected with the answer 5

New value: undefined

New Value: Promise

New Value: 15

End of Program

Question Number : 145 Question Id : 640653521401 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 app with markup “index.html” and javascript file “app.js”.

index.html:

```
  <body>
    <div id="app">
      <router-view></router-view>
    </div>
    <script
src="https://cdn.jsdelivr.net/npm/vue@2/dist/vue.js"></script>
    <script
src="https://unpkg.com/vue-router@3/dist/vue-router.js"></script>
    <script src="app.js"></script>
  </body>
```

app.js:

```
const Home = { template: `<div> Hello World </div>` }
const Error = { template: `<div> Page Not Found</div>` }
const Profile = {
  template: `<div>
                <div v-if='user'>
                    Name: {{user.name}}, State: {{user.state}}
                </div>
                <div v-else>
                    Unknown User
                </div>
            </div>`,
  data() {
    return {
      users: [
        { id: '1', name: 'Narendra', state: 'UP' },
        { id: '2', name: 'Abhishek', state: 'Delhi' },
      ],
    }
  },
```

```
  computed: {
    user() {
      user = this.users.find((usr) => {
        return usr.id == this.$route.params.id
      })
      return user
    },
  },
}

const routes = [
  { path: '/', component: Home },
  { path: '/profile/:id', component: Profile },
  { path: '*', component: Error },
]

const router = new VueRouter({
  routes,
})

new Vue({
  el: '#app',
  router,
})
```

Suppose the application is running on port 8080. What will be rendered inside router-view for the URL "http://127.0.0.1:8080/#/profile/5"?

Options :

6406531737804. ✖ Page Not Found

6406531737805. ✖ Name: Narendra, State: UP

6406531737806. ✖ Name: Abhishek, State: Delhi

6406531737807. ✔ Unknown User

Question Number : 146 Question Id : 640653521402 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 application with markup “index.html” and javascript file “app.js”.

index.html:

```
<body>
    <div id="app">
      <router-view></router-view>
    </div>
    <script
src="https://cdn.jsdelivr.net/npm/vue@2/dist/vue.js"></script>
    <script
src="https://unpkg.com/vue-router@3/dist/vue-router.js"></script>
    <script src="app.js"></script>
  </body>
```

app.js:

```
const Home = { template: `<div> Hello World </div>` }
const DetailsError = { template: `<div> Details not found </div>` }
const PersonalInfo = {
  template: `<div>
                Name: {{user?user.name:'Unknown'}},
                State: {{user?user.state:'Unknown'}}
            </div>`,
  data() {
    return {
      users: [
        { id: '1', name: 'Narendra', state: 'UP' },
        { id: '2', name: 'Abhishek', state: 'Delhi' },
      ],
    }
  },
  computed: {
    user() {
      user = this.users.find((usr) => {
        return usr.id == this.$route.params.id
```

```
      })
      return user
    },
  },
}
const ProfessionalInfo = {
  template: `<div> This is professional Info </div>`,
}
const Profile = {
  template: `<div>
  <div>Welcome User</div>
  <div><router-view></router-view></div>
  </div>`,
}

const routes = [
  { path: '/', component: Home },
  {
    path: '/profile/:id',
    component: Profile,
    children: [
      {
        path: 'personal',
        component: PersonalInfo,
      },
      {
        path: 'professional',
        component: ProfessionalInfo,
      },
      { path: '*', component: DetailsError },
    ],
  },
]

const router = new VueRouter({
  routes,
})

new Vue({
  el: '#app',
  router,
})
```

Suppose the application is running on port 8080. What will be rendered inside the router-view component of div element with ID “app”, when the user visits the URL “http://127.0.0.1:8080/#/profile/3/personal”?

Options :

6406531737808. ✔ Welcome User

Name: Unknown, State: Unknown

6406531737809. ✖ Welcome User

Name: Narendra, State: UP

6406531737810. ✖ Welcome User

Name: Abhishek, State: Delhi

6406531737811. ✖ None of these

Sub-Section Number : 5

Sub-Section Id : 64065374052

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 147 Question Id : 640653521388 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 false regarding promise chain in javascript language?

Options :

6406531737752. ✖ A promise chain may consist of a number of “then” blocks.

6406531737753. ✔ A “finally” block always comes at the end of the promise chain.

6406531737754. ✔ Every “catch” block must always be preceded by a “then” block.

6406531737755. ✖ The “finally” block always gets executed, irrespective of the promise outcome.

Sub-Section Number : 6

Sub-Section Id : 64065374053

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 148 Question Id : 640653521392 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 regarding web storage APIs?

Options :

6406531737768. ✔ The data saved in local storage has no expiration time, unlike session storage

(except in private browsing).

6406531737769. ✖ Both the local storage and session storage return the same object for site loaded over HTTP and HTTPS.

6406531737770. ✖ The data saved in local storage is synced across the devices.

6406531737771. ✔ The data saved in session storage gets cleared as soon as the page session ends.

MLT

Section Id :	64065333952
Section Number :	10
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	15
Number of Questions to be attempted :	15
Section Marks :	100
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 :	64065374054
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 149 Question Id : 640653521404 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 :

6406531737816. ✔ YES

6406531737817. ✖ NO

Sub-Section Number :	2
Sub-Section Id :	64065374055
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 150 Question Id : 640653521405 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 the three weight vectors $\mathbf{w}_1$, $\mathbf{w}_2$, and $\mathbf{w}_3$ are learned for a six-dimensional dataset using a linear regression model or regularized linear regression model (Not in any particular order).

$\mathbf{w}_1 = [0.5, 0, 0.25, 0, 0, -0.14]$

$\mathbf{w}_2 = [0.8, -0.23, 0.45, 0.2, 0.31, -0.54]$

$\mathbf{w}_3 = [0.24, -0.03, 0.1, 0.02, 0.09, -0.14]$

Select the most appropriate match for these weight vectors.

Options :

6406531737818. ✖ $\mathbf{w}_1 \rightarrow$ Linear regression, $\mathbf{w}_2 \rightarrow$ Ridge regression, $\mathbf{w}_3 \rightarrow$ Lasso

6406531737819. ✖ $\mathbf{w}_1 \rightarrow$ Ridge regression, $\mathbf{w}_2 \rightarrow$ Linear regression, $\mathbf{w}_3 \rightarrow$ Lasso

6406531737820. ✖ $\mathbf{w}_1 \rightarrow$ Lasso, $\mathbf{w}_2 \rightarrow$ Ridge regression, $\mathbf{w}_3 \rightarrow$ Linear regression

6406531737821. ✔ $\mathbf{w}_1 \rightarrow$ Lasso, $\mathbf{w}_2 \rightarrow$ Linear regression, $\mathbf{w}_3 \rightarrow$ Ridge regression

Question Number : 151 Question Id : 640653521406 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 a binary classification dataset (classes are 0 and 1) with two binary features $f_1, f_2 \in \{0, 1\}$. A Naive Bayes classifier is learned and the estimated parameters are given as:

$P(f_1 = 1|y = 0) = 0.2$

$P(f_2 = 1|y = 0) = 0.5$

$P(f_1 = 1|y = 1) = 0.6$

$P(f_2 = 1|y = 1) = 0.4$

If a data point $[1, 0]$ is predicted in class 0 by this classifier, what will be the possible values for the estimate of $P(y = 1)$? Assume that tie-breaking goes to class zero. Values in the options are correct to two decimal places.

Options :

6406531737822. ✔ $(0, 0.22]$

6406531737823. ✖ $[0.22, 1)$

6406531737824. ✖ $(0, 0.29]$

6406531737825. ✖ $[0.29, 1)$

Question Number : 152 Question Id : 640653521407 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:

If $p_i^y = 0$ for $y = 0$, then $p_i^y = 1$ for $y = 1$. Here, p_j^y denotes the estimate of the probability that j^{th} feature value is 1 given that label is y ($P(f_j = 1|y)$).

Options :

6406531737826. ✖ TRUE

6406531737827. ✔ FALSE

Question Number : 153 Question Id : 640653521408 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

A linear regression model trained on a dataset $X \in \mathbb{R}^{d \times n}$ achieves zero training error for any label vector y. Which of the following options will necessarily hold true? Here I denotes an identity matrix of an appropriate size.

Options :

6406531737828. ✖ $XX^T = I$

6406531737829. ✔ $X^T(XX^T)^{-1}X = I$

6406531737830. ✖ $(XX^T)^{-1}Xy$ is a vector of all ones

6406531737831. ✖ $(XX^T)^{-1}Xy$ is a vector of all zeros

Sub-Section Number : 3

Sub-Section Id : 64065374056

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 154 Question Id : 640653521409 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 7 Selectable Option : 0

Question Label : Multiple Select Question

Consider the following three models for a one-dimensional dataset:

Model 1: $y = w_1 x_1$

Model 2: $y = w_1^2 x_1$

Model 3: $y = w_1^2 x_1 + w_2 x_1$

Select all the correct options. Assume that we have access to sufficiently large data points.

Options :

6406531737832. ✔ There may be some datasets for which model 1 performs better than model 2.

6406531737833. ✖ There may be some datasets for which model 2 performs better than model 1.

6406531737834. ✖ There may be some datasets for which model 3 performs better than model 1.

6406531737835. ✔ There may be some datasets for which model 3 performs better than model 2.

6406531737836. ✔ Model 1 and Model 3 perform equally well on all datasets.

Question Number : 155 Question Id : 640653521410 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 7 Selectable Option : 0

Question Label : Multiple Select Question

Let w be the solution of the linear regression model and $\tilde{w}$ be the projection of w on the linear subspace spanned by the data points. Which of the following relationship is true?

Options :

6406531737837. ✔ $\text{training error for } w = \text{training error for } \tilde{w}$

6406531737838. ✔ $w = \tilde{w}$

6406531737839. ✖ training error for $w \neq$ training error for $\tilde{w}$

Question Number : 156 Question Id : 640653521411 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 7 Selectable Option : 0

Question Label : Multiple Select Question

Consider the following statement:

MAP estimate for linear regression weights w is equivalent to ridge regression.

Which of the following conditions make the above statement true?

Options :

6406531737840. ✖ Prior for w is Laplace distribution with zero mean.

6406531737841. ✔ Prior for w is $\mathrm{N}(0, \gamma^2 I)$.

6406531737842. ✖ $y_i|x_i \sim \mathrm{N}(0, \sigma^2 I)$

6406531737843. ✔ $y_i|x_i \sim \mathrm{N}(w^T x_i, \sigma^2)$

Sub-Section Number :	4
Sub-Section Id :	64065374057
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 157 Question Id : 640653521412 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

Suppose you want to use a Naive Bayes classifier to predict the gender (male or female) of a person based on two features: their height (f_1) and whether their age is above 20 (f_2). Assume that the features f_1 and f_2 are conditionally independent given the gender of the person, and that the variances of the height distributions $P(f_1|y = \text{male})$ and $P(f_1|y = \text{female})$ are equal. How many parameters are required to classify a new example using this Naive Bayes classifier?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

6

Question Number : 158 Question Id : 640653521413 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

Consider a Naive Bayes model is trained on the following data matrix X of shape (d, n) and corresponding label vector y:

$$X = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 0 \end{bmatrix} \quad y = [0, 1, 0]^T$$

Assume that $\hat{p}$ and $\hat{p}_j^{y_i}$ are estimates for $P(y = 1)$ and $P(f_j = 1|y = y_i)$, respectively. Here, $f_i;\ i = 1, 2$ is the i^{th} feature. These parameters are estimated using MLE. If a test point has label 0, what will be the probability that the point is $[0, 0]^T$?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

0.5

Question Number : 159 Question Id : 640653521414 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

Gaussian kernel regression with parameter $\sigma^2 = 1/2$ was applied to the following dataset with two features:

$$X = \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 \end{bmatrix} \quad y = [2.1, 1, 2, 1.2]^T$$

The weight vector can be written as $w = \phi(X)\alpha$, where ϕ is the transformation mapping corresponding to the kernel. The vector α is given by $[2.1, -2.1, 3, 0]^T$ which is obtained as $(K)^{-1}y$, where K is the kernel matrix. What will be the prediction for point $[1, 1]^T$?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Sub-Section Number :	5
Sub-Section Id :	64065374058
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 160 Question Id : 640653521415 Question Type : SA Calculator : None

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

Correct Marks : 7

Question Label : Short Answer Question

Suppose we have a binary classification dataset with 1000 data points, consisting of 600 points belonging to class 0 and 400 points belonging to class 1. If we use a k-nearest neighbor (k-NN) model with $k = 900$ to predict the class labels of the data points, how many data points will be classified correctly?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

600

Sub-Section Number :	6
Sub-Section Id :	64065374059
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653521416 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 : (161 to 163)

Question Label : Comprehension

Suppose we have 1000 training examples and want to compute the 10-fold Cross-Validation error. This error is calculated as the average of the errors obtained from n_1 iterations of the Cross-Validation process. Each iteration involves training a model on a subset of size n_2 of the training data and evaluating its performance on a disjoint subset of size n_3.

Based on the above data, answer the given subquestions

Sub questions

Question Number : 161 Question Id : 640653521417 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 is the appropriate value of n_1 ?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

10

Question Number : 162 Question Id : 640653521418 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 is the appropriate value of n_2?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

900

Question Number : 163 Question Id : 640653521419 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 is the appropriate value of n_3 ?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

100

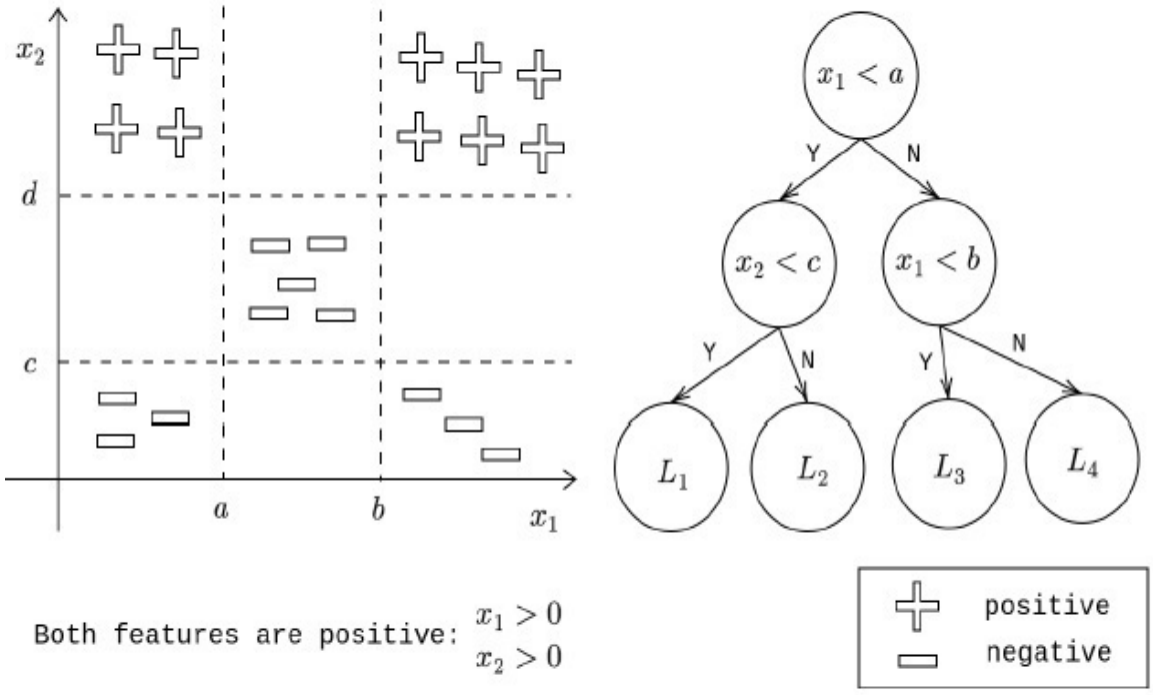
Sub-Section Number :	7
Sub-Section Id :	64065374060
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653521420 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 : (164 to 170)

Question Label : Comprehension

Consider the following training dataset for a binary classification problem on the left and some decision tree for it on the right. The labels lie in the set $\{+1, -1\}$.



Both features are positive: $x_1 > 0$, $x_2 > 0$

L_1, L_2, L_3, L_4 are leaves. The four dotted lines $x_1 = a, x_1 = b, x_2 = c, x_2 = d$ are drawn for your reference. Both features x_1 and x_2 are positive. Our focus will only be on the first quadrant. Use $\log_2$ for all entropy calculations. Calculate all intermediate quantities upto three decimal places.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 164 Question Id : 640653521421 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 label of leaf L_2? Enter 1 or -1.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 165 Question Id : 640653521422 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 label of leaf L_4? Enter 1 or -1.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 166 Question Id : 640653521423 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

Select all true statements regarding the decision boundary of the decision tree.

Options :

6406531737853. ✔ The dotted line $x_2 = d$ is **not** a part of the decision boundary. That is, not even a single point on $x_2 = d$ is a part of the decision boundary.

6406531737854. ✔ The entirety of the dotted line $x_1 = a$ is a part of the decision boundary. That is, every single point on the dotted line is a part of the decision boundary.

6406531737855. ✖ The entirety of the dotted line $x_2 = c$ is a part of the decision boundary. That is, every single point on the dotted line is a part of the decision boundary.

6406531737856. ✖ Only a finite segment of the dotted line $x_1 = b$ is a part of the decision boundary. That is, there are some points on the dotted line that are **not** a part of the decision boundary.

Question Number : 167 Question Id : 640653521424 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 is the entropy of the leaf L_3? Enter your answer correct to three decimal places.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

0

Question Number : 168 Question Id : 640653521425 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 entropy of the leaf L_4? 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 :

0.90 to 0.93

Question Number : 169 Question Id : 640653521426 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 information gain for the entire tree? Use the following formula:

$$\text{Information gain} = \text{Entropy at root} - \text{Weighted entropy of leaves}$$

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 :

0.58 to 0.62

Question Number : 170 Question Id : 640653521427 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

Is the following statement true or false:

The decision tree shown in the diagram is the "best" possible tree. That is, it achieves the greatest information gain from the root to the leaves.

Options :

6406531737860. ✖ TRUE

6406531737861. ✔ FALSE

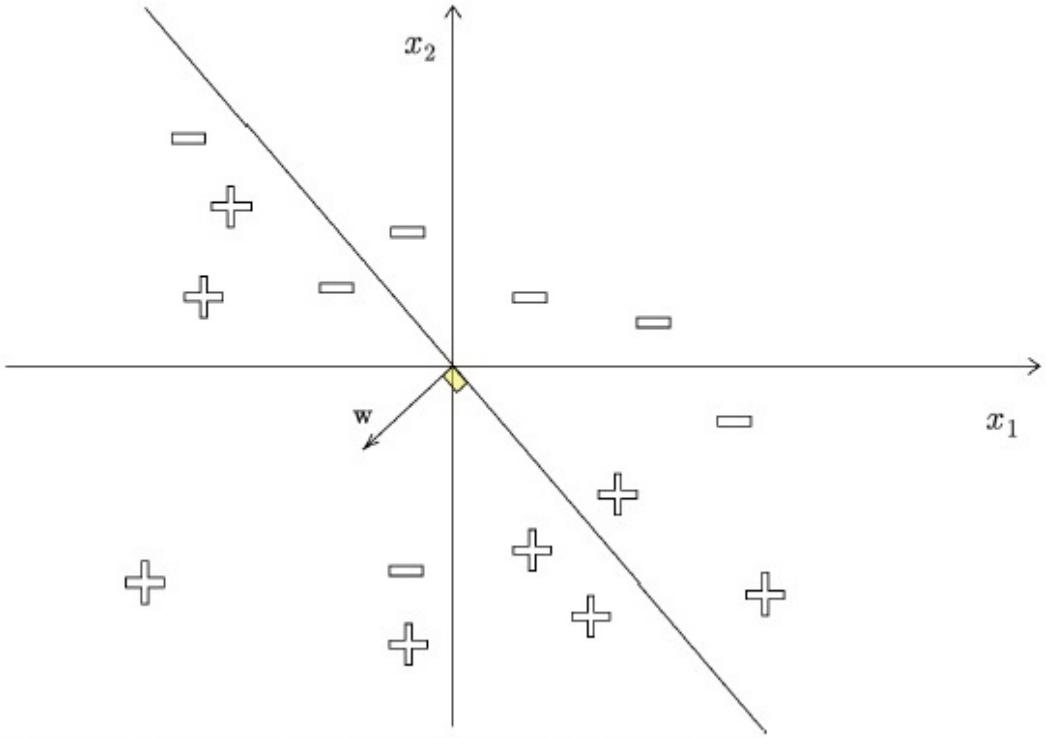
Sub-Section Number :	8
Sub-Section Id :	64065374061
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653521428 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 : (171 to 172)

Question Label : Comprehension

Consider the following training dataset for a binary classification problem that has 15 data-points. The labels are in the set $\{+1, -1\}$. The symbol $+$ is a data-point with label $+1$ and $-$ is a data-point with label -1.



$\mathbf{w}$ is the weight-vector corresponding to a linear classifier.

Based on the above data, answer the given subquestions

Sub questions

Question Number : 171 Question Id : 640653521429 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

How many points are misclassified by the classifier?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

5

Question Number : 172 Question Id : 640653521430 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

Consider another linear classifier with $\mathbf{w}' = 3\mathbf{w}$.

How many points are misclassified by this new classifier?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

5

MLP

Section Id :	64065333953
Section Number :	11
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	25
Number of Questions to be attempted :	25
Section Marks :	50
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 : 64065374062

Question Shuffling Allowed : No

Is Section Default? : null

Question Number : 173 Question Id : 640653521431 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 :

6406531737864. ✔ YES

6406531737865. ✖ NO

Sub-Section Number : 2

Sub-Section Id : 64065374063

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 174 Question Id : 640653521432 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

Ashok has to train a logistic regression model on a dataset with gradient descent approach. Which of the following solvers can he use?

Options :

6406531737866. ✖ newton-cg

6406531737867. ✖ lbfgs

6406531737868. ✖ liblinear

6406531737869. ✔ sag

6406531737870. ✔ saga

Sub-Section Number :	3
Sub-Section Id :	64065374064
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 175 Question Id : 640653521433 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 following code snippet:

```
from sklearn.utils.multiclass import type_of_target
import numpy as np
print(type_of_target(np.array([[0, 1], [1, 1]])))
print(type_of_target([1.0, 0.0, 3.0]))
print(type_of_target(['a', 'b', 'a']))
```

What will be the output of the above code snippet in the correct sequence?

Options :

6406531737871. ✔ 'multilabel-indicator'
'multiclass'
'binary'

6406531737872. ✖

'multiclass'
'multiclass'
'binary'

6406531737873. ✖ 'binary'
'multiclass'
'multilabel-indicator'

6406531737874. ✖ 'multilabel-indicator'
'continuous'
'binary'

Question Number : 176 Question Id : 640653521434 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

Brajesh wrote following code snippet:

```
clf = Perceptron(max_iter=100,
                 random_state=1729)
```

He learnt that every time he calls fit() method on 'clf', the parameters learnt from the previous training session (i.e. previous call to 'fit()') are lost. What should he change in code so that this problem is removed?

Options :

6406531737875. ✔ Set 'warm_start=True'

6406531737876. ✖ Combine training data from different training sessions

6406531737877. ✖ Set 'retain_parameters=True'

6406531737878. ✖ This problem can not be solved.

Question Number : 177 Question Id : 640653521435 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 following variants of gradient descent algorithm:

1. full batch gradient descent
2. mini batch gradient descent
3. stochastic gradient descent

Which of the following variants of gradient descent can be implemented with SGDClassifier?

Options :

6406531737879. ✖ only 3

6406531737880. ✔ 1, 2 and 3

6406531737881. ✖ 1 and 2 only

6406531737882. ✖ 2 and 3 only

Question Number : 178 Question Id : 640653521439 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 have a multi-class classification problem with n classes. Which of the following methods require exactly n classifiers to solve this problem?

Options :

6406531737895. ✔ OneVsRestClassifier

6406531737896. ✖ OneVsOneClassifier

6406531737897. ✖ OutputCodeClassifier

6406531737898. ✖ MultiOutputClassifier

Question Number : 179 Question Id : 640653521441 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

What might be the possible output of the following code:

```
from sklearn.feature_extraction.text import CountVectorizer
corpus = ["Hello Hello World great"]
vectorizer = CountVectorizer()
X = vectorizer.fit_transform(corpus)
print(X.toarray())
```

Options :

6406531737903. ✔ [1 2 1]

6406531737904. ✖ [1 2 3]

6406531737905. ✖ [0 1 1]

6406531737906. ✖ [1 1 1]

Question Number : 180 Question Id : 640653521442 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 following code snippet:

```
import numpy as np
from sklearn.pipeline import Pipeline
from sklearn.impute import SimpleImputer
from sklearn.preprocessing import MinMaxScaler
from sklearn.linear_model import LinearRegression
steps = [
    ('imputer', SimpleImputer(missing_values=np.nan, strategy='mean')),
    ('scaler', MinMaxScaler()),
    ('model', LinearRegression())
]
pipe = Pipeline(steps = steps)
```

From the above code what pipe[1].fit_transform(X) does ? where X is a feature matrix

Options :

6406531737907. ✖ Replaces missing values with mean value of feature

6406531737908. ✔ Applies MinMaxScaling on the X

6406531737909. ✖ LinearRegression model fitting

6406531737910. ✖ None of these

Question Number : 181 Question Id : 640653521443 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

What might be the possible output of the following code:

```
from sklearn.metrics import mean_absolute_error
y_true = [3, -0.5, 2, 7]
y_pred = [2.5, 0.0, 2, 8]
mean_absolute_error(y_true, y_pred)
```

Options :

6406531737911. ✖ 0.00

6406531737912. ✔ 0.50

6406531737913. ✖ 0.72

6406531737914. ✖ 1.00

Question Number : 182 Question Id : 640653521444 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

What might be the possible output of the following code:

```
from sklearn.metrics import precision_score
y_true = [1,1,0,1,0,0,1,0,1]
y_pred = [0,1,0,1,0,1,1,1,1]
precision_score(y_true,y_pred)
```

Options :

6406531737915. ✖ 0.00

6406531737916. ✖ 0.33

6406531737917. ✔ 0.66

6406531737918. ✖ 0.99

Question Number : 183 Question Id : 640653521446 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

Mention TRUE or FALSE: Feature scaling does not impact KNN model performance

Options :

6406531737923. ✖ TRUE

6406531737924. ✔ FALSE

Question Number : 184 Question Id : 640653521447 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

By using all features of a dataset accuracy score of 100% is achieved on the training set, but accuracy score of 70% on test set, which of the following statements is most relevant?

Options :

6406531737925. ✖ Model is underfitting

6406531737926. ✔ Model is overfitting

6406531737927. ✖ Nothing, the model is perfect

Question Number : 185 Question Id : 640653521450 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 code snippets correctly sets up a RandomizedSearchCV object to perform hyperparameter tuning on a RandomForestClassifier with the following parameters to be tested:

• Number of estimators: 50, 100, 150
• Maximum depth of the tree: 5, 10, 15
• Minimum number of samples to enable a split: 2, 4, 6

Options :

6406531737937. ✖
```
rfc = RandomForestClassifier(random_state=0)
param_distributions = {n_estimators: [50, 100, 150],
max_depth: [5, 10, 15],
min_samples_split: [2, 4, 6]}
randomized_search = RandomizedSearchCV(rfc,
param_distributions=param_distributions,
cv=5)
```

6406531737938. ✖
```
rfc = RandomForestClassifier(random_state=0)
param_distributions = ['n_estimators': [50, 100, 150],
'max_depth': [5, 10, 15],
'min_samples_split': [2, 4, 6]]
randomized_search = RandomizedSearchCV(rfc,
param_distributions=param_distributions,
cv=5)
```

```
rfc = RandomForestClassifier(random_state=0)
param_distributions = ['n_estimators': {50, 100, 150},
'max_depth': {5, 10, 15},
'min_samples_split': {2, 4, 6}]
randomized_search = RandomizedSearchCV(rfc,
param_distributions=param_distributions,
cv=5)
```

6406531737939. ✖

```
rfc = RandomForestClassifier(random_state=0)
param_distributions = {'n_estimators': [50, 100, 150],
'max_depth': [5, 10, 15],
'min_samples_split': [2, 4, 6]}
randomized_search = RandomizedSearchCV(rfc,
param_distributions=param_distributions, cv=5)
```

6406531737940. ✔

Question Number : 186 Question Id : 640653521451 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

Decision Trees are prone to:

Options :

6406531737941. ✖ Low bias, low variance

6406531737942. ✖ High bias, low variance

6406531737943. ✔ Low bias, high variance

6406531737944. ✖ High bias, high variance

Question Number : 187 Question Id : 640653521454 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. How many DecisionTreeClassifier models will be trained internally?

```
from sklearn.ensemble import BaggingRegressor
from sklearn.model_selection import GridSearchCV
param_grid = [{'max_depth':range(1, 20, 2)}]
gs = GridSearchCV(DecisionTreeClassifier(), param_grid, cv = 10)
gs.fit(X,y)
```

Options :

6406531737955. ✖ 1000

6406531737956. ✖ 20

6406531737957. ✖ 10000

6406531737958. ✔ 100

6406531737959. ✖ 90

Sub-Section Number : 4

Sub-Section Id : 64065374065

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 188 Question Id : 640653521436 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

The precision-recall curve

Options :

6406531737883. ✔ plots a graph with precision value on X-axis and recall value on Y-axis

6406531737884. ✔ computes precision-recall pairs for different probability thresholds

6406531737885. ✖ computes precision-recall pairs for one singular probability threshold

6406531737886. ✖ plots a graph with recall value on X-axis and precision value on Y-axis

Question Number : 189 Question Id : 640653521437 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 a classification dataset with 98% negative samples and 2% positive samples. A model is trained on this data, which of the following evaluation metrics are suitable for measuring effectiveness of this model:

Options :

6406531737887. ✖ accuracy

6406531737888. ✔ precision

6406531737889. ✔ recall

6406531737890. ✔ F-1 score

Question Number : 190 Question Id : 640653521438 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 following code snippet:

```
from sklearn.naive_bayes import MultinomialNB
estimator  = MultinomialNB()
estimator.fit(X, y)
```

where X and y are training data.

Options :

6406531737891. ✖ MultinomialNB is best suited when feature matrix X contains text data and not the word counts.

6406531737892. ✔ MultinomialNB is best suited when feature matrix X contains word counts for text data.

6406531737893. ✖ The MultinomialNB classifier is suitable for classification with continuous features.

6406531737894. ✖ None of these

Question Number : 191 Question Id : 640653521440 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 option(s) are correct regarding regularization?

Options :

6406531737899. ✔ It is a technique used to minimize the adjusted loss function and avoid overfitting.

6406531737900. ✖ It increases the bias and variance of the training model

6406531737901. ✔ Elastic net regularization is a combination of L1 and L2 regularization both.

6406531737902. ✖ It controls the number of passes a training dataset takes in an algorithm.

Question Number : 192 Question Id : 640653521445 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 statements are true? (Multiple options may be correct.)

Options :

6406531737919. ✔ KNN models with low values of K produces complex decision boundaries.

6406531737920. ✔ KNN models with high values of K produces smooth decision boundaries.

6406531737921. ✖ In KNN models K does not impact the decision boundaries.

6406531737922. ✖ None of these

Question Number : 193 Question Id : 640653521449 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

Fill in the missing parameter value in the following estimator that can be used to classify the data

```
from sklearn.svm import SVC
clf = SVC(kernel = ______)
clf.fit(X, y)
```

Options :

6406531737933. ✔ 'poly',

6406531737934. ✖ 'lasso'

6406531737935. ✔ 'rbf',

6406531737936. ✖ 'scale'

Question Number : 194 Question Id : 640653521452 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 correct?

Options :

6406531737945. ✖ Decision trees are prone to underfitting.

6406531737946. ✖ By increasing the 'max_depth' parameter in 'DecisionTreeClassifier', the tree is likely to underfit

6406531737947. ✖ By increasing the 'min_samples_leaf' parameter in 'DecisionTreeClassifier', the tree is likely to overfit.

6406531737948. ✖ By increasing the 'min_samples_split' parameter in 'DecisionTreeClassifier', the tree is likely to overfit.

6406531737949. ✖ By increasing the 'ccp_alpha' parameter in 'DecisionTreeClassifier', the tree is likely to overfit.

6406531737950. ✔ None of these

Sub-Section Number : 5

Sub-Section Id : 64065374066

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 195 Question Id : 640653521448 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 options are true for regularization parameter C in sklearn.svm.SVC ?

Options :

6406531737928. ✖ Large value of the regularization parameter C will overfit the training set and complex decision boundaries will form.

6406531737929. ✔ Large value of the regularization parameter C will underfit the training set and smooth decision boundaries will form.

6406531737930. ✔ Small value of the regularization parameter C will overfit the training set and complex decision boundaries will form.

6406531737931. ✖ Small value of the regularization parameter C will underfit the training set and smooth decision boundaries will form.

6406531737932. ✖ None of these

Question Number : 196 Question Id : 640653521455 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 block of code:

```
from sklearn.datasets import load_breast_cancer
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split
X,y = load_breast_cancer(as_frame = True,
                         return_X_y = True)
X_train,X_test,y_train,y_test = train_test_split(X,y,
                                                 test_size = 0.2,
                                                 random_state = 1)
clf = DecisionTreeClassifier(min_samples_split = 5,
                             min_samples_leaf = 3,
                             random_state = 5)
clf.fit(X_train, y_train)
print(clf.score(X_test, y_test))
```

In which of the following scenarios, the split will NOT be made at node N?

Options :

6406531737960. ✖ Number of samples at node N = 10. If it is split, it will result in 4 nodes in the left child and 6 nodes in the right child.

6406531737961. ✖ Number of samples at node N = 6. If it is split, it will result in 3 nodes in the left child and 3 nodes in the right child.

6406531737962. ✔ Number of samples at node N = 12. If it is split, it will result in 2 nodes in the left child and 10 nodes in the right child.

6406531737963. ✔ Number of samples at node N = 4. If it is split, it will result in 3 nodes in the left child and 1 node in the right child.

Sub-Section Number :	6
Sub-Section Id :	64065374067
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 197 Question Id : 640653521453 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 with respect to some feature matrix X and target vector y:

```
from sklearn.datasets import load_wine
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split

X_train,X_test,y_train,y_test = train_test_split(X,y,
                                                 test_size = 0.10,
                                                 random_state = 12)

clf = DecisionTreeClassifier(max_depth = 6,
                             min_samples_split = 2,
                             min_samples_leaf=3,
                             random_state = 81)

clf.fit(X_train, y_train)
print(clf.score(X_train, y_train))
```

Assume that the output of the above code is 0.852. If we increase the value of the parameter 'max_depth', which of the following is more likely to happen?:

Options :

6406531737951. ✔ The output score is likely to increase.

6406531737952. ✖ The output score is likely to decrease.

6406531737953. ✖ The change in 'max_depth' is not likely to have any effect on the output.

6406531737954. ✖ If we increase the value of 'max_depth' beyond 6, the code will throw an error, as the max_depth can not be more than the product of 'min_samples_split' and 'min_samples_leaf'.

BDM

Section Id :	64065333954
Section Number :	12
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	11
Number of Questions to be attempted :	11
Section Marks :	15
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 :	64065374068
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 198 Question Id : 640653521456 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 :

6406531737964. ✔ YES

6406531737965. ✖ NO

Sub-Section Number :	2
Sub-Section Id :	64065374069
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 199 Question Id : 640653521458 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 of an item for a customer is greater than the per unit price of an item, the customer will ideally/theoretically: (select the most appropriate answer)

Options :

6406531737970. ✖ stop buying the item

6406531737971. ✔ keep buying the item

6406531737972. ✖ buy more of competitor's item

6406531737973. ✖ marginal utility does not impact buying decisions

Question Number : 200 Question Id : 640653521460 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

Ravi's demand for product X increased by 5% when his income decreased by 2%. Product X is _____ for Ravi.

Options :

6406531737978. ✖ a luxury

6406531737979. ✔ an inferior good

6406531737980. ✖ a normal good

6406531737981. ✖ a substitute good

Question Number : 201 Question Id : 640653521463 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 demand curve has a negative slope because of:

Options :

6406531737991. ✔ the law of diminishing utility

6406531737992. ✖ the law of supply

6406531737993. ✖ the law of demand

6406531737994. ✖ the law of increasing opportunity cost

6406531737995. ✖ the law of decreasing opportunity cost

Question Number : 202 Question Id : 640653521466 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

For a customer with fixed income to maximize utility, he should buy each good in amounts such that:

Options :

6406531738007. ✖ marginal utility of each good is maximized

6406531738008. ✖ total utility is same for each good

6406531738009. ✖ marginal utility per rupee spent is maximized for each good

6406531738010. ✔ marginal utility per rupee spent is the same for each good

Sub-Section Number :	3
Sub-Section Id :	64065374070
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 203 Question Id : 640653521465 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

Why is the quick ratio a more rigorous test of short-term solvency than the current ratio? (Choose all that are applicable)

Options :

6406531738003. ✖ The quick ratio eliminates prepaid expenses for the numerator

6406531738004. ✔ The quick ratio considers only cash and marketable securities as current assets

6406531738005. ✖ The quick ratio eliminates prepaid expenses for the denominator

6406531738006. ✔ The quick ratio eliminates inventories from the numerator

Sub-Section Number : 4

Sub-Section Id : 64065374071

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 204 Question Id : 640653521457 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 a source of survey data? (select all that is applicable)

Options :

6406531737966. ✔ Market research data

6406531737967. ✖ Stock market data

6406531737968. ✖ Rainfall data

6406531737969. ✔ Consumer pyramid data

Question Number : 205 Question Id : 640653521459 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

Luxury goods are characterized by: (select all that apply)

Options :

6406531737974. ✔ high income elasticity of demand

6406531737975. ✖ an increase in income leads to an decrease in demand

6406531737976. ✔ an increase in income leads to an increase in demand

6406531737977. ✖ low income elasticity of demand

Question Number : 206 Question Id : 640653521461 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

When marginal utility is _____, total utility_____: (select all that apply)

Options :

6406531737982. ✖ negative, increases

6406531737983. ✔ negative, decreases

6406531737984. ✔ positive, increases

6406531737985. ✖ positive, decreases

6406531737986. ✔ zero, is maximum

6406531737987. ✖ zero, is minimum

6406531737988. ✖ maximum, is zero

6406531737989. ✖ minimum, is zero

Sub-Section Number :	5
Sub-Section Id :	64065374072
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 207 Question Id : 640653521464 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 :

6406531737996. ✔ Current assets are 2 times the liability

6406531737997. ✖ Liability is 2 times the current assets

6406531737998. ✔ Stocks is 0.5 times the liability

6406531737999. ✖ Liability is 0.5 times Stocks

6406531738000. ✔ Current assets are greater than stocks

6406531738001. ✖ Stocks are greater than current assets

6406531738002. ✖ None of these

Sub-Section Number :	6
Sub-Section Id :	64065374073
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 208 Question Id : 640653521462 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

A firm has annual sales turnover of INR 95,00,000/-. Its total current liabilities sum up to INR 3,00,00,000/-. It has INR 15,00,000/- as accounts receivable. Calculate the firm's debtor days (round the answer to 2 decimal places).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

57.00 to 58.00

Business Analytics

Section Id :	64065333955
Section Number :	13
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	8
Number of Questions to be attempted :	8
Section Marks :	20
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 :	64065374074
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 209 Question Id : 640653521467 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 :

6406531738011. ✔ YES

6406531738012. ✖ NO

Sub-Section Number : 2

Sub-Section Id : 64065374075

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 210 Question Id : 640653521468 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

Latent demand in a demand-response curve is the area obtained when?

Options :

6406531738013. ✔ Price is reduced below the identified optimal price

6406531738014. ✖ Price is increased beyond the identified optimal price

6406531738015. ✖ The optimal price is increased beyond the maximum available price

6406531738016. ✖ Quantity is reduced below the identified optimal quantity

6406531738017. ✖ Quantity is increased beyond the identified maximum quantity

Question Number : 211 Question Id : 640653521476 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

You solve the primal of a linear program with a maximization objective, three decision variables and two constraints of the less than or equal to type. Non-negativity restrictions apply to the decision variables. After solving the linear program, you find that the first constraint is not binding (LHS < RHS) and the second constraint is binding (LHS = RHS). Which of the following statements is/are correct?

Options :

6406531738031. ✖ There are three decision variables in the dual

6406531738032. ✖ The dual variable corresponding to the second constraint is zero

6406531738033. ✔ There are two decision variables in the dual formulation

6406531738034. ✔ The dual variable corresponding to the second constraint is non-zero

Question Number : 212 Question Id : 640653521481 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 Multiple Linear Regression, the “R” represents __ (choose all those that are applicable)

Options :

6406531738038. ✖ Correlation between the dependent variable and all independent variables

6406531738039. ✔ Correlation between the actual and predicted values of the dependent variable

6406531738040. ✖ Correlation between the predicted value of the dependent variable and the actual value of the independent variable

6406531738041. ✖ Correlation between the errors

6406531738042. ✖ Correlation between the actual and predicted value of any given independent variable

6406531738043. ✖ Correlation between the actual value of the dependent variable and the predicted value of the errors

6406531738044. ✖ None of these

Sub-Section Number :	3
Sub-Section Id :	64065374076
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653521469 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 : (213 to 217)

Question Label : Comprehension

The price and demand for a product are provided in Table 1. The linear regression model is fit for this data in excel, and the output is given in Table 2. Using this information, answer the given subquestions.

Price	Demand
10	9703
15	4701
20	2284
25	2137
30	1036
35	503
40	144
45	111
50	54

Table-1

Regression Model Parameter	Value
R-Squared	0.7084
Observations	9
Intercept	8125
Co-efficient (Beta-1)	-194.27
S.E of Intercept	1538.44
S.E of Co-efficient (Beta-1)	47.10

Table-2

Sub questions

Question Number : 213 Question Id : 640653521470 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 total market size?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

8125

Question Number : 214 Question Id : 640653521471 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 price-demand data based on the fitted model *(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 :

41.60 to 42.00

Question Number : 215 Question Id : 640653521472 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 elasticity of the (regression line) demand, when the price is Rs. 33 (round to two decimal places)? *(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 :

3.60 to 3.80

Question Number : 216 Question Id : 640653521473 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

At the price of Rs. 33, based on the elasticity (of the regression line)_____

Options :

6406531738021. ✔ Demand is elastic

6406531738022. ✖ Demand is inelastic

6406531738023. ✖ Demand indicates luxury item

6406531738024. ✖ Demand indicates inferior item

Question Number : 217 Question Id : 640653521474 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

As the price moves to the satiating price, then elasticity _____?

Options :

6406531738025. ✖ Decreases

6406531738026. ✔ Increases

6406531738027. ✖ Remains the same

6406531738028. ✖ Increases then decreases

6406531738029. ✖ Decreases then increases

Sub-Section Number :	4
Sub-Section Id :	64065374077
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 218 Question Id : 640653521475 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

You have estimated the demand to follow the following relationship: D(p) = 100 - p. Now, you intend to maximize the revenue R(p) = D(p)* p. You find the first derivative of R(p) with respect to p, equate it to 0 and find p^*. What is the value of p^*?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

49.9 to 50.1

Sub-Section Number :	5
Sub-Section Id :	64065374078
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653521477 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 : (219 to 221)

Question Label : Comprehension

A multiple linear regression model, as specified below is fit on a data set with 150 data points.

$$\text{MLR Model: } Y = 2.1 + 1.4 * X_1 - 4.2 * X_2 + 0.5 * X_3 + \varepsilon$$

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 219 Question Id : 640653521478 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

How many degrees of freedom are present for the “Residuals” in the ANOVA Table?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

146

Question Number : 220 Question Id : 640653521479 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

How many degrees of freedom are present for the “Regression” in the ANOVA Table?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 221 Question Id : 640653521480 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

How many total degrees of freedom are present for the fitted model in the ANOVA Table?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

149

Sub-Section Number :	6
Sub-Section Id :	64065374079
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653521482 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 229)

Question Label : Comprehension

Company “ABC” manufacturer’s product “X”. Currently, the quality inspection of “X” is done manually through visual inspection. The aim of the quality inspection process is to identify defective products. From historical experience, manual visual inspection correctly identified 75% of defective items in any given batch of only defective items.

The management has decided to replace manual visual inspection with an automatic detection system (ADS). This ADS runs a logistic model in the background for classifying an item as defective or not-defective based on photos taken by a camera. To test the ADS, a sample of 100 units of X is taken. 30% of the sample contains defective items. The samples are passed through the ADS, and the system identifies 20% of the non-defective items as defective and 10% of the defective items as non-defective.

Using this information, answer the given subquestions.

Sub questions

Question Number : 222 Question Id : 640653521483 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

How many “True Positives” is ADS predicting?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

27

Question Number : 223 Question Id : 640653521484 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

How many “False Positives” is ADS predicting?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

14

Question Number : 224 Question Id : 640653521485 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

How many “True Negatives” is ADS predicting?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

56

Question Number : 225 Question Id : 640653521486 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

How many “False Negatives” is ADS predicting?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 226 Question Id : 640653521487 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 accuracy of the ADS? (*Note: Enter the answer as a numeric percentage value rounded to two decimal places without the % symbol. 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 :

82.00 to 84.00

Question Number : 227 Question Id : 640653521488 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 precision of the ADS when predicting defective products? *(Note: Enter the answer as a numeric percentage value rounded to two decimal places without the % symbol. 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 :

65.00 to 67.00

Question Number : 228 Question Id : 640653521489 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 recall of the ADS when predicting non-defective products? *(Note: Enter the answer as a numeric percentage value rounded to two decimal places without the % symbol. 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 :

79.00 to 81.00

Question Number : 229 Question Id : 640653521490 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

Should ADS be implemented?

Options :

6406531738052. ✖ Yes, the precision of ADS in predicting defects is higher than the current manual visual inspection

6406531738053. ✖ No, the precision of ADS in predicting defects is lower than the current manual visual inspection

6406531738054. ✔ Yes, the recall of ADS in predicting defects is higher than the current manual visual inspection

6406531738055. ✖ No, the recall of ADS in predicting defects is lower than the current manual visual inspection

6406531738056. ✖ Yes, the precision of ADS in predicting non-defects is higher than the current manual visual inspection

6406531738057. ✖ No, the precision of ADS in predicting non-defects is lower than the current manual visual inspection

6406531738058. ✖ Yes, the recall of ADS in predicting non-defects is higher than the current manual visual inspection

6406531738059. ✖ No, the recall of ADS in predicting non-defects is lower than the current manual visual inspection

System Commands

Section Id :	64065333956
Section Number :	14
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	13
Number of Questions to be attempted :	13
Section Marks :	100
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 :	64065374080
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 230 Question Id : 640653521491 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 :

6406531738060. ✔ YES

6406531738061. ✖ NO

Sub-Section Number : 2

Sub-Section Id : 64065374081

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 231 Question Id : 640653521492 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

```
for i in *; do
    # -d is an unary operator returns exit status 0
    # if the operand is a directory
    if [ -d "$i" ]; then
        mv "$i" "$i.d"
    fi
done
```

Choose the correct statement with respect to the above script.

Options :

6406531738062. ✔ The files in the current directory will not be renamed

6406531738063. ✖ The directories in the subdirectories of the current directory will be renamed

6406531738064. ✖ Only the empty directories will be renamed

6406531738065. ✖ The files are moved from the current directory to another directory with its name suffixed by ".d"

Question Number : 232 Question Id : 640653521500 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 command to find all occurrences of `{{DATE}}` in the file `template` and replace with the value of shell variable `DATE` in the file. Note that there may be spaces between `{{` and `DATE` and `DATE` and `}}`.
Hint: The option `-i` in SED does the in-place replacement.

Options :

6406531738090. ✖ `sed "s/{{DATE}}/$DATE/g" template`

6406531738091. ✖ `sed -i 's/{{[ ]*DATE[ ]*}}/$DATE/g' template`

6406531738092. ✔ `sed -i "s/{{[ ]*DATE[ ]*}}/$DATE/g" template`

6406531738093. ✖ `sed -i "s/{{[ ]*DATE[ ]*}}/$DATE/" template`

Question Number : 233 Question Id : 640653521501 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

The file 'dates.txt' has a list of dates in MM/DD/YYYY format. Which of the following commands can be used to convert it to YYYY-MM-DD format?
Hint: SED uses Basic Regular Expression Engine (BRE) by default.

Options :

6406531738094. ✖ `sed 's/\([0-9]{2}\)\/\([0-9]{2}\)\/\([0-9]{4}\)/\3-\1-\2/' dates.txt`

6406531738095. ✖ `sed 's/([0-9]{2})/([0-9]{2})/([0-9]{4})/\3-\1-\2/' dates.txt`

6406531738096. ✖ `sed 's/\([0-9]\{2\}\)\/\([0-9]\{2\}\)\/\([0-9]\{4\}\)/\4-\2-\2/' dates.txt`

6406531738097. ✔ `sed 's/\([0-9]\{2\}\)\/\([0-9]\{2\}\)\/\([0-9]\{4\}\)/\3-\1-\2/' dates.txt`

Question Number : 234 Question Id : 640653521502 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

In a quoted CSV file, the fields are bound by double quotes. Given below is an example for quoted CSV file.

```
"Nasrin","Guindy, Chennai","12389"
"Ram Kumar","Daryaganj, Delhi","09890"
```

Note that `Daryaganj, Delhi` is a single field inside the quotes CSV.

Write a SED script to convert the quoted CSV to Tab Separated Value file(TSV) and remove the quotes.

Assume that the field do not contain tabs or a single comma character. The tab character can be represented by `\t`

Options :

6406531738098. ✖
```
s/"/\t/g
```

6406531738099. ✔
```
s/","/\t/g
s/"//g
```

6406531738100. ✖
```
s/"//g
s/","/\t/g
```

6406531738101. ✖
```
s/,/\t/g
s/"//g
```

Question Number : 235 Question Id : 640653521507 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

Which of the following commands will print the file while prepending the line number to the start of each line, irrespective of the data in the file?

Options :

6406531738118. ✖
```
awk 'END {print NR,$0}' employee_details.txt
```

6406531738119. ✖
```
awk 'BEGIN{FS=","}{print NR,$1}' employee_details.txt
```

6406531738120. ✔
```
awk '{print NR,$0}' employee_details.txt
```

6406531738121. ✖
```
awk '{print $1,$0}' employee_details.txt
```

Sub-Section Number :	3
Sub-Section Id :	64065374082
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 236 Question Id : 640653521493 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

```
for i in *; do

    ** MISSING COMMAND **

    # -d is an unary operator returns exit status 0
    # if the operand is a directory
    if [ -d "$i" ]; then
        mv "$i" "$i.d"
    fi
done
```

Select the missing command to make the above script to produce the same result on every execution. The file/directory names will be the same after the first and every other execution will be the same.

Hint: The option `-q` in grep will not print output only returns the exit status

Options :

6406531738066. ✖ No change required. The given script produces the same result on every execution.

6406531738067. ✖ `ls | grep -q ".d$" && continue`

6406531738068. ✖ `ls | grep -q "\.d$" && continue`

6406531738069. ✔ `echo "$i" | grep -q "\.d$" && continue`

Question Number : 237 Question Id : 640653521503 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

```
awk '
    NR == FNR {
        arr[$0]++
    }
    NR != FNR && !arr[$0] {
        print $0
    }
' file_1 file_2
```

What does the output from the above command represent?

Options :

6406531738102. ✖ Line that present in file_1 and file_2

6406531738103. ✖ Line that present in file_1 but not in file_2

6406531738104. ✔ Line that present in file_2 but not in file_1

6406531738105. ✖ Line that present in file_1 or file_2; the first occurrence will be printed

Question Number : 238 Question Id : 640653521506 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

Here are the top five lines of access log of a server.

```
103.47.219.249 - - [27/Jan/2022:00:01:11 +0530] "GET / HTTP/1.1" 301 429
"-" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_6) AppleWebKit/601.7.7
(KHTML, like Gecko) Version/9.1.2 Safari/601.7.7"
54.209.123.136 - - [27/Jan/2022:00:01:18 +0530] "GET
/AlloyOnto/AlloyOnto.owl HTTP/1.1" 301 494 "-" "Python-urllib/3.6"
54.209.123.136 - - [27/Jan/2022:00:01:18 +0530] "GET
/AlloyOnto/AlloyOnto.owl HTTP/1.1" 301 494 "-" "Python-urllib/3.6"
54.209.123.136 - - [27/Jan/2022:00:01:19 +0530] "GET
/AlloyOnto/AlloyOnto.owl HTTP/1.1" 200 1410215 "-" "Python-urllib/3.6"
54.209.123.136 - - [27/Jan/2022:00:01:19 +0530] "GET
/AlloyOnto/AlloyOnto.owl HTTP/1.1" 200 1410215 "-" "Python-urllib/3.6"
```

Given the following AWK script is executed on the access log file. What is the expected output from the AWK script?

```
#!/usr/bin/awk -f

{
  datetime = $4":"$5
  time=substr(datetime, 14, 8)

  if ( time < "06:00:00" ) {
    if ( $1 in ip ) { ip[$1]++ }
    else { ip[$1]=1 }
  }
}

END {
  mx=0
  for (i in ip) {
    if (ip[i] > mx) {
      mx = ip[i]
      mxip = i
    }
  }
  print mxip
}
```

Options :

6406531738114. ✖ The IP address of the client that made most requests of all time

6406531738115. ✖ The IP address of the client that made the least requests from 6 am to midnight.

6406531738116. ✔ The IP address of the client that made most requests from midnight to 6 am.

6406531738117. ✖ The IP address of the client that made most requests from 6 am to midnight.

Sub-Section Number : 4

Sub-Section Id : 64065374083

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 239 Question Id : 640653521494 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

```
$ xargs --help | head -2
Usage: xargs [OPTION]... COMMAND [INITIAL-ARGS]...
Run COMMAND with arguments INITIAL-ARGS and more arguments read from
input.

$ ls -l
total 20
drwxrwxr-x  3 amit amit  4096 Feb 28 13:29 .
drwxr-xr-x 27 amit amit 12288 Feb 28 13:28 ..
-rw-rw-r--  1 amit amit     0 Feb 28 13:29 a
-rw-rw-r--  1 amit amit     0 Feb 28 13:29 b
-rw-rw-r--  1 amit amit     0 Feb 28 13:29 c
drwxrwxr-x  2 amit amit  4096 Feb 28 13:29 d

$ ls | xargs echo
a b c d
```

Select the command(s) to move the files a, b and c to the directory d in the current working directory.

Options :

6406531738070. ✔ `mv a b c d`

6406531738071. ✔ `ls | xargs mv -t d`

6406531738072. ✔ `ls | sort | xargs mv`

6406531738073. ✔ `mv *`

Question Number : 240 Question Id : 640653521504 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

```
awk '
    {
        arr[$0]++
    }
    END {
        for (i in arr) {
            if (arr[i] > 2) {
                print i
            }
        }
    }
' file_1 file_2 file_3
```

The above command prints a line under which condition?

Options :

6406531738106. ✖ If a line is present once in any two files

6406531738107. ✔ If a line is present in all three files

6406531738108. ✔ If a line is present in any two files and its total occurrence is at least 3

6406531738109. ✖ If a line is present in only one file but its total the occurrence is at most 2

Question Number : 241 Question Id : 640653521505 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

The structure of AWK blocks are provided below

```
pattern { procedure  }
```

Which of the statement(s) are true regarding AWK.

Options :

6406531738110. ✔ BEGIN block will execute the script before reading the file.

6406531738111. ✔ The AWK script that only has a BEGIN block does not require file/stdin.

6406531738112. ✔ END block will execute once all the lines/records from the files/stdin are read.

6406531738113. ✔ The block without any pattern will execute for all the lines/records from files/stdin.

Sub-Section Number :	5
Sub-Section Id :	64065374084
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653521495 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 : (242 to 245)

Question Label : Comprehension

Assume the filenames will not have a colon (:) in it.

Use the console output to answer the given subquestions.

```
$ grep --help
Usage: grep [OPTION]... PATTERNS [FILE]...
Search for PATTERNS in each FILE.
Example: grep -i 'hello world' menu.h main.c
PATTERNS can contain multiple patterns separated by newlines.
    .......
  -i, --ignore-case         ignore case distinctions in patterns and data
      --no-ignore-case      do not ignore case distinctions (default)
    .......
Output control:
    .......
  -o, --only-matching       show only nonempty parts of lines that match
  -q, --quiet, --silent     suppress all normal output
    .......
  -r, --recursive           like --directories=recurse
    .......
  -c, --count               print only a count of selected lines per FILE
    .......

$ sort --help
Usage: sort [OPTION]... [FILE]...
  or:  sort [OPTION]... --files0-from=F
Write sorted concatenation of all FILE(s) to standard output.

With no FILE, or when FILE is -, read standard input.

Mandatory arguments to long options are mandatory for short options too.
Ordering options:

    .......
  -n, --numeric-sort          compare according to string numerical value
    .......
  -r, --reverse               reverse the result of comparisons
    .......
  -C, --check=quiet, --check=silent  like -c, but do not report first bad
line
      --compress-program=PROG  compress temporaries with PROG;
                               decompress them with PROG -d
      --debug               annotate the part of the line used to sort,
                               and warn about questionable usage to stderr
      --files0-from=F       read input from the files specified by
                            NUL-terminated names in file F;
```

```
                          If F is - then read names from standard input
  -k, --key=KEYDEF          sort via a key; KEYDEF gives location and
type
    .......
  -t, --field-separator=SEP  use SEP instead of non-blank to blank
transition
    .......

$ grep -ric "print"
tools/example.sh:0
tools/upgrade.sh:12
tools/uninstall.sh:12
tools/install.sh:44
tools/autossh.sh:3

$ cat data
13118,21233,24423
29515,22595,27723
20753,2195,4761
29399,23451,23061
725,11432,26480

$ cat data | sort -t , -k 3 -n
20753,2195,4761
29399,23451,23061
13118,21233,24423
725,11432,26480
29515,22595,27723
```

Sub questions

Question Number : 242 Question Id : 640653521496 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

```
$ grep -ric "print" |
    sort -nr -t : -k 2 |
    cut -d: -f1 |
    head -n 10
```

What will be the output from the above command represent?

Options :

6406531738074. ✖ Total number of *lines* have the string "print" in all files in the current and subdirectories

6406531738075. ✖ Total number of occurrences of "print" in all files in the current and subdirectories

6406531738076. ✔ Top 10 files that contains most number of lines have "print" among all files in the current and subdirectories

6406531738077. ✖ Top 10 files that contains the least number of lines have "print" among all files in the current and subdirectories

Question Number : 243 Question Id : 640653521497 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

```
$ grep -ric "print" |
    cut -d: -f2 |
    while read n; do
        count=${count:-0}
        count=$((count + n))
        echo $count
    done | tail -n 1
```

What will be the output from the above command represent?

Options :

6406531738078. ✔ Total number of *lines* have the string "print" in all files in the current and subdirectories

6406531738079. ✖ Total number of *files* have the string "print" in the current and subdirectories

6406531738080. ✖ Total number of *occurrences* of "print" in all files in the current and subdirectories

6406531738081. ✖ Total number of *occurrences* of "print" in all files in the current directory

Question Number : 244 Question Id : 640653521498 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

```
$ grep -ric "print" |
    cut -d: -f2 |
    while read n; do
        count=${count:-0}
        count=$((count + n))
        echo $count
    done | tail -n 1
```

What will be the equivalent command(s) using AWK with respect to the provided data?

Options :

6406531738082. ✔

```
grep -ric "print" |
    cut -d: -f2 |
    awk '{c+=$1} END{print c}'
```

6406531738083. ✔

```
grep -ric "print" |
    awk 'BEGIN{FS=":"} {c+=$2} END{print c}'
```

6406531738084. ✖

```
grep -ric "print" |
    awk '{c+=$1} END{print c}'
```

6406531738085. ✖

```
grep -ric "print" |
    awk 'BEGIN{FS=":"} {c=$2} END{print c}'
```

Question Number : 245 Question Id : 640653521499 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

```
$ grep -ric "print" |
    cut -d: -f2
```

What will be the equivalent command(s) using SED with respect to the provided data?

Options :

6406531738086. ✔

```
grep -ric "print" |
    sed 's/.*://'
    # Assumption: no colon in the filename
    # refer sample output
```

6406531738087. ✔

```
grep -ric "print" |
    sed 's/[^:]*://'
```

6406531738088. ✖

```
grep -ric "print" |
    sed 's/[^:]*:[^:]*//g'
```

6406531738089. ✖

```
grep -ric "print" |
    sed 's/:.*//'
```