

Notations :

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

Change Font Color :	No
Change Background Color :	No
Change Theme :	No
Help Button :	No
Show Reports :	No
Show Progress Bar :	No

Maths1

Section Id :	640653138796
Section Number :	1
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
Section Negative Marks :	0
Group All Questions :	No
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653386944
Question Shuffling Allowed :	No

Question Number : 1 Question Id : 6406532124992 Question Type : MCQ

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : MATHEMATICS FOR DATA

SCIENCE I (COMPUTER BASED EXAM)"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?

CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

Options :

6406536925251. ✓ Yes

6406536925252. ✗ No

Question Number : 2 Question Id : 6406532124993 Question Type : MCQ

Correct Marks : 0

Question Label : Multiple Choice Question

Instructions:

- There are some questions which have functions with discrete valued domains (such as day, month, year etc).
- For NAT type questions, enter only one right answer even if you get multiple answers for that particular question.
- Notations:
 - $\mathbb{R}$ = Set of real numbers
 - $\mathbb{Q}$ = Set of rational numbers
 - $\mathbb{Z}$ = Set of integers
 - $\mathbb{N}$ = Set of natural numbers
- The set of natural numbers includes 0.

Options :

6406536925253. ✓ Instructions has been mentioned above.

6406536925254. ✗ This Instructions is just for a reference & not for an evaluation.

Sub-Section Number : 2

Sub-Section Id : 640653386945

Question Shuffling Allowed : Yes

Question Number : 3 Question Id : 6406532124994 Question Type : SA Keyboard Layout : Inscript

Correct Marks : 3

Question Label : Short Answer Question

If $\log_2(\log_2 x) + \log_2(\log_4 x) = 1$,
for $x > 1$, find x .

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :

4

Question Number : 4 **Question Id :** 6406532124997 **Question Type :** SA **Keyboard Layout :** Inscript
Correct Marks : 3

Question Label : Short Answer Question

A researcher studies the relationship between the number of hours studied x and the test score y . The observed data for five students are given below:

x (hours studied)	y (observed score)
1	3
2	5
3	6
4	8

A linear prediction model is given by

$$\hat{y} = 2x + 2.$$

Find the sum of squared errors (SSE) for this model.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :

10

Question Number : 5 **Question Id :** 6406532124998 **Question Type :** SA **Keyboard Layout :** Inscript
Correct Marks : 3

Question Label : Short Answer Question

Consider the function $f(x)$ defined by

$$f(x) = \begin{cases} 2x^2 \sin\left(\frac{1}{x}\right) + b & \text{if } x \neq 0, \\ 5 & \text{if } x = 0. \end{cases}$$

If f is continuous at $x = 0$, find the value of b .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

5

Sub-Section Number : 3

Sub-Section Id : 640653386946

Question Shuffling Allowed : Yes

Question Number : 6 Question Id : 6406532124995 Question Type : SA Keyboard Layout : Inscript

Correct Marks : 5

Question Label : Short Answer Question

Let $f(x) = 28x^2 + \frac{1}{2}$, $0 \leq x \leq 6$. The estimated area obtained by dividing the interval into 3 sub-intervals of equal length and the left end points of the sub-intervals for height of the rectangles is (in square units)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1123

Sub-Section Number : 4

Sub-Section Id : 640653386947

Question Shuffling Allowed : Yes

Question Number : 7 Question Id : 6406532124996 Question Type : SA Keyboard Layout : Inscript

Correct Marks : 2

Question Label : Short Answer Question

Evaluate the limit

$$\lim_{x \rightarrow 0} \frac{\sqrt{1+2x} - \sqrt{1-x}}{x}$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1.5

Sub-Section Number :

5

Sub-Section Id :

640653386948

Question Shuffling Allowed :

Yes

Question Number : 8 Question Id : 6406532124999 Question Type : MCQ

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the two quadratic functions

$$y_1 = x^2 - 4x + 1 \quad \text{and} \quad y_2 = x^2 - 6x - 3.$$

A quadratic function $f(x) = ax^2 + bx + c$ has its vertex at the intersection point of the graphs of y_1 and y_2 , its y -intercept is 2, and its axis of symmetry is parallel to the y -axis. What is the equation of $f(x)$?

Options :

6406536925260. ✓ $y = \frac{-11}{4}(x + 2)^2 + 13$.

6406536925261. ✗ $y = \frac{-11}{4}(x - 2)^2 + 13$

6406536925262. ✗ $y = \frac{11}{4}(x + 2)^2 + 13$

6406536925263. ✗ $y = \frac{-11}{4}(x + 2)^2 - 13$

Question Number : 9 Question Id : 6406532125001 Question Type : MCQ

Correct Marks : 4

Question Label : Multiple Choice Question

Consider two polynomials $p(x) = -x^4 + 5x^3 - 7x - 2$ and $q(x) = -x^4 + 5x^3 - x^2 - 2$. Which

of the following options is true?

Options :

6406536925268. ✓ The graphs of $p(x)$ and $q(x)$ intersect at two points.

6406536925269. ✗ $p(x) \rightarrow \infty$ as $x \rightarrow \infty$.

6406536925270. ✗ $p(x)$ has 5 turning points.

6406536925271. ✗ $q(x) \rightarrow \infty$ as $x \rightarrow -\infty$.

Sub-Section Number :

6

Sub-Section Id :

640653386949

Question Shuffling Allowed :

Yes

Question Number : 10 Question Id : 6406532125000 Question Type : MSQ

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Let $A = \{1, 2, 3, 4\}$. Consider the following relation on A :

$$R_1 = \{(a, b) \in A \times A \mid a + b \text{ is even}\}$$

Which of the following statements are **true**?

Options :

6406536925264. ✗ R_1 is not transitive.

6406536925265. ✓ R_1 is symmetric.

6406536925266. ✗ R_1 is not reflexive.

6406536925267. ✓ R_1 is transitive.

Sub-Section Number :

7

Sub-Section Id :

640653386950

Question Shuffling Allowed :

Yes

Question Number : 11 Question Id : 6406532125002 Question Type : SA Keyboard Layout : Inscript

Correct Marks : 4

Question Label : Short Answer Question

Find the number of solutions of the equation

$$9^x + 3^x - 6 = 0.$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

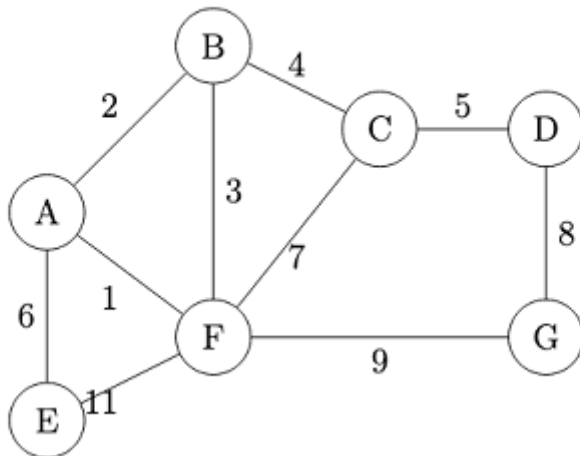
1

Question Number : 12 **Question Id :** 6406532125004 **Question Type :** SA **Keyboard Layout :** Inscript

Correct Marks : 4

Question Label : Short Answer Question

Calculate the cost of minimum spanning tree for the below graph.



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

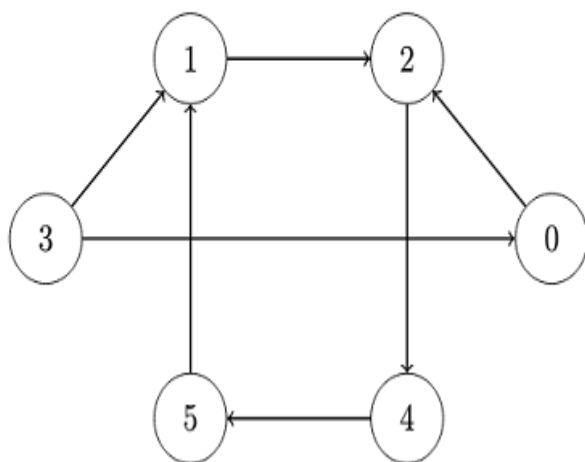
26

Question Number : 13 **Question Id :** 6406532125007 **Question Type :** SA **Keyboard Layout :** Inscript

Correct Marks : 4

Question Label : Short Answer Question

A vertex u is called a root vertex of a directed graph if there is a directed path from u to every other vertex in the graph. Below is a directed graph G with the vertex set $\{0, 1, 2, 3, 4, 5\}$. Find the root vertex of G .



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Sub-Section Number :

8

Sub-Section Id :

640653386951

Question Shuffling Allowed :

Yes

Question Number : 14 Question Id : 6406532125003 Question Type : MCQ

Correct Marks : 3

Question Label : Multiple Choice Question

Which of the following options is true?

Options :

6406536925273. ✓ The cost of the spanning tree obtained by Prim's Algorithm is the same as obtained by Kruskal's Algorithm.

6406536925274. ✗ The minimum cost-spanning tree obtained by Prim's Algorithm is always the same as obtained by Kruskal's Algorithm.

6406536925275. ✗ The minimum cost-spanning tree is not a tree.

6406536925276. ✗ If the weight of each edge in a graph is equal, then the total cost of the graph is equal to the cost of the minimum cost-spanning tree.

Sub-Section Number :

9

Sub-Section Id :

640653386952

Question Shuffling Allowed :

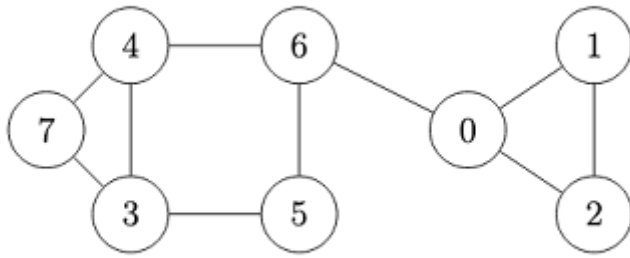
Yes

Question Number : 15 Question Id : 6406532125005 Question Type : MSQ

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the graph given below.



Which of the following options is(are) correct?

Options :

6406536925278. ✖ If we perform Breadth-First Search at node 0, then one of the possible orders in which the nodes will be visited is 01246573.

6406536925279. ✔ If we perform Depth First Search at node 7, then one of the possible order in which the nodes will be visited is 74356012.

6406536925280. ✔ If we perform Breadth-First Search at node 0, then one of the possible orders in which the nodes will be visited is 01264537.

6406536925281. ✖ If we perform Depth First Search at node 0, then one of the possible orders in which the nodes will be visited is 76435012.

Question Number : 16 Question Id : 6406532125006 Question Type : MSQ

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the adjacency matrix of an undirected graph G :

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

Which of the following options is/are true?

Options :

6406536925282. ✖ The number of edges is 8.

6406536925283. ✔ The number of vertices is 5.

6406536925284. ✔ The number of edges is 7.

6406536925285. ✖ Each vertex has degree 3.