

Question 1 : 640653902323

Total Mark : 0.00 | Type : MCQ

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : SEMESTER I: 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 :

- ☐ YES
- ☐ NO

[Discussions \(0\)](#)**Question 2 : 640653902324**

Total Mark : 0.00 | Type : MCQ

Instructions:

- There are some questions that 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 :

- ☐ Instructions has been mentioned above.
- ☐ This Instructions is just for a reference & not for an evaluation.

[Discussions \(0\)](#)

Question 3 : 640653902325[View Solutions \(0\)](#)

Total Mark : 4.00 | Type : MSQ

Which of the following is (are) correct?

OPTIONS :

- ☐ Floyd-Warshall algorithm is used for all pair shortest paths.
- ☐ The Shortest path problem is not applicable to a graph with a negative weightcycle.
- ☐ Bellman-Ford algorithm is used for single source shortest path.
- ☐ Dijkstra's algorithm is used for all pair shortest paths.

[Discussions \(0\)](#)**Question 4 : 640653902326**[View Solutions \(0\)](#)

Total Mark : 3.00 | Type : MSQ

Consider the following adjacency matrix

$$\begin{matrix} & A & B & C & D & E \\ \begin{matrix} A \\ B \\ C \\ D \\ E \end{matrix} & \begin{pmatrix} 0 & 1 & 0 & 1 & 1 \\ 1 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{pmatrix} \end{matrix}$$

which represents graph G which has 5 vertices A, B, C, D and E .

Which of the following is true about the graph G ?

OPTIONS :

- ☐ The number of vertices in G of degree 3 are 3.
- ☐ The total number of edges in G are 7.
- ☐ The total number of edges in G are 14.
- ☐ There is a cycle in G .

[Discussions \(0\)](#)**Question 5 : 640653902335**[View Solutions \(0\)](#)

Total Mark : 3.00 | Type : MSQ

Consider the following function:

$$f(x) = \begin{cases} \frac{x}{(x+1)(x+2)}, & x \geq 1, \\ \frac{1}{x-5}, & x < 1 \end{cases}$$

Which of the following options is (are) correct?

OPTIONS :

- ☐ $\lim_{x \rightarrow -2^+} f(x) = \infty$
- ☐ The function f is continuous.
- ☐ $\lim_{x \rightarrow 5^+} f(x) = \lim_{x \rightarrow 5^-} f(x) = \frac{5}{42}$
- ☐ At $x = 1$, the function f is discontinuous.

 Discussions (0)



Question 6 : 640653902336

 View Solutions (0)

Total Mark : 3.00 | Type : MSQ

Which of the following statements is/are true about the function $f(x) = x^2 + 2x - 8$?

OPTIONS :

- ☐ f is one-one on its domain.
- ☐ f has an inverse on its domain.
- ☐ The vertex of this parabola is at $(-1, -9)$.
- ☐ y - intercept of the given parabola is -8 .

 Discussions (0)



Question 7 : 640653902339

 View Solutions (0)

Total Mark : 3.00 | Type : MSQ

Consider the following relations defined on the set of integers

- $R_1 = \{(x, y) | x, y \in \mathbb{Z} \text{ and } 7 \text{ divides } (x - y)\}$
- $R_2 = \{(x, y) | x, y \in \mathbb{Z} \text{ and } x + y = 2\}$

Choose the correct option(s).

OPTIONS :

- ☐ R1 is not transitive.
- ☐ R2 is symmetric.
- ☐ R1 is symmetric.
- ☐ R2 is transitive.

[Discussions \(0\)](#)

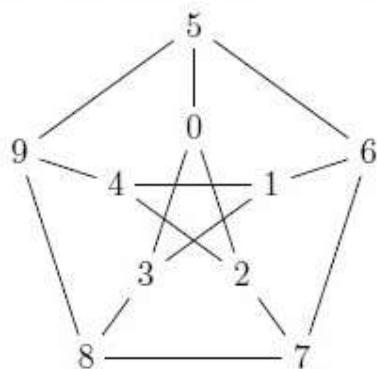


Question 8 : 640653902327

[View Solutions \(0\)](#)

Total Mark : 4.00 | Type : SA

What is the minimum number of colours required to colour the graph given below?



Answer (Numeric):

Answer

[Discussions \(0\)](#)



Question 9 : 640653902341

[View Solutions \(0\)](#)

Total Mark : 4.00 | Type : SA

You have been closely monitoring your bike's mileage recently. Here is a table showing two rows representing the amount paid for fuel(in ₹) and the corresponding mileage (in Km). Consider y as the amount paid and x as the corresponding mileage in Km. You have noted down the distance traveled each time when the fuel meter falls back to a fixed reference mark and predicted that the equation of the best fit line is $y = 5x - 21$. What will be the value of SSE w.r.t the best fit line?

Amount paid (in ₹)	80	50	60	100	48
Distance (in Km)	20	15	16	25	14

Table: 1

Answer (Numeric):

Answer

Discussions (0)



Question 10 : 640653902328

Total Mark : 0.00 | Type : COMPREHENSION

Consider a weighted graph G with 7 vertices { rows and columns are in the order $V_1, V_2, V_3, V_4, V_5, V_6, V_7$ }, which is represented by the following adjacency matrix.

Use the following information for given sub-questions

$$\begin{bmatrix} 0 & 24 & 0 & 0 & 36 & 0 & 28 \\ 24 & 0 & 0 & 32 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 4 & 12 \\ 0 & 32 & 0 & 0 & 8 & 0 & 0 \\ 36 & 0 & 0 & 8 & 0 & 0 & 0 \\ 0 & 0 & 4 & 0 & 0 & 0 & 20 \\ 28 & 0 & 12 & 0 & 0 & 20 & 0 \end{bmatrix}.$$

Discussions (0)



Question 11 :
640653902329

View Parent QN

View Solutions (0)

Total Mark : 4.00 | Type : MCQ

Suppose we perform Prim's algorithm on the graph G starting from vertex V_1 to find an MCST. Then the order in which the vertices are added is

OPTIONS :

☐ $V_1, V_3, V_6, V_7, V_2, V_4, V_5$

☐ $V_1, V_2, V_7, V_3, V_6, V_4, V_5$

☐ $V_1, V_2, V_4, V_5, V_7, V_3, V_6$

☐ $V_1, V_3, V_6, V_7, V_5, V_4, V_2$

 Discussions (0)



Question 12 :

640653902330

 View Parent QN

 View Solutions (0)

Total Mark : 2.00 | Type : SA

Find the value MCST.

Answer (Numeric):

Answer

 Discussions (0)



Question 13 : 640653902332

Total Mark : 0.00 | Type : COMPREHENSION

Based on the above data, answer the given subquestions.

Consider the following functions;

- $v(t) = 4t^2 + 2t$
- $s(t) = 20 + 4t - t^2$

Let $[.]$ be the floor function (greatest integer function), e.g., $[2.34] = 2$, $[5] = 5$.

 Discussions (0)



Question 14 :

640653902333

 View Parent QN

 View Solutions (0)

Total Mark : 3.00 | Type : SA

If A and B are the areas under the curves $v(t)$ and $s(t)$ respectively, from $t = 0$ to $t = 1$ then what is the value of $[A] + [B]$.

Answer (Numeric):

Answer

Discussions (0)

Question 15 :
640653902334

View Parent QN

View Solutions (0)

Total Mark : 2.00 | Type : SA

If α and β are the Y -coordinates of the points of intersection of the curves $v(t)$ and $s(t)$ then what is the value of $10(\alpha + \beta)$.

Answer (Numeric):

Answer

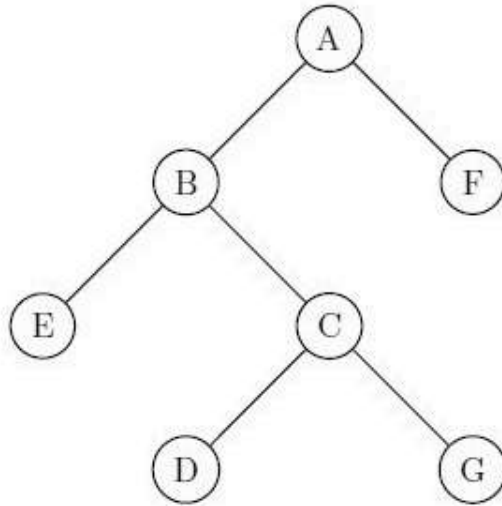
Discussions (0)

Question 16 : 640653902331

View Solutions (0)

Total Mark : 3.00 | Type : MCQ

Suppose we obtain the following BFS tree rooted at node A for an undirected graph with vertices $\{A, B, C, D, E, F, G\}$.



Which of the following cannot be an edge in the original graph?

OPTIONS :

- ☐ (A,D)
- ☐ (E,C)
- ☐ (D,G)
- ☐ (B,F)

Discussions (0)



Question 17 : 640653902337

View Solutions (0)

Total Mark : 3.00 | Type : MCQ

Choose the correct option(s).

OPTIONS :

- ☐ $\lim_{x \rightarrow 0} [x \times \sin(\frac{1}{x})] = 0$
- ☐ $\lim_{x \rightarrow 0} \frac{e^{(1/x)}}{e^{(1/x)} + 1} = 0$
- ☐ $\lim_{x \rightarrow 0} [x \times \sin(\frac{1}{x})] = 1$

☐ $\lim_{x \rightarrow 0} \frac{e^{(1/x)}}{e^{(1/x)} + 1} = 1$ ☐

 Discussions (0)



Question 18 : 640653902340

☐ View Solutions (0)

Total Mark : 3.00 | Type : SA

Points $A(4, 3)$, $B(-3, -4)$ and $C(m, n)$ are collinear. If points $D(-1, 2)$, $E(5, -4)$ and C are also collinear, the value of $\frac{4m + 9n}{2m + 3n}$ is.

Answer (Numeric):

Answer

 Discussions (0)



Question 19 : 640653902338

☐ View Solutions (0)

Total Mark : 4.00 | Type : MCQ

Consider the functions $f(x) = \sqrt{x+4}$ and $g(x) = \log(1+x^2)$. Which of the following options is/are true?

OPTIONS :

☐ $(f \circ g)(x) = \log(2x+5)$ on its domain of definition.

☐ The domain of the function $(g \circ f)(x)$ is $(-5, \infty)$.

☐ The domain of the function $(g \circ f)(x)$ is $[-6, -1]$.

☐ $(g \circ f)(x) = \log(x+5)$ on its domain of definition.

 Discussions (0)



Question 20 : 640653902342

☐ View Solutions (0)

Total Mark : 2.00 | Type : MSQ

Consider two polynomials $p(x) = -x^5 + 5x^4 - 7x - 2$ and $q(x) = -x^5 + 5x^4 - x^2 - 2$. Which of the following options is/are true?

OPTIONS :

☐ $p(x)$ and $q(x)$ intersect at two points. ☐

☐ $p(x) \rightarrow \infty$ as $x \rightarrow \infty$. ☐

☐ $p(x)$ has 5 turning points. ☐

☐ $q(x) \rightarrow -\infty$ as $x \rightarrow \infty$. ☐

 Discussions (0)



 SUBMIT EXAM