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

Correct Marks : 1

Question Label : Multiple Choice Question

Vowel sounds are produced due to the free flow of air without constriction. This statement is:

Options :

6406531560077. ✔ TRUE

6406531560078. ✖ FALSE

Question Number : 57 Question Id : 640653469396 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

Answer whether true or false.

/w/ and /y/ are monophthongs.

Options :

6406531560079. ✖ TRUE

6406531560080. ✔ FALSE

Sem1 Maths1

Section Id :	64065330305
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	12
Number of Questions to be attempted :	12
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 :	64065367497
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 58 Question Id : 640653469397 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 "FOUNDATION LEVEL : SEMESTER 1: MATHEMATICS FOR DATA SCIENCE I"

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

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

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

Options :

6406531560081. ✔ YES

6406531560082. ✖ NO

Question Number : 59 Question Id : 640653469398 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

Instructions:

- There are some questions which have functions with discrete valued domains (such as day, month, year etc). For simplicity, we treat them as continuous functions.
- For NAT type question, 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 :

6406531560083. ✔ Useful Data has been mentioned above

6406531560084. ✖ This data attachment is just for a reference & not for an evaluation.

Sub-Section Number :	2
Sub-Section Id :	64065367498
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 60 Question Id : 640653469399 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 Cartesian product $A \times A$ has 9 elements. Two of the elements of the Cartesian product are (2, 0) and (0, 8). Find the sum of all the elements in set A.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

10

Sub-Section Number : 3

Sub-Section Id : 64065367499

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 61 Question Id : 640653469400 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

In a survey among 250 students in Nilgiri house of IITM BSc degree, the following data were found:

• 100 students have a Hotstar subscription
• 110 students have Netflix subscription
• 120 students have Amazon Prime membership.
• 30 students have both Hotstar and Netflix subscriptions whereas 30 students have both Hotstar and Amazon Prime and 40 students subscribe to both Netflix and Amazon Prime.

Assuming that all students have at least one OTT subscription, determine how many students have memberships to all 3 OTT: Hotstar, Netflix and Amazon Prime?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

20

Question Number : 62 Question Id : 640653469402 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

Assume that a ball was thrown from the point $(0, 4)$ on the XY-plane as shown in the Figure 1. The ball reaches a maximum height of 6 meters and it returns to a height of 4 m after 2 seconds. Let $h(t) = at^2 + bt + c$ be the quadratic function that represents the height (in meters) of the ball after t seconds, where $a, b, c \in \mathbb{Z} \setminus \{0\}$.

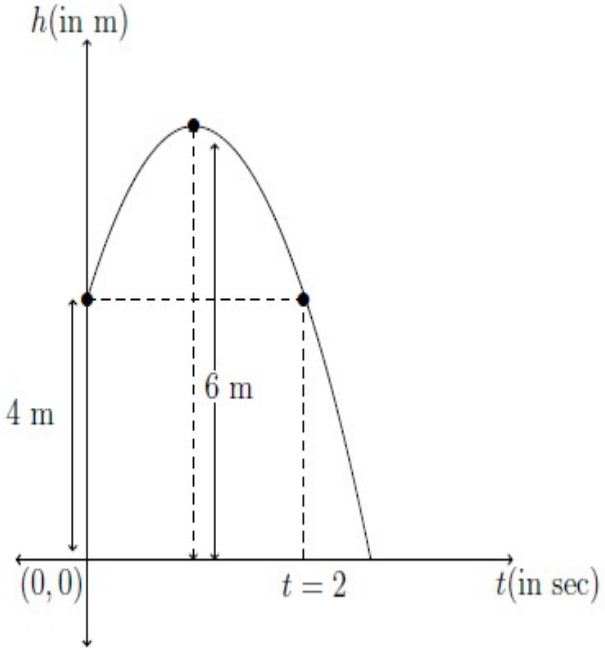

Figure 1

Find the values of $a + b + c$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

6

Question Number : 63 Question Id : 640653469405 Question Type : SA Calculator : None

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

Correct Marks : 5

Question Label : Short Answer Question

You 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 $y = 5x - 22$. 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

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

26

Sub-Section Number :	4
Sub-Section Id :	64065367500
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 64 Question Id : 640653469401 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

Suppose $A = \{a, b, c, d\}$ and $B = \{p, q, r, s\}$ are two sets. Consider the following relations from A to B.

- $R_1 = \{(a, p), (c, r), (d, q)\}$
- $R_2 = \{(a, s), (b, s), (c, p), (d, r)\}$
- $R_3 = \{(a, p), (b, r), (b, s), (d, q)\}$
- $R_4 = \{(a, r), (b, p), (c, q), (d, s)\}$

Which of the following statements are correct?

Options :

6406531560087. ✖ R_2,R_3, and R_4 are functions

6406531560088. ✔ R_2 and R_4 are functions

6406531560089. ✖ R_2 is an injective function

6406531560090. ✔ R_4 is a bijective function

Question Number : 65 Question Id : 640653469403 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 5 Selectable Option : 0

Question Label : Multiple Select Question

Which of the following functions may represent the graph given in Figure 2?

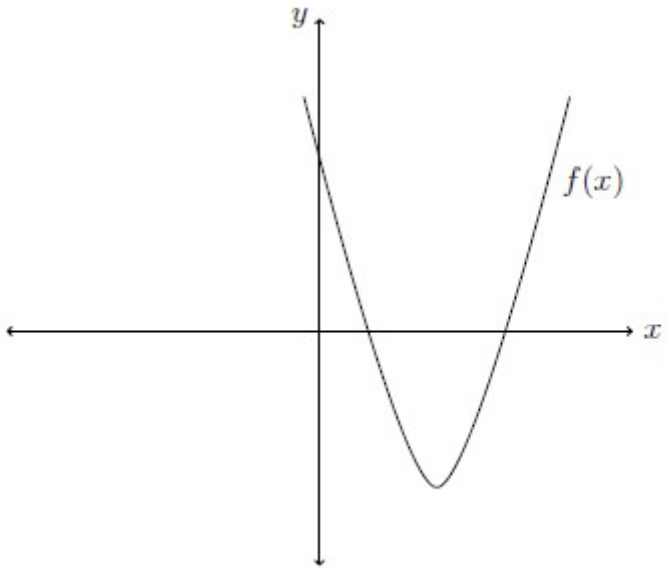

Figure: 2

Options :

6406531560092. ✔ $f(x) = x^2 - 8x + 12$

6406531560093. ✖ $f(x) = x^2 + 10x - 21$

6406531560094. ✖ $f(x) = 2x^2 + 8x + 4$

6406531560095. ✔ $f(x) = x^2 - 6x + 4$

Question Number : 66 Question Id : 640653469404 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

Ankit is located at (3, 3). He called Ajay to ask his location. Ajay describes the path he had taken from home (located at the origin) as: " I walked three units towards East and then nine units towards North. And I repeated the same pattern thrice." Now Ankit wants a direct path to reach Ajay, then choose the correct options. (Note that North represents the direction along the positive *y*-axis.)

Options :

6406531560096. ✔ Ankit should follow $4x - y - 9 = 0$.

6406531560097. ✔ Ankit will have to walk a distance of $6\sqrt{17}$ units

6406531560098. ✔ Ajay has walked a distance of 36 units from his home.

6406531560099. ✖ Ajay has walked a distance of $9\sqrt{10}$ units from his home.

Question Number : 67 Question Id : 640653469407 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

Rubika launches her new company in the year 2010, which makes a yearly profit in lakhs as the polynomial function $p(x) = 0.1x^2 (x - 1) (x - 2) (x - 3)^2 (x - 4) (x - 9)$ for the first 12 years since the launch, where x is the number of years since 2010 (i.e., $x = 0$ denotes the year 2010, $x = 1$ denotes the year 2011, and so on). Let the loss be represented as $-ve$ of profit. Which of the following options are correct?

Options :

6406531560105. ✔ Including the year in which the company was launched, it neither made a profit nor a loss six times in 12 years.

6406531560106. ✖ The company made profit in years $x \in \{7, 8, 10, 11\}$.

6406531560107. ✔ The company made loss (−*ve* profit) in years $x \in \{5, 6, 7, 8\}$.

6406531560108. ✔ In the year 2022 (i.e., $x = 12$) the company made profit.

Question Number : 68 Question Id : 640653469408 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

Figure 2 shows the graph of a polynomial $p(x)$. Choose the set of correct option(s).

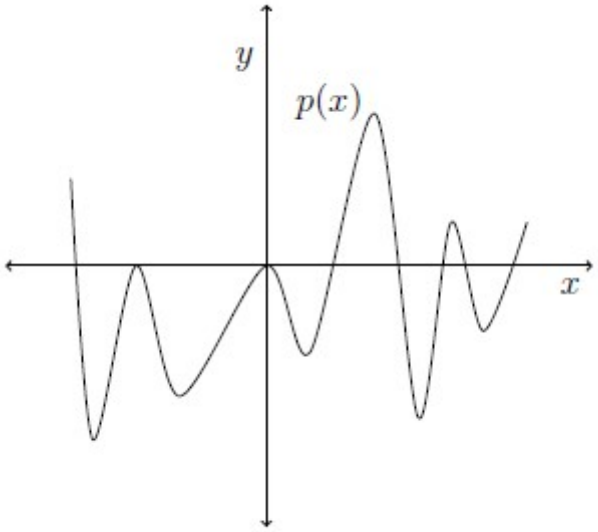

Figure 2

Options :

6406531560109. ✔ The degree of $p(x)$ is at least 10.

6406531560110. ✔ $p(x)$ represent an even degree polynomial.

6406531560111. ✖ Total number of turning point of $p(x)$ are 8.

6406531560112. ✔ Multiplicities of zero and one of the negative roots could be the same.

Sub-Section Number :	5
Sub-Section Id :	64065367501
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 69 Question Id : 640653469406 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

Figure: 3 shows the curves represented by polynomials $f(x)$, $g(x)$, and $h(x)$ of degrees 4, 4, and 2 respectively, on the XY plane. Let $f(x) - g(x) = ax(x-2)(x-5)(x-10)$, $a \neq 0$. If b is a negative constant, then choose the most possible expression for $h(x)$ and other correct statements among the given options. (Note that the figure is not according to scale .)

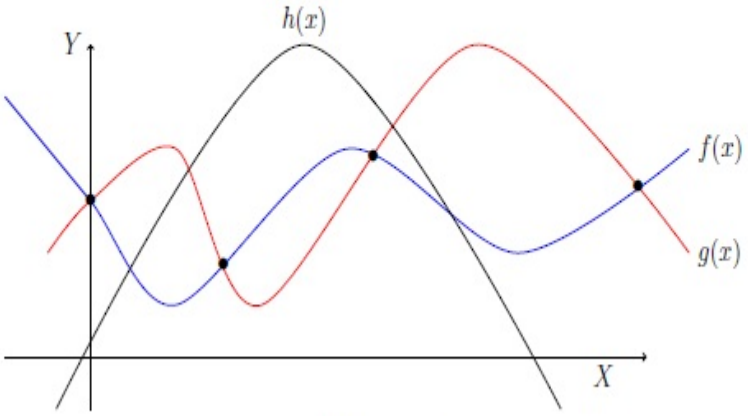

Figure: 3

Options :

6406531560101. ✖ $h(x) = b(x^2 + 8x - 7)$

6406531560102. ✖ $f(x) = g(x)$ at $x = 0, -2, -5, -10$

6406531560103. ✔ $h(x) = b(x^2 - 6x - 7)$

6406531560104. ✔ $f(x) = g(x)$ at $x = 0, 2, 5, 10$

Sem1 Statistics1

Section Id : 64065330306

Section Number : 4