

Indian Institute of Technology, Madras - BS in Data Science and Applications

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 FOUNDATION AN EXAM QDF2 15 Mar 2026
Subject Name :	2026 Mar15: IIT M AN EXAM QDF2
Creation Date :	2026-03-05 10:48:22
Duration :	120
Total Marks :	380
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 :	64065332677
Group Maximum Duration :	0
Group Minimum Duration :	90

Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	380
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
Revisit Section :	Yes
Action on Revisit Section :	View and Edit
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

Maths1

Section Id :	640653129244
Section Number :	1
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
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653360212
Question Shuffling Allowed :	No

Question Number : 1 Question Id : 6406531951223

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 :

6406536344072. ✓ Yes

6406536344073. ✗ No

Question Number : 2 Question Id : 6406531951224

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.
- Numerical answers need to be rounded off to two decimal places.
- 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 :

6406536344074. ✓ Instructions has been mentioned above.

6406536344075. ✗ This Instructions is just for a reference & not for an evaluation.

Sub-Section Number :

2

Sub-Section Id :

640653360213

Question Shuffling Allowed :

Yes

Question Number : 3 Question Id : 6406531951225

Correct Marks : 5

Question Label : Short Answer Question

In a survey among 250 students in Bandipur House of IITM BS degree, the following data were found:

- 100 students have a Spotify subscription.
- 110 students have a YouTube Premium subscription.
- 120 students have an Apple Music membership.
- 30 students have both Spotify and YouTube Premium subscriptions, whereas 30 students have both Spotify and Apple Music subscriptions, and 40 students subscribe to both YouTube Premium and Apple Music.

Assuming that all students have at least one OTT subscription, determine how many students have memberships to all three platforms: Spotify, YouTube Premium, and Apple Music.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

20

Sub-Section Number : 3

Sub-Section Id : 640653360214

Question Shuffling Allowed : Yes

Question Number : 4 Question Id : 6406531951226

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Let

$$R = \{(a, c), (b, c), (d, c), (b, a)\}$$

be a relation on the set

$$A = \{a, b, c, d\}.$$

The relation R is

Options :

6406536344077. ✖ a function

6406536344078. ✖ reflexive

6406536344079. ✔ transitive

6406536344080. ✖ symmetric

Question Number : 5 Question Id : 6406531951230

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following options is/are true?

Options :

6406536344087. ✖ If m and n are the x -intercept and y -intercept of the line $2x + 3y = 6$, respectively, then $m + n = 6$.

6406536344088. ✖ The y -intercept of a line is the perpendicular distance of the line from the origin.

6406536344089. ✔ The lines $2x + 3y = 6$ and $3x - 2y = 6$ are perpendicular to each other.

6406536344090. ✔ The distance between the two parallel lines $2x + 3y = 6$ and $4x + 6y = 12$ is 0.

Question Number : 6 Question Id : 6406531951235

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the polynomial $p(x) = a_n x^n + \cdots + a_1 x_1 + a_0$, where $a_i \in \mathbb{R}$ and $a_n \neq 0$. Suppose $x_0 \in \mathbb{R}$ is the smallest root of p . From the options below, choose the conditions that ensure that $p(x)$ is strictly decreasing in $(-\infty, x_0)$.

Options :

6406536344101. ✖ n is odd and $a_n > 0$.

6406536344102. ✔ n is odd and $a_n < 0$.

6406536344103. ✔ n is even and $a_n > 0$.

6406536344104. ✖ n is even and $a_n < 0$.

Question Number : 7 Question Id : 6406531951236

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

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 :

6406536344105. ✔ $q(x) \longrightarrow -\infty$ as $x \longrightarrow \infty$.

6406536344106. ✖ $p(x) \longrightarrow \infty$ as $x \longrightarrow \infty$.

6406536344107. ✖ $p(x)$ has at most 5 turning points.

6406536344108. ✖ $q(x)$ has at most 5 turning points.

Sub-Section Number : 4
Sub-Section Id : 640653360215
Question Shuffling Allowed : Yes

Question Number : 8 Question Id : 6406531951227

Correct Marks : 3

Question Label : Short Answer Question

If $A = \{4, 5, 6\}$, $B = \{4, 7, 8\}$ and $C = \{4, 6, 7\}$, then find the cardinality of

$$(A - B) \times (B \cap C).$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

Sub-Section Number : 5
Sub-Section Id : 640653360216
Question Shuffling Allowed : Yes

Question Number : 9 Question Id : 6406531951228

Correct Marks : 4

Question Label : Multiple Choice Question

A straight line L passes through the point $(2, 3)$ and cuts equal intercepts on the x -axis and the y -axis. Which of the following represents the equation of the line L ?

Options :

6406536344082. ✔ $y = -x + 5$

6406536344083. ✖ $x + y = 6$

6406536344084. ✖ $y = x + 1$

6406536344085. ✖ $2x + y = 7$

Sub-Section Number : 6
Sub-Section Id : 640653360217
Question Shuffling Allowed : Yes

Question Number : 10 Question Id : 6406531951229

Correct Marks : 4

Question Label : Short Answer Question

You are monitoring your mobile data usage over time. Whenever the data usage reaches a fixed alert level, you record the data used (in GB) and the corresponding amount charged (in Rs). Let x denote the data used and y denote the amount charged. Based on previous observations, the best-fit linear model relating y and x is given by

$$y = 12x - 10.$$

The observed data are given below:

Data used (GB)	2	3	4	5	6
Amount charged (Rs)	14	25	39	52	63

Compute the Sum of Squared Errors (SSE) with respect to the given best-fit line.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
7

Question Number : 11 Question Id : 6406531951231

Correct Marks : 4

Question Label : Short Answer Question

If the product of two consecutive positive integers is 182, find the smaller of the two of them.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
13

Question Number : 12 Question Id : 6406531951232

Correct Marks : 4

Question Label : Short Answer Question

Consider the quadratic function

$$f(x) = ax^2 + 2x + 3,$$

where $a \in \mathbb{R}$. If the slope of the graph $f(x)$ at $x = 2$ is equal to -2 , determine the value of a .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

-1

Sub-Section Number :

7

Sub-Section Id :

640653360218

Question Shuffling Allowed :

Yes

Question Number : 13 Question Id : 6406531951233

Correct Marks : 5 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the two quadratic functions

$$f(x) = x^2 - 4x + c, \quad g(x) = -x^2 + 3x + c,$$

where $c \in \mathbb{R}$. Which of the following statements are true?

Options :

6406536344093. ✓ The quadratic equations $f(x) = 0$ and $g(x) = 0$ both have two distinct real roots if and only if c lies between $-\frac{9}{4}$ and 4 .

6406536344094. ✗ The quadratic equations $f(x) = 0$ and $g(x) = 0$ both have two distinct real roots if and only if c lies between -4 and $\frac{9}{4}$.

6406536344095. ✗ The vertex of f corresponds to the maximum of the function f .

6406536344096. ✓ The vertex of g corresponds to the maximum of the function g .

Question Number : 14 Question Id : 6406531951234

Correct Marks : 5 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the polynomial function $p(x) = -(x^2 - 16)(x - 3)^2(2 - x)^2(x + 9)$. Choose the set of correct options.

Options :

6406536344097. ✓ $p(x)$ is strictly decreasing when $x \in (4, \infty)$.

6406536344098. ✓ Total number of turning points of $p(x)$ are 6.

6406536344099. ✗ $p(x)$ is strictly increasing when $x \in (-\infty, 9)$.

6406536344100. ✗ There are exactly 7 points on $p(x)$ where the slope of the tangent is 0.