CUET UG - 2022
(CANDIDATE RESPONSE SHEET)

Paper/Subject	MATHEMATICS/APPLIED MATHEMATICS
Exam Date	18 Aug 2022
Exam Slot	1

Question ID:481301
Section Name:COMPULSORY
Question:
If

$$\int \frac{5x+3}{\sqrt{x^2+4x+10}}\,dx = a\sqrt{x^2+4x+10} + b\log\left|x+2+\sqrt{x^2+4x+10}\right| + C,$$

then value of $a-b$ is :

A 12

B 2

C 8

D 7

Answer Given By Candidate:**Not Attempted**

Question ID:481302
Section Name:COMPULSORY
Question:
Given that A and B are events such that $A \subset B$

A. $P(A \cup B) = P(A) + P(B)$
B. $P(A \cap B) = P(A)\,P(B)$
C. $P(B/A) = 1$
D. $P(A \cap B) = P(A)$

Choose the correct answer from the options given below :

A A only

B B only

C C and D only

D D only

Answer Given By Candidate:**C**

Question ID:481303
Section Name:COMPULSORY

Question:
The probability distribution of number of doublets in two throws of a pair of dice is:

A

x	0	1	2
$P(X = x)$	$\frac{1}{36}$	$\frac{10}{36}$	$\frac{25}{36}$

B

x	0	1	2
$P(X = x)$	$\frac{1}{36}$	$\frac{12}{36}$	$\frac{23}{36}$

C

x	0	1	2
$P(X = x)$	$\frac{23}{36}$	$\frac{12}{36}$	$\frac{1}{36}$

D

x	0	1	2
$P(X = x)$	$\frac{25}{36}$	$\frac{10}{36}$	$\frac{1}{36}$

Answer Given By Candidate:**Not Attempted**

Question ID:481304
Section Name:COMPULSORY
Question:
Slope of tangent to the curve $y = x^3 - 3x^2 - 9x + 7$ at $(-1, 12)$ is :

A -1

B 3

C 0

D -3

Answer Given By Candidate:**C**

Question ID:481305
Section Name:COMPULSORY
Question:
Order and degree of the differential equation :

$\left(\frac{d^2y}{dx^2}\right)^{\frac{-3}{2}} = 2\left(\frac{dy}{dx}\right)^{\frac{-1}{3}}$ are:

A

$2, \frac{-3}{2}$

B 2, 2

C 2, 9

D 9, 2

Answer Given By Candidate:**C**

Question ID:481306
Section Name:COMPULSORY
Question:
The differential equation representing family of curves $xy^2 = \log y + C$, where C is arbitrary constant, is :

A $\frac{1-y^3}{2xy^2}$

B $\frac{y^3}{1-2xy^2}$

C $\frac{1-y}{2xy^2}$

D $\frac{1-y^2}{2xy}$

Answer Given By Candidate:**Not Attempted**

Question ID:481307
Section Name:COMPULSORY
Question:
The area (in sq. units), above x-axis under the line $y = x + 1$ and between $x = 2$ and $x = 3$ is :

A $\frac{7}{2}$

B $\frac{9}{2}$

C $\frac{11}{2}$

D $\frac{13}{2}$

Answer Given By Candidate:**Not Attempted**

Question ID:481308
Section Name:COMPULSORY
Question:

If $\int \frac{x^2}{(x+2)^2} e^x \, dx = e^x f(x) + C$, then $f(x)$ is equal to :

A $\frac{x^2}{(x+2)^2}$

B $\frac{1}{(x+2)}$

C $\frac{x-2}{x+2}$

D $\frac{x}{(x+2)}$

Answer Given By Candidate:**Not Attempted**

Question ID:481309
Section Name:COMPULSORY
Question:

If $\int \frac{x^2+7}{(x^2+9)(x^2+5)} \, dx = \frac{\sqrt{5}}{a} \tan^{-1}\left(\frac{x}{\sqrt{5}}\right) + \frac{1}{b} \tan^{-1}\left(\frac{x}{3}\right) + C$, then the value of $a + b$ is :

A 4

B 8

C 12

D 16

Answer Given By Candidate:**A**

Question ID:4813010
Section Name:COMPULSORY
Question:

The point(s) on the curve $x^2 + y^2 - 2x - 8 = 0$ at which the tangent(s) is (are) parallel to x–axis is (are) :

A $(2, \pm 1)$

B $(3, -3)$

C $(1, \pm 3)$

D $(0, 2\sqrt{2})$

Answer Given By Candidate:**D**

Question ID:4813011
Section Name:COMPULSORY
Question:

For the curve $\sqrt{x}+\sqrt{y}=1, \frac{dy}{dx}$ at $\left(\frac{1}{4}, \frac{1}{4}\right)$ is:

A $\frac{1}{2}$

B 1

C -1

D 2

Answer Given By Candidate:**A**

Question ID:4813012
Section Name:COMPULSORY
Question:

$\int_0^1 \frac{dx}{\sqrt{x^2+8x+17}} =$

A $\log\left(\frac{5+\sqrt{26}}{4+\sqrt{17}}\right)$

B $\log\left(\frac{4+\sqrt{17}}{5+\sqrt{26}}\right)$

C $\log\left(\frac{1+\sqrt{17}}{5+\sqrt{26}}\right)$

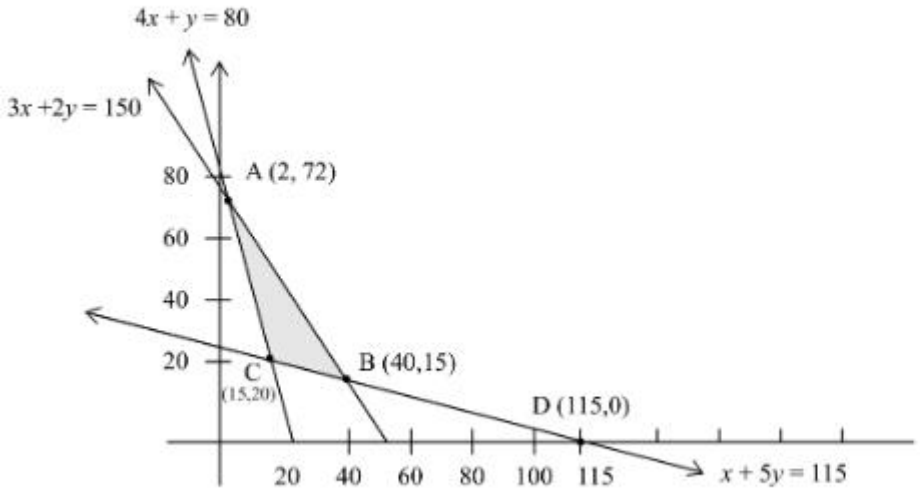
D $\log\left(\frac{1+\sqrt{26}}{\sqrt{17}}\right)$

Answer Given By Candidate:**D**

Question ID:4813013
Section Name:COMPULSORY

Question:

The feasible region (shaded area) of LPP with objective function minimum (z) = $2x + 10y$ is as shown in the figure below.



The optimal solution is at :

A Point B only

B Point C only

C Both B and C

D All points on the line segment BC

Answer Given By Candidate:**D**

Question ID:4813014
Section Name:COMPULSORY
Question:

Let A be a square matrix of size 4 and $|A| = 4$. If $|2\ \text{Adj.}(3A)| = 2^a\ 3^b$, then $a + b$ is equal to :

A 10

B 22

C 42

D 64

Answer Given By Candidate:**Not Attempted**

Question ID:4813015
Section Name:COMPULSORY
Question:

If A is a non-singular matrix of order 3, and $A^2 = 3A$, then the value of $|A|$ is :

A -3

B 3

C 9

D 27

Answer Given By Candidate:**C**

Question ID:4813051
Section Name:MATHEMATICS CORE
Question:
If $\tan^{-1}x + \tan^{-1}y = \frac{4\pi}{5}$, then $\cot^{-1}x + \cot^{-1}y$ equals to:

A π

B $\frac{2\pi}{5}$

C $\frac{\pi}{5}$

D $\frac{3\pi}{5}$

Answer Given By Candidate:**C**

Question ID:4813052
Section Name:MATHEMATICS CORE
Question:
The principal value of $cos^{-1}\left(cos\frac{7\pi}{6}\right)$ is equal to:

A $\frac{\pi}{3}$

B $\frac{\pi}{6}$

C $\frac{5\pi}{6}$

D $\frac{7\pi}{6}$

Answer Given By Candidate:**B**

Question ID:4813053
Section Name:MATHEMATICS CORE
Question:
The range of the function $x^2 + x + 1, x \in \mathbb{R}$ is :

A $\left[\frac{3}{4}, \infty\right)$

B $[1, \infty)$

C $\left(\frac{1}{\sqrt{2}}, \infty\right)$

D $(\sqrt{2}, \infty)$

Answer Given By Candidate:**Not Attempted**

Question ID:4813054
Section Name:MATHEMATICS CORE
Question:
Let $f: \{1, 2, 3, 4\} \to \{1, 2, 3, 4\}$ and $g: \{1, 2, 3, 4\} \to \{1, 2, 3\}$ defined as $f(1) = 1, f(2) = 2, f(3) = f(4) = 3$, $g(1) = 1$, $g(2) = 2$ and $g(3) = g(4) = 3$.

A f is onto

B g is one-one

C fog is not one-one

D f is one-one

Answer Given By Candidate:**Not Attempted**

Question ID:4813055
Section Name:MATHEMATICS CORE
Question:
In function $f: A \to B$, $n(A) = 3$ and $n(B) = 5$, then number of injective functions from set A to set B is :

A 6

B 60

C 120

D 125

Answer Given By Candidate:**B**

Question ID:4813056
Section Name:MATHEMATICS CORE
Question:
If A_1 and A_2 are two partitions of the area of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, such that $A_1 - A_2 = \frac{\pi ab}{4}$, then value of A_2 is :

A 0.625 πab

B 0.75 πab

C 0.35 πab

D 0.375 πab

Answer Given By Candidate:**Not Attempted**

Question ID:4813057
Section Name:MATHEMATICS CORE
Question:

If $A=\begin{bmatrix}1 & a\\ 0 & 1\end{bmatrix}$ and n is positive integer then A^n ,($n \in N$), is equal to :

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

B $\begin{bmatrix}1 & na\\ 1 & 0\end{bmatrix}$

C $\begin{bmatrix}n & na\\ 0 & n\end{bmatrix}$

D $\begin{bmatrix}1 & n^2a\\ 0 & 1\end{bmatrix}$

Answer Given By Candidate:**A**

Question ID:4813058
Section Name:MATHEMATICS CORE
Question:

If A and B are symmetric matrices of same order, then AB – BA is :

A Null Matrix

B Unit Matrix

C Symmetric Matrix

D Skew-Symmetric Matrix

Answer Given By Candidate:**D**

Question ID:4813059
Section Name:MATHEMATICS CORE
Question:

Given $A=\begin{bmatrix}x & z & -5\\ y & 0 & 9\\ 5 & -9 & 0\end{bmatrix}$ is a skew symmetric matrix, then the value of $x+y+z$ is :

A 0

B -1

C x

D 1

Answer Given By Candidate:**A**

Question ID:4813060
Section Name:MATHEMATICS CORE
Question:

If $f(x) = e^x \sin x,\ x \in \left[-\frac{\pi}{2}, 0\right]$, then the value of 'c' in Rolle's theorem is :

A $-\frac{\pi}{6}$

B $-\frac{\pi}{4}$

C $-\frac{\pi}{8}$

D $-\frac{\pi}{3}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813061
Section Name:MATHEMATICS CORE
Question:

The area of the triangle (in sq. units) with vertices (2, 7), (1, 1) and (10, 8) is :

A $\frac{75}{2}$

B 75

C 47

D $\frac{47}{2}$

Answer Given By Candidate:**D**

Question ID:4813062
Section Name:MATHEMATICS CORE
Question:

The value of k for which the function $f(x) = \begin{cases} kx^2, & x \le 2 \\ 3, & x > 2 \end{cases}$

is always continuous, is:

A $\frac{4}{3}$

B $\frac{3}{4}$

C 3

D 2

Answer Given By Candidate:**C**

Question ID:4813063
Section Name:MATHEMATICS CORE
Question:

The range of the function $f(x) = \frac{x}{a} + \frac{b}{x}, x > 0$ where a and b are positive real number, is :

A $\left[2\sqrt{\frac{b}{a}}, \infty\right)$

B $\left[\sqrt{\frac{b}{a}}, \infty\right)$

C $\left(-\sqrt{\frac{b}{a}}, \infty\right)$

D $\left(3\sqrt{\frac{b}{a}}, \infty\right)$

Answer Given By Candidate:**Not Attempted**

Question ID:4813064
Section Name:MATHEMATICS CORE
Question:

$\int \frac{\sqrt{\cot x}}{\sin x \cos x}\, dx =$

A $\frac{2}{\sqrt{tanx}} + C$

B $\frac{2}{3}(cotx)^{\frac{3}{2}} + C$

C $2\sqrt{tanx} + C$

D $-2\sqrt{cotx} + C$

Answer Given By Candidate:**B**

Question ID:4813065
Section Name:MATHEMATICS CORE
Question:

The solution of the differential equation $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$ is:

A

$y + x = k(1 - xy)$

B $y + \frac{y^3}{3} = x + \frac{x^3}{3} + C$

C $y = x$

D $x - y = k(1 + xy)$

Answer Given By Candidate:**Not Attempted**

Question ID:4813066
Section Name:MATHEMATICS CORE
Question:
Let $\vec{a} = 2\hat{i} + \hat{k}$, $\vec{b} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{c} = 4\hat{i} - 3\hat{j} + 7\hat{k}$ be three vectors. The vector $(\vec{r})$ satisfying $\vec{r} \times \vec{b} = \vec{c} \times \vec{b}$ and $\vec{r}.\vec{a} = 0$ is :

A $\hat{i} - 4\hat{j} - 2\hat{k}$

B $2\hat{i} + \hat{j} - 4\hat{k}$

C $\hat{i} + 8\hat{j} + 2\hat{k}$

D $-\hat{i} - 8\hat{j} + 2\hat{k}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813067
Section Name:MATHEMATICS CORE
Question:
If a fair coin is tossed 10 times, then the probability of getting exactly six heads is:

A $\frac{105}{512}$

B $\frac{150}{512}$

C $\frac{105}{152}$

D $\frac{105}{215}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813068
Section Name:MATHEMATICS CORE

Question:
If a random variable X has the following probability distribution :

x	0	1	2	3	4	5	6	7
$P(X = x)$	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2 + k$

Then $P(X > 6)$ is :

A 0.017

B 0.17

C 0.1

D 0.71

Answer Given By Candidate:**Not Attempted**

Question ID:4813069
Section Name:MATHEMATICS CORE
Question:
If $P(A) = \frac{6}{11}, P(B) = \frac{5}{11}$ and $P(A \cup B) = \frac{7}{11}$, then the value of P(A/B) is :

A $\frac{5}{6}$

B $\frac{4}{7}$

C $\frac{4}{5}$

D $\frac{5}{7}$

Answer Given By Candidate:**C**

Question ID:4813070
Section Name:MATHEMATICS CORE

Question:
Which of the following statements is/are correct:

A. For any two events E, F, $P(E/F) = \frac{P(E \cap F)}{P(E)}$ provided $P(E) \neq 0$
B. The two events E and F are independent if $P(E \cap F) = P(E).P(F)$
C. Two events E and F are mutually exclusive if $P(E \cap F) \neq 0$
D. If E_1, E_2 are mutually exclusive and exhaustive events associated with a random experiment and let A be any event that occurs with them, then by Baye's Theorem $P(E_1/A) = \frac{P(A/E_1)P(E_1)}{P(A/E_1)P(E_1) + P(A/E_2)P(E_2)}$

Choose the correct answer from the options given below :

A B, C, D only

B A, B only

C B, D only

D A, B, C only

Answer Given By Candidate:**A**

Question ID:4813071
Section Name:MATHEMATICS CORE
Question:
A, B are independent events such that $P(A) = \frac{1}{3}$, $P(A \cap B) = \frac{1}{12}$, then $P(A' \cap B')$ is equal to :

A $\frac{1}{12}$

B $\frac{1}{2}$

C $\frac{1}{6}$

D $\frac{1}{4}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813072
Section Name:MATHEMATICS CORE
Question:
If $\vec{a} = -\hat{i} - \hat{j} + \hat{k}, \vec{b} = 2\hat{i} + \hat{j} - \hat{k}, \vec{c} = \hat{i} + 3\hat{j} + 4\hat{k}$, and $\vec{a} \times (\vec{c} \times \vec{b}) = \alpha\vec{b} + \beta\vec{c}$, then $\alpha + \beta$ is equal to :

A -1

B -2

C -3

D -4

Answer Given By Candidate:**A**

Question ID:4813073
Section Name:MATHEMATICS CORE
Question:
Corner points of the feasible region for an LPP are $(0, 2)$, $(3, 0)$, $(5, 0)$, $(5, 7)$ and $(0, 6)$. Let $z = 4x + 6y$ be the objective function, then minimum value of z occurs at :

A $(0, 2)$ only

B $(3, 0)$ only

C any point of the line segment joining the points $(0, 2)$ and $(3, 0)$

D the mid-point of the line segment joining the points $(0, 2)$ and $(3, 0)$ only

Answer Given By Candidate:**C**

Question ID:4813074
Section Name:MATHEMATICS CORE
Question:
The number of optimal feasible solutions of the LPP given by
Maximize $(z) = x + 2y$
subject to $x + 3y \leq 90$
$x + y \geq 40$
$x \leq y$
$x \geq 0, y \geq 0$ is :

A One

B Two

C Infinite

D Zero

Answer Given By Candidate:**B**

Question ID:4813075
Section Name:MATHEMATICS CORE
Question:
The direction ratio's of the line of intersection of two planes $x + y + z + 1 = 0$ and $3x + 2y + 4z - 9 = 0$, are :

A $\langle 1, 1, 1 \rangle$

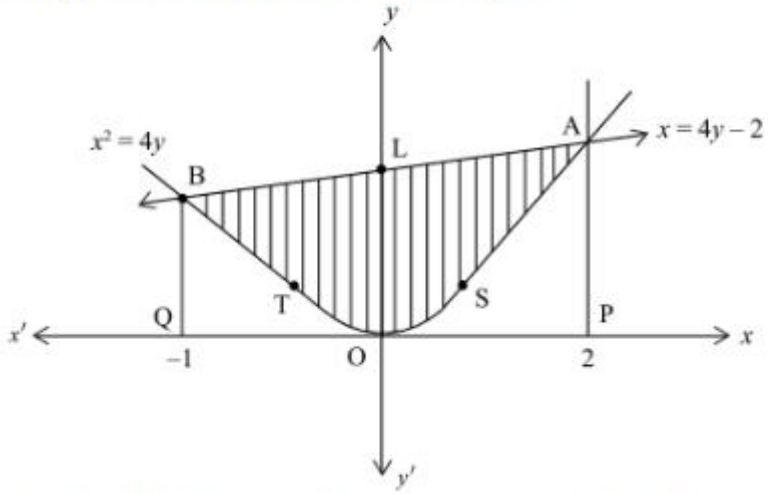
B $\langle 3, 2, 4 \rangle$

C <2, -1, -1>

D <4, 3, 5>

Answer Given By Candidate:**B**

Passage:
Anaihta designs an open air honeybee nest on the branch of a tree, whose cross-section by a vertical plane is parabolic and the branch of the tree is given by a straight line AB as shown in the figure.



Based on the above information, answer the following.

Question ID:4813076
Section Name:MATHEMATICS CORE
Question:
The points of intersection of the parabola and the line are

A $(2,1),\left(-1,\frac{1}{4}\right)$

B $(2,-1),\left(1,\frac{1}{4}\right)$

C $\left(\frac{1}{2},1\right),\left(\frac{1}{4},-1\right)$

D $(1,2),\left(\frac{1}{4},-1\right)$

Answer Given By Candidate:**A**

Question ID:4813077
Section Name:MATHEMATICS CORE

Question:
The area of the trapezium ABQP is :

A $\frac{15}{16}$ sq. units

B $\frac{15}{8}$ sq. units

C $\frac{8}{15}$ sq. units

D $\frac{8}{9}$ sq. units

Answer Given By Candidate:**Not Attempted**

Question ID:4813078
Section Name:MATHEMATICS CORE
Question:
The area of the shaded region in the given figure is :

A $\frac{33}{16}$ sq. units

B $\frac{8}{9}$ sq. units

C $\frac{9}{8}$ sq. units

D $\frac{16}{33}$ sq. units

Answer Given By Candidate:**C**

Question ID:4813079
Section Name:MATHEMATICS CORE
Question:
The slope of the tangent curve $x^2 = 4y$ at A is :

A 1

B -1

C $\frac{1}{2}$

D $-\frac{1}{2}$

Answer Given By Candidate:**A**

Question ID:4813080
Section Name:MATHEMATICS CORE

Question:
The area of the region OPASO is :

A $\frac{9}{8}$ sq. units

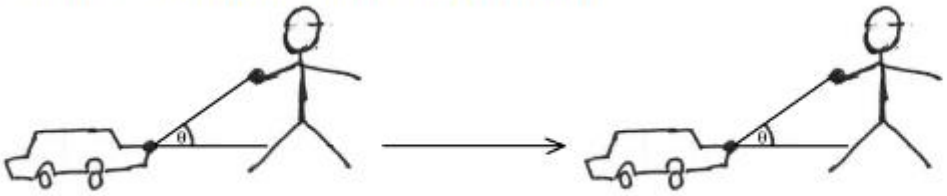
B $\frac{1}{4}$ sq. units

C $\frac{2}{3}$ sq. units

D $\frac{7}{8}$ sq. units

Answer Given By Candidate:**Not Attempted**

Passage:
A baby boy is playing with his toy car. The car is attached with a rope or a string. The boy is pulling the rope and playing with it. If the car is moving in a horizontal line which is represented by $\frac{x-1}{1}=\frac{y+4}{-2}=\frac{z}{0}$ and the rope is represented by line $\vec{r}=12\hat{i}+3\hat{j}-4\hat{k}+\lambda(-5\hat{i}+12\hat{k})$, then answer the following questions which is based on the above information.



Based on the above information, answer the following.

Question ID:4813081
Section Name:MATHEMATICS CORE
Question:
The vector form of the line in which the car is moving is :

A $\vec{r}=(12\hat{i}-4\hat{j})+\mu(6\hat{i}-6\hat{j})$

B $\vec{r}=(-2\hat{i}+4\hat{j})+\mu(6\hat{i}+6\hat{j})$

C $\vec{r}=(\hat{i}-4\hat{j})+\mu(\hat{i}-2\hat{j})$

D $\vec{r}=(\hat{i}-4\hat{j}+6\hat{k})+\mu(-3\hat{i}+6\hat{j})$

Answer Given By Candidate:**C**

Question ID:4813082
Section Name:MATHEMATICS CORE

Question:
The direction ratio's of the line in which car is moving is given by:

A <1, –1, 0>

B <–1, 2, 1>

C <1, –2, 0>

D <1, 1, 0>

Answer Given By Candidate:**C**

Question ID:4813083
Section Name:MATHEMATICS CORE
Question:
The direction cosines of the line (rope) is given by :

A $< \frac{12}{13}, \frac{3}{13}, \frac{-4}{13} >$

B $< \frac{-12}{13}, \frac{-3}{13}, \frac{4}{13} >$

C $< \frac{5}{13}, 0, \frac{12}{13} >$

D $< \frac{-5}{13}, 0, \frac{12}{13} >$

Answer Given By Candidate:**D**

Question ID:4813084
Section Name:MATHEMATICS CORE
Question:
The acute angle between the line (rope) and the line in which the car is moving is given by:

A $cos^{-1}\left(\frac{3}{39}\right)$

B $cos^{-1}\left(\frac{5\sqrt{5}}{39}\right)$

C $cos^{-1}\left(\frac{15}{39}\right)$

D $cos^{-1}\left(\frac{\sqrt{5}}{13}\right)$

Answer Given By Candidate:**Not Attempted**

Question ID:4813085
Section Name:MATHEMATICS CORE
Question:
If the boy is pulling a car at a speed of 1.6 m/s then distance moved by the car in 10 seconds is :

A 1.6 m

B 16 m

C 160 m

D 0.16 m

Answer Given By Candidate:**B**