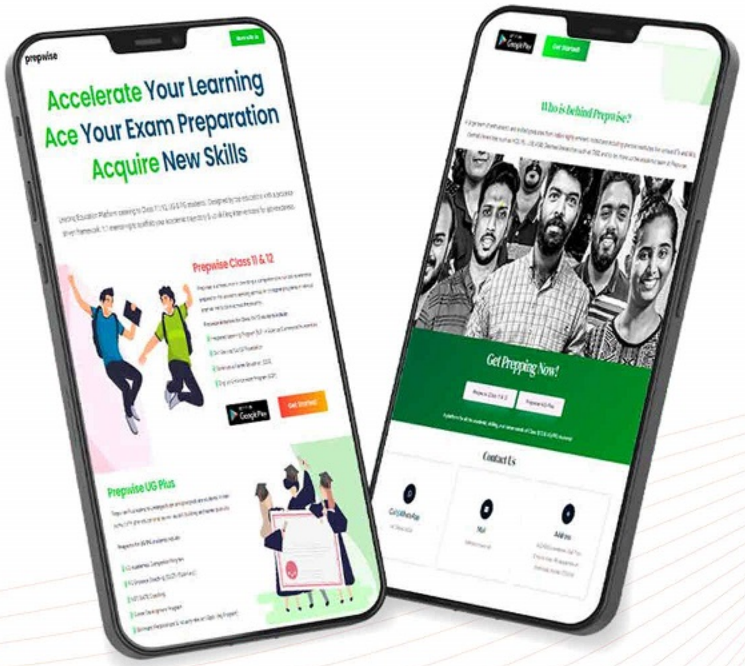
राष्ट्रीय परीक्षा एजेंसी
National Testing Agency
Excellence in Assessment

prepwise



CUET UG

Previous Year Question Paper

2022

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Previous Year Question Paper

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Section II
Mathematics

Section Name:COMPULSORY
Question:

If $\begin{bmatrix} 1 & 2 \\ 4 & 7 \end{bmatrix}^{-1} = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, then value of $a+b+c+d$ is :

(1) -2
(2) 1
(3) 7
(4) 12

Question:

Match **List - I** with **List - II**.

List - I	List - II
(A) $\begin{bmatrix} -2 & 0 \\ 0 & -2 \end{bmatrix}$	(I) Symmetric Matrix
(B) $\begin{bmatrix} -4.2 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 2 \end{bmatrix}$	(II) Skew Symmetric Matrix
(C) $\begin{bmatrix} \sqrt{3} & 2 & 1 \\ 2 & 0 & -1 \\ 1 & -1 & 2 \end{bmatrix}$	(III) Diagonal Matrix
(D) $\begin{bmatrix} 0 & a & b \\ -a & 0 & c \\ -b & -c & 0 \end{bmatrix}$	(IV) Scalar Matrix

Choose the **correct** answer from the options given below :

(1) (A) - (IV), (B) - (III), (C) - (I), (D) - (II)

(2) (A) - (III), (B) - (IV), (C) - (II), (D) - (I)

(3) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

(4) (A) - (II), (B) - (I), (C) - (IV), (D) - (III)

Section Name:COMPULSORY
Question:

If the objective function for an LPP is $z = 3x + 4y$ and the corner points of the bounded feasible region are (5, 0), (6, 8), (4, 10) and (0, 8) then the maximum value of z occurs at :

(1) (0, 8)
(2) (5, 0)
(3) (4, 10)
(4) (6, 8)

Section Name:COMPULSORY
Question:

If A and B are two independent events such that $P(A) = 0.6,\ P(B) = 0.7$
then value of $P(A \cup B)$ is :

(1) 1.3
(2) 1
(3) 0.42
(4) 0.88

Section Name:COMPULSORY
Question:

A bag has three medals in it namely Gold, Silver and Bronze. Ritu and Nadeem take out one medal at a time (with replacement) alternatively till one of them gets a, Gold and wins the game. If Ritu starts the game then probability of her winning the game is :

(1) $\frac{2}{5}$

(2) $\frac{3}{5}$

(3) $\frac{1}{3}$

(4) $\frac{2}{3}$

Question:

If X is a random-variable with probability distribution as given below

x	0	1	2	3
$P(X = x)$	k	3k	3k	k

The Var(X) is :

(1) $\frac{1}{4}$

(2) $\frac{3}{4}$

(3) $\frac{3}{5}$

(4) $\frac{5}{4}$

Section Name:COMPULSORY
Question:

The general solution of differential equation $(e^{x}+e^{-x})dy-(e^{x}-e^{-x})dx=0$ is :

(1) $e^{x}-e^{-x}=Ce^{y}$

(2) $e^{x}-e^{-x}=Ce^{-y}$

(3) $e^{x}+e^{-x}=Ce^{-y}$

(4) $e^{x}+e^{-x}=Ce^{y}$

Section Name:COMPULSORY
Question:

If $y = \left(x + \sqrt{x^2 + 1}\right)^n$, then value of $\dfrac{(x^2+1)\dfrac{d^2y}{dx^2} + x\dfrac{dy}{dx}}{y}$ is equal to :

(1) n^2

(2) x^2

(3) $x^2 + 1$

(4) $(x^2+1)y^2$

Section Name:COMPULSORY
Question:

The solution of differential equation : $\log\left(\frac{dy}{dx}\right) = x^2 - y + \log x$, is :

(1) $e^{x^2} = 2e^y + C$
(2) $e^{x^2} = e^y + C$
(3) $e^x = y + C$
(4) $e^{x^2} = y^2 + C$

Section Name:COMPULSORY
Question:

Area lying between the curves $y^2 = 4x$ and $y = 2x$ is :

(1) $\frac{2}{3}$

(2) $\frac{1}{3}$

(3) $\frac{1}{4}$

(4) $\frac{3}{4}$

Question:

$$\int \frac{x^3}{x+1}\,dx =$$

(1) $x + \frac{x^2}{2} + \frac{x^3}{3} - \log|1+x| + C$

(2) $x + \frac{x^2}{2} - \frac{x^3}{3} - \log|1+x| + C$

(3) $x - \frac{x^2}{2} - \frac{x^3}{3} - \log|1+x| + C$

(4) $x - \frac{x^2}{2} + \frac{x^3}{3} - \log|1+x| + C$

Section Name:COMPULSORY
Question:

The point on the curve $y = x^2 - 6x + 5$ at which the slope of the tangent drawn is -2, is :

(1) $(-2, -3)$

(2) $(-2, 3)$

(3) $(2, 3)$

(4) $(2, -3)$

Section Name: COMPULSORY
Question:

The number of skew symmetric matrics can be formed by using all elements of set $\{0, a, -a, b, -b, c, -c\}$ is :

(1) 6

(2) 12

(3) 48

(4) 196

Section Name:COMPULSORY
Question:

Consider a matrix $A = (a_{ij})_{3 \times 3} = \begin{bmatrix} 1 & 2 & 3 \\ 4 & x & 5 \\ 7x & 4 & 2x \end{bmatrix}$ such that minor of a_{11} = cofactor of a_{23}.

Then the value of x is :

(1) $\frac{7+\sqrt{17}}{2}, \frac{7-\sqrt{17}}{2}$

(2) $1, -8$

(3) $-1, 8$

(4) $-7, 8$

Section Name:COMPULSORY
Question:

If a and b are order and degree of the differential equation

$\frac{d^2y}{dx^2} = \left[1 + \left(\frac{dy}{dx}\right)^3\right]^{\frac{2}{5}}$ respectively, then the value of a $\times$ b is :

(1) 10

(2) 6

(3) 4

(4) Not defined

Section Name: MATHEMATICS CORE
Question:

If two sets A and B contain 5 and 6 elements respectively, then number of injective functions from set A to set B can be formed are :

(1) 720

(2) 120

(3) 24

(4) 18

Section Name: MATHEMATICS CORE
Question:

The maximum value of $\cos^{-1}x$; $0 \leq x \leq 1$ is :

(1) $\frac{\pi}{2}$

(2) π

(3) 1

(4) 2π

Section Name: MATHEMATICS CORE

Question:

Let $f : R \rightarrow R$ be defined as $f(x) = x^4$. Choose the correct answer :

(1) f is one - one onto

(2) f is one - one but not onto

(3) f is many - one and onto

(4) f is neither one - one nor onto

Section Name: MATHEMATICS CORE

Question:

If $f(x) = |x|$ and $g(x) = [x]$, where $[\ \cdot\ ]$ is greatest integer function, then $fog(-2.5)$ is equal to :

(1) 2

(2) -2

(3) 3

(4) -3

Section Name: MATHEMATICS CORE

Question:

Match **List - I** with **List - II**.

List - I	List - II
(A) $\cos^{-1}\left(\frac{1}{2}\right) - 2\,\text{cosec}^{-1}(-2)$	(I) π
(B) $\cot^{-1}\sqrt{3} - \tan^{-1}\sqrt{3} - \sin^{-1}\left(\frac{1}{2}\right)$	(II) -2π
(C) $2\sec^{-1}(-2) - \text{cosec}^{-1}\left(\frac{2}{\sqrt{3}}\right)$	(III) $-\frac{\pi}{3}$
(D) $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) - 2\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$	(IV) $\frac{2\pi}{3}$

Choose the **correct** answer from the options given below :

(1) (A) - (I), (B) - (III), (C) - (II), (D) - (IV)

(2) (A) - (IV), (B) - (III), (C) - (I), (D) - (II)

(3) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

(4) (A) - (IV), (B) - (II), (C) - (III), (D) - (I)

Section Name: MATHEMATICS CORE

Question:

If $A = \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$, $B = \begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}$ and $AB = 8I$, then solution of system of equation

$x - y + z = 4$, $x - 2y - 2z = 9$ and $2x + y + 3z = 1$, is :

(1) $x = 3,\ y = -2,\ z = -1$

(2) $x = -3,\ y = -2,\ z = -1$

(3) $x = 2,\ y = 3,\ z = 1$

(4) $x = 2,\ y = -1,\ z = -3$

Section Name:MATHEMATICS CORE
Question:

The number of all possible matrices of order 2×3 with each entry either 8 or 9 is :

(1) 06

(2) 36

(3) 32

(4) 64

Section Name: MATHEMATICS CORE
Question:

Let $A = (a_{ij})$ be a 3×3 matrix whose elements are given by $a_{ij} = \frac{i-j}{i+j}$. Then, A is :

(1) Identity Matrix

(2) Symmetric Matrix

(3) Skew - symmetric Matrix

(4) Zero Matrix

Section Name:MATHEMATICS CORE

Question:

The six faces of dice represents numbers 2, 2, 2, 2, 3 and 3. If three such dice are thrown, the probability of getting sum greater than 6 is :

(1) $\frac{19}{27}$

(2) $\frac{8}{27}$

(3) $\frac{16}{27}$

(4) $\frac{1}{9}$

Section Name:MATHEMATICS CORE
Question:

If sum and product of the mean and variance of a binomial distributed random variable (X) are 24 and 128 respectively, then P(X=1) is :

(1) $\frac{1}{2^9}$

(2) $\frac{3}{2^{18}}$

(3) $\frac{19}{2^{27}}$

(4) $\frac{1}{2^{27}}$

Section Name:MATHEMATICS CORE
Question:

If a plane pass through points $(1, -1, 1)$, $(0, 3, 6)$ and $(8, 4, 2)$, then direction ratios of vector normal to plane are :

(1) <7, −12, 11>

(2) <1, −1, 7>

(3) <7, 12, 1>

(4) <1, −4, −6>

Question:

The function defined by

$$f(x) = \begin{cases} 5, & x \leq 2 \\ ax + b, & 2 < x < 10 \\ 21, & x \geqslant 10 \end{cases}$$

is continuous function. Then values of a and b are :

(1) a = 1, b = 2

(2) a = 1, b = 1

(3) a = 2, b = 1

(4) a = 2, b = 2

Section Name:MATHEMATICS CORE
Question:

If $x = \sqrt{a^{\sin^{-1}t}}$, $y = \sqrt{a^{\cos^{-1}t}}$ then $\left(\frac{d^2y}{dx^2}\right)$ is :

(1) $-2yx^{-2}$
(2) $2yx^{-2}$
(3) $-\frac{y}{x}$
(4) $\frac{x^2}{2y}$

Section Name:MATHEMATICS CORE
Question:

$$\int \frac{e^x(1+x)}{\sin^2(x e^x)}\,dx =$$

(1) $-\cot(xe^x)+C$

(2) $\tan(e^x)+C$

(3) $\cot(xe^x)+C$

(4) $\tan(xe^x)+C$

Section Name: MATHEMATICS CORE

Question:

The integrating factor of the differential equation

$x\frac{dy}{dx} - 3y = e^{-2x}$ is :

(1) $\frac{1}{x}$

(2) $\frac{1}{x^2}$

(3) $\frac{1}{x^3}$

(4) x^3

Section Name:MATHEMATICS CORE
Question:

If two vectors $\vec{a}$ and $\vec{b}$ are such that $|\vec{a}| = 2, |\vec{b}| = 3$ and $\vec{a} \cdot \vec{b} = 6$, then the angle between $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ is :

(1) $60°$

(2) $90°$

(3) $180°$

(4) $45°$

Question:

If $\vec{a} = 2\hat{i} + \hat{j} - 2\hat{k}$ and

$\vec{b} = 6\hat{i} + 2\hat{j} - 3\hat{k}$.

The vector, which bisect angle between two vectors $\vec{a}$ and $\vec{b}$, is :

(1) $2\hat{i} - \hat{j} + \hat{k}$

(2) $4\hat{i} - \hat{j} + 5\hat{k}$

(3) $-3\hat{i} + \hat{j} + 4\hat{k}$

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

Section Name: MATHEMATICS CORE

Question:

Let A and B be two independent events such that $P(A) = x$, $P(B) = y$ and $P(AB') = 0.2$. If $P(A' \cap B') = 0.4$ then :

(1) $x = y$

(2) $15x + 15y = 1$

(3) $15x - 15y + 1 = 0$

(4) $5x = 2y$

Question:

If sides of a triangle are represented by vectors $2\hat{i} - \hat{j} + 3\hat{k}$ and $2\hat{i} + \hat{j} + \hat{k}$, then its area is equal to :

(1) $\sqrt{3}$

(2) $2\sqrt{3}$

(3) $4\sqrt{3}$

(4) $5\sqrt{7}$

Section Name: MATHEMATICS CORE

Question:

$$\int_0^{\pi} \frac{x\,dx}{1+\sin^2 x} =$$

(1) $\frac{\pi}{2\sqrt{2}}$

(2) $\frac{\pi^2}{2\sqrt{2}}$

(3) $\frac{\pi^2}{4}$

(4) $\frac{\pi}{3\sqrt{2}}$

Question:

The optimal solution of LPG,

Maximise $(z) = 4x + y$

subject to : $x + y \leq 50$, $3x + y \leq 90$, $x \geqslant 0$, $y \geqslant 0$ is :

(1) 220

(2) 110

(3) 120

(4) 150

Section Name:MATHEMATICS CORE
Question:

The corner points of the feasible region for an LPP are (7, 0), (6, 2), (0, 5). Let $z = 3x + 4y$ be the objective function. Then $\max(z) - \min(z)$ is equal to :

(1) 27

(2) 25

(3) 20

(4) 6

Section Name:MATHEMATICS CORE
Question:

If $\int \frac{x^2+3}{(x^2+5)(x^2+1)}\,dx = u\tan^{-1}x + v\tan^{-1}\left(\frac{x}{\sqrt{5}}\right) + C$

where C is arbitrary constant, then value of $\frac{1}{u^2}+\frac{1}{v^2}$ is equal to :

(1) 20
(2) 24
(3) 84
(4) 112

Section Name:MATHEMATICS CORE
Question:

The area enclosed by line segments given by

$$\frac{|x|}{a} + \frac{|y|}{b} = 1, a > 0, b > 0 \text{ is :}$$

(1) $\frac{\pi}{2}$ ab

(2) 2 π ab

(3) 2 ab

(4) $\frac{3}{4}$ π ab

Section Name:MATHEMATICS CORE
Question:

The vector equation of line passing through (1, 2, 3) and parallel to the planes $\vec{r} \cdot (\hat{i} - \hat{j} + 2\hat{k}) = 5$ and $\vec{r} \cdot (3\hat{i} + \hat{j} + \hat{k}) = 6$ is :

(1) $\vec{r} = \hat{i} - 2\hat{j} - 3\hat{k} + \lambda(-3\hat{i} + 5\hat{j} + 4\hat{k})$

(2) $\vec{r} = \hat{i} + 2\hat{j} + 3\hat{k} + \lambda(-3\hat{i} + 5\hat{j} + 4\hat{k})$

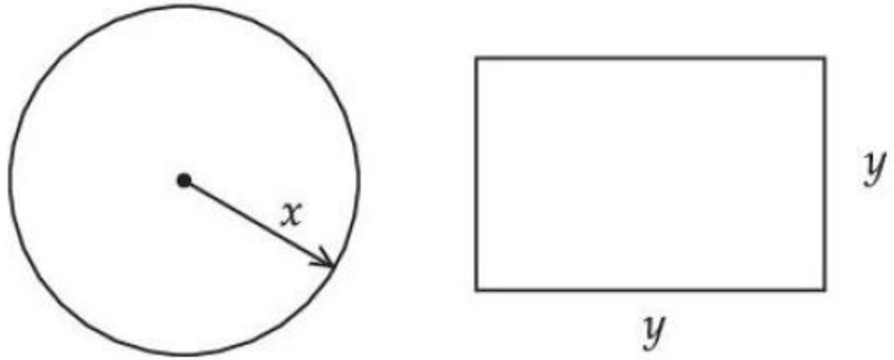
(3) $\vec{r} = \hat{i} + \hat{j} + \hat{k} + \lambda(3\hat{i} - 5\hat{j} + 4\hat{k})$

(4) $\vec{r} = \hat{i} + 2\hat{j} + 3\hat{k} + \lambda(3\hat{i} + 5\hat{j} - 4\hat{k})$

Question:

Based on the below information, answer the questions.

A wire of length 28 m is to be cut into two pieces. One of the pieces is to be made into a circle and the other into square. Let x be the radius of circle and y be the side of square.



The relation between the variables x and y is :

(1) $y = \frac{14 - \pi x}{2}$

(2) $y = \frac{14 + \pi x}{2}$

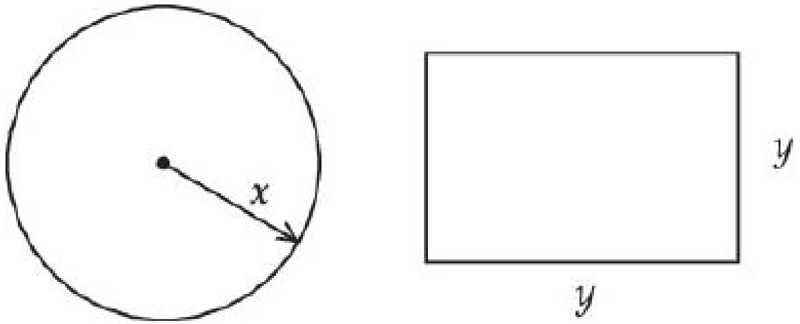
(3) $x = \frac{28 - \pi y}{2}$

(4) $x = \frac{14 + \pi y}{2}$

Question:

Based on the below information, answer the questions.

A wire of length 28 m is to be cut into two pieces. One of the pieces is to be made into a circle and the other into square. Let x be the radius of circle and y be the side of square.



The combined area (A) of circle and square is :

(1) $\pi x^2 + \left(\frac{14 + \pi x}{2}\right)^2$

(2) $\pi x^2 + \left(\frac{14 - 2\pi x}{2}\right)^2$

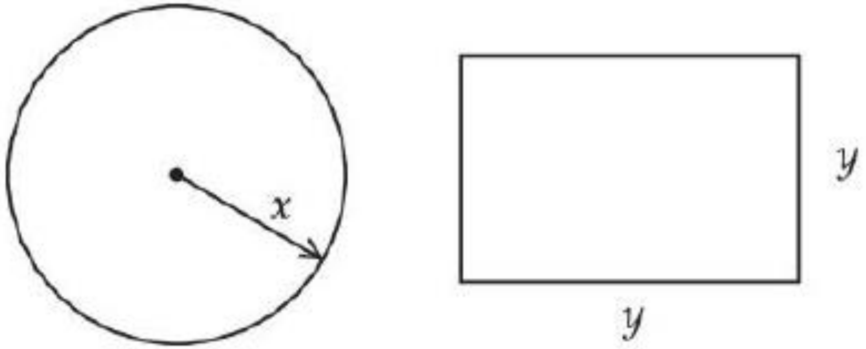
(3) $\pi x^2 + \left(\frac{\pi x - 14}{4}\right)^2$

(4) $\pi x^2 + \left(\frac{14 - \pi x}{2}\right)^2$

Question:

Based on the below information, answer the questions.

A wire of length 28 m is to be cut into two pieces. One of the pieces is to be made into a circle and the other into square. Let x be the radius of circle and y be the side of square.



The value of x (in cm) for which the combined area(A) is minimum, is :

(1) $\frac{14}{\pi + 4}$

(2) $\frac{14}{4 - \pi}$

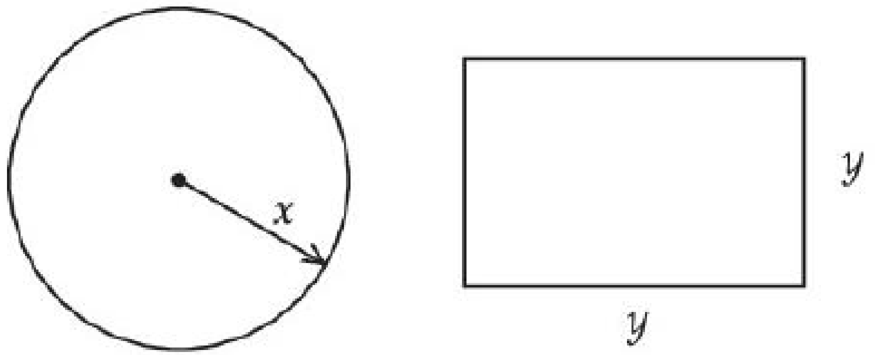
(3) $\frac{\pi + 4}{14}$

(4) $\frac{4 - \pi}{14}$

Question:

Based on the below information, answer the questions.

A wire of length 28 m is to be cut into two pieces. One of the pieces is to be made into a circle and the other into square. Let x be the radius of circle and y be the side of square.



The length (in cm) of the piece of wire forming square for minimum combined area(A) is :

(1) $\frac{28}{\pi + 4}$

(2) $\frac{56}{\pi + 4}$

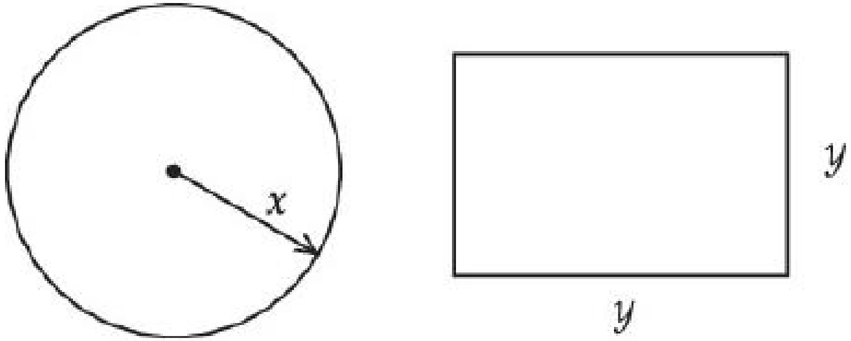
(3) $\frac{112}{\pi + 4}$

(4) $\frac{14}{\pi + 4}$

Question:

Based on the below information, answer the questions.

A wire of length 28 m is to be cut into two pieces. One of the pieces is to be made into a circle and the other into square. Let x be the radius of circle and y be the side of square.



The length (in cm) of the piece of wire forming circle for minimum combined area(A) is :

(1) $\frac{28\pi}{\pi + 4}$

(2) $\frac{56\pi}{\pi + 4}$

(3) $\frac{112\pi}{\pi + 4}$

(4) $\frac{14\pi}{\pi + 4}$

Section Name: MATHEMATICS CORE
Question:

Answer the questions using the below information.

Suppose the floor of a hotel is made up of mirror polished Salvatore stone. There is a large crystal chandelier attached to the ceiling of the hotel room. Consider the floor of the hotel room as a plane having equation $x-y+z=4$ and the crystal chandelier is suspended at the point (1, 0, 1).

The direction ratios of the perpendicular from the point (1, 0, 1) to the plane $x-y+z=4$, are :

(1) $(-1, -1, 1)$

(2) $(1, -1, -1)$

(3) $(-1, -1, -1)$

(4) $(1, -1, 1)$

Section Name:MATHEMATICS CORE
Question:

Answer the questions using the below information.

Suppose the floor of a hotel is made up of mirror polished Salvatore stone. There is a large crystal chandelier attached to the ceiling of the hotel room. Consider the floor of the hotel room as a plane having equation $x-y+z=4$ and the crystal chandelier is suspended at the point (1, 0, 1).

The length of the perpendicular from the point (1, 0, 1) to the plane $x-y+z=4$, is :

(1) $\frac{2}{\sqrt{3}}$ units

(2) $\frac{4}{\sqrt{3}}$ units

(3) $\frac{6}{\sqrt{3}}$ units

(4) $\frac{8}{\sqrt{3}}$ units

Section Name:MATHEMATICS CORE
Question:

Answer the questions using the below information.

Suppose the floor of a hotel is made up of mirror polished Salvatore stone. There is a large crystal chandelier attached to the ceiling of the hotel room. Consider the floor of the hotel room as a plane having equation $x-y+z=4$ and the crystal chandelier is suspended at the point (1, 0, 1).

The equation of the perpendicular from the point (1, 0, 1) to the plane $x-y+z=4$ is :

(1) $\frac{x-1}{2}=\frac{y+3}{-1}=\frac{z+5}{2}$

(2) $\frac{x-1}{-2}=\frac{y+3}{-1}=\frac{z-5}{2}$

(3) $\frac{x-1}{1}=\frac{y}{-1}=\frac{z-1}{1}$

(4) $\frac{x-1}{2}=\frac{y}{-2}=\frac{z-1}{1}$

Section Name:MATHEMATICS CORE
Question:

Answer the questions using the below information.

Suppose the floor of a hotel is made up of mirror polished Salvatore stone. There is a large crystal chandelier attached to the ceiling of the hotel room. Consider the floor of the hotel room as a plane having equation $x-y+z=4$ and the crystal chandelier is suspended at the point (1, 0, 1).

The equation of the plane, parallel to the plane $x-y+z=4$, which is at a unit distance from the point (1, 0, 1) is :

(1) $x-y+z+(2-\sqrt{3})=0$

(2) $x-y+z-(2+\sqrt{3})=0$

(3) $x-y+z+(2+\sqrt{3})=0$

(4) $x-y+z+1=0$

Section Name:MATHEMATICS CORE
Question:

Answer the questions using the below information.

Suppose the floor of a hotel is made up of mirror polished Salvatore stone. There is a large crystal chandelier attached to the ceiling of the hotel room. Consider the floor of the hotel room as a plane having equation $x-y+z=4$ and the crystal chandelier is suspended at the point (1, 0, 1).

The direction cosine of the normal to the plane $x-y+z=4$, are :

(1) $\left(\frac{1}{\sqrt{3}}, -\frac{1}{\sqrt{3}}, -\frac{1}{\sqrt{3}}\right)$

(2) $\left(\frac{1}{\sqrt{3}}, -\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$

(3) $\left(-\frac{1}{\sqrt{3}}, -\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$

(4) $\left(-\frac{1}{\sqrt{3}}, -\frac{1}{\sqrt{3}}, -\frac{1}{\sqrt{3}}\right)$