

National Testing Agency

Question Paper Name :	BTECH E 4th Sep 2020 Shift 1
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BTECH

Group Number :	1
Group Id :	405036122
Group Maximum Duration :	0
Group Minimum Duration :	180
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	300
Is this Group for Examiner? :	No

Mathematics

Section Id :	405036408
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	25
Number of Questions to be attempted :	25
Section Marks :	100
Display Number Panel :	Yes
Group All Questions :	Yes
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	405036783

Question Shuffling Allowed :

Yes

Question Number : 51 Question Id : 40503611206 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

A survey shows that 63% of the people in a city read newspaper A whereas 76% read newspaper B. If $x\%$ of the people read both the newspapers, then a possible value of x can be :

Options :

40503640691. 29

40503640692. 55

40503640693. 65

40503640694. 37

Question Number : 51 Question Id : 40503611206 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

एक सर्वेक्षण दर्शाता है कि एक शहर में 63% लोग समाचार पत्र A पढ़ते हैं, जबकि 76% समाचार पत्र B पढ़ते हैं। यदि $x\%$ लोग दोनों समाचार पत्र पढ़ते हैं, तो x का एक सम्भावित मान हो सकता है :

Options :

40503640691. 29

40503640692. 55

40503640693. 65

40503640694. 37

Question Number : 52 Question Id : 40503611207 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

Let $[t]$ denote the greatest integer $\leq t$. Then the equation in x , $[x]^2 + 2[x + 2] - 7 = 0$ has :

Options :

40503640695. no integral solution.

40503640696. exactly two solutions.

40503640697. exactly four integral solutions.

40503640698. infinitely many solutions.

Question Number : 52 Question Id : 40503611207 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

यदि $[t]$ महत्तम पूर्णांक $\leq t$ दर्शाता है, तो x में समीकरण,
 $[x]^2 + 2[x + 2] - 7 = 0$

Options :

40503640695. का कोई पूर्णांकीय हल नहीं है।

40503640696. के मात्र दो हल हैं।

40503640697. के मात्र चार पूर्णांकीय हल हैं।

40503640698. के अनन्त हल हैं।

Question Number : 53 Question Id : 40503611208 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

Let $u = \frac{2z + i}{z - ki}$, $z = x + iy$ and $k > 0$. If the

curve represented by $\text{Re}(u) + \text{Im}(u) = 1$ intersects the y -axis at the points P and Q where $PQ = 5$, then the value of k is :

Options :

40503640699. $\frac{1}{2}$

40503640700. 2

40503640701. $\frac{3}{2}$

40503640702. 4

Question Number : 53 Question Id : 40503611208 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना $u = \frac{2z + i}{z - ki}$, $z = x + iy$ तथा $k > 0$ हैं। यदि

$\text{Re}(u) + \text{Im}(u) = 1$ द्वारा निरूपित वक्र, y -अक्ष को P तथा Q पर काटता है, जबकि $PQ = 5$ है, तो k बराबर है :

Options :

40503640699. $\frac{1}{2}$

40503640700. 2

40503640701. $\frac{3}{2}$

40503640702. 4

Question Number : 54 Question Id : 40503611209 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If $A = \begin{bmatrix} \cos\theta & i\sin\theta \\ i\sin\theta & \cos\theta \end{bmatrix}$, $\left(\theta = \frac{\pi}{24}\right)$ and

$A^5 = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, where $i = \sqrt{-1}$, then

which one of the following is not true ?

Options :

40503640703. $a^2 - d^2 = 0$

40503640704. $a^2 - b^2 = \frac{1}{2}$

40503640705. $0 \leq a^2 + b^2 \leq 1$

40503640706. $a^2 - c^2 = 1$

Question Number : 54 Question Id : 40503611209 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

यदि $A = \begin{bmatrix} \cos\theta & i\sin\theta \\ i\sin\theta & \cos\theta \end{bmatrix}$, $\left(\theta = \frac{\pi}{24}\right)$ तथा

$A^5 = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, जबकि $i = \sqrt{-1}$ है, तो निम्न में

से कौन-सा सत्य नहीं है?

Options :

40503640703. $a^2 - d^2 = 0$

40503640704. $a^2 - b^2 = \frac{1}{2}$

40503640705. $0 \leq a^2 + b^2 \leq 1$

40503640706. $a^2 - c^2 = 1$

Question Number : 55 Question Id : 40503611210 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The value of $\sum_{r=0}^{20} {}^{50-r}C_6$ is equal to :

Options :

40503640707. ${}^{50}C_6 - {}^{30}C_6$

40503640708. ${}^{50}C_7 - {}^{30}C_7$

40503640709. ${}^{51}C_7 - {}^{30}C_7$

40503640710. ${}^{51}C_7 + {}^{30}C_7$

Question Number : 55 Question Id : 40503611210 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$\sum_{r=0}^{20} {}^{50-r}C_6$ बराबर है :

Options :

40503640707. ${}^{50}C_6 - {}^{30}C_6$

40503640708. ${}^{50}C_7 - {}^{30}C_7$

40503640709. ${}^{51}C_7 - {}^{30}C_7$

40503640710. ${}^{51}C_7 + {}^{30}C_7$

Question Number : 56 Question Id : 40503611211 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

Let α and β be the roots of $x^2 - 3x + p = 0$
and γ and δ be the roots of $x^2 - 6x + q = 0$.
If $\alpha, \beta, \gamma, \delta$ form a geometric progression.
Then ratio $(2q + p) : (2q - p)$ is :

Options :

40503640711. $33 : 31$

40503640712. $9 : 7$

40503640713. $5 : 3$

40503640714. $3 : 1$

Question Number : 56 Question Id : 40503611211 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

माना α तथा β , समीकरण $x^2 - 3x + p = 0$ के मूल हैं
और γ तथा δ , समीकरण $x^2 - 6x + q = 0$ के मूल हैं।
यदि α, β, γ तथा δ गुणोत्तर श्रेणी में हैं, तो अनुपात,
 $(2q + p) : (2q - p)$ है :

Options :

40503640711. 33 : 31

40503640712. 9 : 7

40503640713. 5 : 3

40503640714. 3 : 1

Question Number : 57 Question Id : 40503611212 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If

$1 + (1 - 2^2 \cdot 1) + (1 - 4^2 \cdot 3) + (1 - 6^2 \cdot 5) + \dots +$
 $(1 - 20^2 \cdot 19) = \alpha - 220\beta$, then an ordered pair
 (α, β) is equal to :

Options :

40503640715. (10, 97)

40503640716. (10, 103)

40503640717. (11, 103)

40503640718. (11, 97)

Question Number : 57 Question Id : 40503611212 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि

$1 + (1 - 2^2 \cdot 1) + (1 - 4^2 \cdot 3) + (1 - 6^2 \cdot 5) + \dots +$
 $(1 - 20^2 \cdot 19) = \alpha - 220\beta$, तो एक क्रमित युग्म
 (α, β) बराबर है :

Options :

40503640715. $(10, 97)$

40503640716. $(10, 103)$

40503640717. $(11, 103)$

40503640718. $(11, 97)$

Question Number : 58 Question Id : 40503611213 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let f be a twice differentiable function on
 $(1, 6)$. If $f(2) = 8$, $f'(2) = 5$, $f'(x) \geq 1$ and
 $f''(x) \geq 4$, for all $x \in (1, 6)$, then :

Options :

40503640719. $f(5) \leq 10$

40503640720. $f(5) + f'(5) \geq 28$

40503640721. $f'(5) + f''(5) \leq 20$

40503640722. $f(5) + f'(5) \leq 26$

Question Number : 58 Question Id : 40503611213 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना फलन f , अन्तराल $(1, 6)$ में दो बार अवकलनीय है। यदि $f(2) = 8, f'(2) = 5$, तथा सभी $x \in (1, 6)$ के लिए $f'(x) \geq 1$ तथा $f''(x) \geq 4$ हैं, तो :

Options :

40503640719. $f(5) \leq 10$

40503640720. $f(5) + f'(5) \geq 28$

40503640721. $f'(5) + f''(5) \leq 20$

40503640722. $f(5) + f'(5) \leq 26$

Question Number : 59 Question Id : 40503611214 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If $(a + \sqrt{2} b \cos x)(a - \sqrt{2} b \cos y) = a^2 - b^2$,

where $a > b > 0$, then $\frac{dx}{dy}$ at $\left(\frac{\pi}{4}, \frac{\pi}{4}\right)$ is :

Options :

40503640723. $\frac{a - b}{a + b}$

40503640724. $\frac{2a + b}{2a - b}$

40503640725. $\frac{a + b}{a - b}$

40503640726. $\frac{a - 2b}{a + 2b}$

Question Number : 59 Question Id : 40503611214 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

यदि $(a + \sqrt{2} b \cos x)$

$(a - \sqrt{2} b \cos y) = a^2 - b^2$, जहाँ $a > b > 0$ हैं,

तो $\left(\frac{\pi}{4}, \frac{\pi}{4}\right)$ पर $\frac{dx}{dy}$ बराबर है :

Options :

40503640723. $\frac{a - b}{a + b}$

40503640724. $\frac{2a + b}{2a - b}$

40503640725. $\frac{a + b}{a - b}$

40503640726. $\frac{a - 2b}{a + 2b}$

Question Number : 60 Question Id : 40503611215 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

Let $f(x) = |x - 2|$ and $g(x) = f(f(x))$, $x \in [0, 4]$.

Then $\int_0^3 (g(x) - f(x)) \, dx$ is equal to :

Options :

40503640727. 0

40503640728. $\frac{1}{2}$

40503640729. 1

40503640730. $\frac{3}{2}$

Question Number : 60 Question Id : 40503611215 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

यदि $x \in [0, 4]$ के लिए $f(x) = |x - 2|$ तथा

$g(x) = f(f(x))$ हैं, तो $\int_0^3 (g(x) - f(x)) dx$ बराबर

है :

Options :

40503640727. 0

40503640728. $\frac{1}{2}$

40503640729. 1

40503640730. $\frac{3}{2}$

Question Number : 61 Question Id : 40503611216 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The integral $\int \left(\frac{x}{x \sin x + \cos x} \right)^2 dx$ is equal

to

(where C is a constant of integration) :

Options :

40503640731. $\sec x + \frac{x \tan x}{x \sin x + \cos x} + C$

40503640732. $\sec x - \frac{x \tan x}{x \sin x + \cos x} + C$

40503640733. $\tan x + \frac{x \sec x}{x \sin x + \cos x} + C$

40503640734. $\tan x - \frac{x \sec x}{x \sin x + \cos x} + C$

Question Number : 61 Question Id : 40503611216 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

समाकलन $\int \left(\frac{x}{x \sin x + \cos x} \right)^2 dx$ बराबर है
(जहाँ C एक समाकलन अचर है) :

Options :

40503640731. $\sec x + \frac{x \tan x}{x \sin x + \cos x} + C$

40503640732. $\sec x - \frac{x \tan x}{x \sin x + \cos x} + C$

40503640733. $\tan x + \frac{x \sec x}{x \sin x + \cos x} + C$

40503640734. $\tan x - \frac{x \sec x}{x \sin x + \cos x} + C$

Question Number : 62 Question Id : 40503611217 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let $f(x) = \int \frac{\sqrt{x}}{(1+x)^2} dx$ ($x \geq 0$). Then

$f(3) - f(1)$ is equal to :

Options :

40503640735. $-\frac{\pi}{12} + \frac{1}{2} + \frac{\sqrt{3}}{4}$

40503640736. $\frac{\pi}{12} + \frac{1}{2} - \frac{\sqrt{3}}{4}$

40503640737. $\frac{\pi}{6} + \frac{1}{2} - \frac{\sqrt{3}}{4}$

40503640738. $-\frac{\pi}{6} + \frac{1}{2} + \frac{\sqrt{3}}{4}$

Question Number : 62 Question Id : 40503611217 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि $f(x) = \int \frac{\sqrt{x}}{(1+x)^2} dx$ ($x \geq 0$) है, तो

$f(3) - f(1)$ बराबर है :

Options :

40503640735. $-\frac{\pi}{12} + \frac{1}{2} + \frac{\sqrt{3}}{4}$

40503640736. $\frac{\pi}{12} + \frac{1}{2} - \frac{\sqrt{3}}{4}$

40503640737. $\frac{\pi}{6} + \frac{1}{2} - \frac{\sqrt{3}}{4}$

40503640738. $-\frac{\pi}{6} + \frac{1}{2} + \frac{\sqrt{3}}{4}$

Question Number : 63 Question Id : 40503611218 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

Let $y = y(x)$ be the solution of the differential equation,

$$xy' - y = x^2(x \cos x + \sin x), \quad x > 0. \quad \text{If}$$

$y(\pi) = \pi$, then $y''\left(\frac{\pi}{2}\right) + y\left(\frac{\pi}{2}\right)$ is equal to :

Options :

40503640739. $1 + \frac{\pi}{2}$

40503640740. $1 + \frac{\pi}{2} + \frac{\pi^2}{4}$

40503640741. $2 + \frac{\pi}{2}$

40503640742. $2 + \frac{\pi}{2} + \frac{\pi^2}{4}$

Question Number : 63 Question Id : 40503611218 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

माना अवकल समीकरण

$$xy' - y = x^2(x \cos x + \sin x), x > 0 \text{ का हल } y = y(x)$$

है। यदि $y(\pi) = \pi$ है, तो $y''\left(\frac{\pi}{2}\right) + y\left(\frac{\pi}{2}\right)$ बराबर

है :

Options :

40503640739. $1 + \frac{\pi}{2}$

40503640740. $1 + \frac{\pi}{2} + \frac{\pi^2}{4}$

40503640741. $2 + \frac{\pi}{2}$

40503640742. $2 + \frac{\pi}{2} + \frac{\pi^2}{4}$

Question Number : 64 Question Id : 40503611219 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

A triangle ABC lying in the first quadrant has two vertices as A(1, 2) and B(3, 1). If $\angle BAC = 90^\circ$, and $\text{ar}(\Delta ABC) = 5\sqrt{5}$ sq. units, then the abscissa of the vertex C is :

Options :

40503640743. $1 + 2\sqrt{5}$

40503640744. $1 + \sqrt{5}$

40503640745. $2 + \sqrt{5}$

40503640746. $2\sqrt{5} - 1$

Question Number : 64 Question Id : 40503611219 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

एक त्रिभुज ABC, जो प्रथम चतुर्थांश में स्थित है, के दो शीर्ष बिन्दु A(1, 2) तथा B(3, 1) हैं। यदि $\angle BAC = 90^\circ$ तथा $\text{ar}(\Delta ABC) = 5\sqrt{5}$ वर्ग इकाई है, तो शीर्ष बिन्दु C का भुज (Abscissa) है :

Options :

40503640743. $1 + 2\sqrt{5}$

40503640744. $1 + \sqrt{5}$

40503640745. $2 + \sqrt{5}$

40503640746. $2\sqrt{5} - 1$

Question Number : 65 Question Id : 40503611220 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

Let $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ ($a > b$) be a given ellipse,

length of whose latus rectum is 10. If its eccentricity is the maximum value of the

function, $\phi(t) = \frac{5}{12} + t - t^2$, then $a^2 + b^2$

is equal to :

Options :

40503640747. 116

40503640748. 126

40503640749. 135

40503640750. 145

Question Number : 65 Question Id : 40503611220 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ ($a > b$) एक दीर्घवृत्त दिया है

जिस के नाभिलम्ब जीवा की लम्बाई 10 है। यदि इस

की उत्केन्द्रता, फलन $\phi(t) = \frac{5}{12} + t - t^2$ के

अधिकतम मान के बराबर है, तो $a^2 + b^2$ बराबर है :

Options :

40503640747. 116

40503640748. 126

40503640749. 135

40503640750. 145

Question Number : 66 Question Id : 40503611221 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let $P(3, 3)$ be a point on the hyperbola,

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. If the normal to it at P

intersects the x -axis at $(9, 0)$ and e is its

eccentricity, then the ordered pair (a^2, e^2)

is equal to :

Options :

40503640751. $\left(\frac{9}{2}, 2\right)$

40503640752. $(9, 3)$

40503640753. $\left(\frac{3}{2}, 2\right)$

40503640754. $\left(\frac{9}{2}, 3\right)$

Question Number : 66 Question Id : 40503611221 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

माना बिन्दु $P(3, 3)$ अतिपरवलय, $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

पर स्थित है। यदि P पर इसका अभिलंब, x -अक्ष को बिन्दु $(9, 0)$ पर काटता है तथा इसकी उत्केन्द्रता e के बराबर है, तो क्रमित युग्म (a^2, e^2) बराबर है :

Options :

40503640751. $\left(\frac{9}{2}, 2\right)$

40503640752. $(9, 3)$

40503640753. $\left(\frac{3}{2}, 2\right)$

40503640754. $\left(\frac{9}{2}, 3\right)$

Question Number : 67 Question Id : 40503611222 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let x_0 be the point of local maxima of

$$f(x) = \vec{a} \cdot (\vec{b} \times \vec{c}), \quad \text{where}$$

$$\vec{a} = x\hat{i} - 2\hat{j} + 3\hat{k}, \quad \vec{b} = -2\hat{i} + x\hat{j} - \hat{k}$$

$$\text{and } \vec{c} = 7\hat{i} - 2\hat{j} + x\hat{k}. \text{ Then the value}$$

of $\vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a}$ at $x = x_0$ is :

Options :

40503640755. -30

40503640756. -22

40503640757. -4

40503640758. 14

Question Number : 67 Question Id : 40503611222 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि x_0 , फलन $f(x) = \vec{a} \cdot (\vec{b} \times \vec{c})$ का स्थानीय

उच्चिष्ठ है, जहाँ $\vec{a} = x\hat{i} - 2\hat{j} + 3\hat{k}$,

$\vec{b} = -2\hat{i} + x\hat{j} - \hat{k}$ तथा

$\vec{c} = 7\hat{i} - 2\hat{j} + x\hat{k}$ हैं, तो $x = x_0$ पर

$\vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a}$ का मान है :

Options :

40503640755. -30

40503640756. -22

40503640757. -4

40503640758. 14

Question Number : 68 Question Id : 40503611223 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The mean and variance of 8 observations are 10 and 13.5, respectively. If 6 of these observations are 5, 7, 10, 12, 14, 15, then the absolute difference of the remaining two observations is :

Options :

40503640759. 3

40503640760. 5

40503640761. 7

40503640762. 9

Question Number : 68 Question Id : 40503611223 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

8 प्रेक्षकों का माध्य तथा प्रसरण क्रमशः 10 तथा 13.5 हैं। यदि इनमें से 6 प्रेक्षक 5, 7, 10, 12, 14 तथा 15 हैं, तो बाकी दो प्रेक्षकों का निरपेक्ष अंतर है :

Options :

40503640759. 3

40503640760. 5

40503640761. 7

40503640762. 9

Question Number : 69 Question Id : 40503611224 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 4 Wrong Marks : 1

Two vertical poles $AB = 15$ m and $CD = 10$ m are standing apart on a horizontal ground with points A and C on the ground. If P is the point of intersection of BC and AD, then the height of P (in m) above the line AC is :

Options :

40503640763. 6

40503640764. $10/3$

40503640765. $20/3$

40503640766. 5

Question Number : 69 Question Id : 40503611224 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

दो सीधे खंभे $AB = 15$ m तथा $CD = 10$ m, क्षैतिज भूमि पर इस प्रकार खड़े हैं कि A तथा C भूमि पर हैं। यदि BC तथा AD का प्रतिच्छेदन बिन्दु P है, तो रेखा AC से P की ऊँचाई (m में) है :

Options :

40503640763. 6

40503640764. $10/3$

40503640765. $20/3$

40503640766. 5

Question Number : 70 Question Id : 40503611225 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Given the following two statements :

$(S_1) : (q \vee p) \rightarrow (p \leftrightarrow \sim q)$ is a tautology.

$(S_2) : \sim q \wedge (\sim p \leftrightarrow q)$ is a fallacy. Then :

Options :

40503640767. both (S_1) and (S_2) are correct.

40503640768. only (S_1) is correct.

40503640769. only (S_2) is correct.

40503640770. both (S_1) and (S_2) are not correct.

Question Number : 70 Question Id : 40503611225 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

निम्न दो कथन दिए गए हैं :

$(S_1) : (q \vee p) \rightarrow (p \leftrightarrow \sim q)$ एक पुनरुक्ति है।

$(S_2) : \sim q \wedge (\sim p \leftrightarrow q)$ एक विरोधुक्ति है। तो :

Options :

40503640767. (S_1) तथा (S_2) दोनों सही हैं।

40503640768. केवल (S_1) सही है।

40503640769. केवल (S_2) सही है।

40503640770. (S_1) तथा (S_2) दोनों सही नहीं हैं।

Sub-Section Number :

2

Sub-Section Id :

405036784

Question Shuffling Allowed :

Yes

Question Number : 71 Question Id : 40503611226 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

If the system of equations

$$x - 2y + 3z = 9$$

$$2x + y + z = b$$

$x - 7y + az = 24$, has infinitely many solutions, then $a - b$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002

Question Number : 71 Question Id : 40503611226 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

यदि समीकरण निकाय

$$x - 2y + 3z = 9$$

$$2x + y + z = b$$

$$x - 7y + az = 24$$

के अनन्त हल हैं तो $a - b$ बराबर है _____ ।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002

Question Number : 72 **Question Id :** 40503611227 **Question Type :** SA **Display Question Number :** Yes

Correct Marks : 4 **Wrong Marks :** 0

Let $(2x^2 + 3x + 4)^{10} = \sum_{r=0}^{20} a_r x^r$. Then

$\frac{a_7}{a_{13}}$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002

Question Number : 72 **Question Id :** 40503611227 **Question Type :** SA **Display Question Number :** Yes

Correct Marks : 4 Wrong Marks : 0

यदि $(2x^2 + 3x + 4)^{10} = \sum_{r=0}^{20} a_r x^r$, तो $\frac{a_7}{a_{13}}$

बराबर है _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002

Question Number : 73 Question Id : 40503611228 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

Suppose a differentiable function $f(x)$ satisfies the identity $f(x+y) = f(x) + f(y) + xy^2 + x^2y$, for all real x and y . If $\lim_{x \rightarrow 0} \frac{f(x)}{x} = 1$, then $f'(3)$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002

Question Number : 73 Question Id : 40503611228 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

माना सभी वास्तविक संख्याओं x तथा y के लिए, एक अवकलनीय फलन $f(x)$, सर्वसमिका (identity) $f(x+y) = f(x) + f(y) + xy^2 + x^2y$ को संतुष्ट करता है। यदि $\lim_{x \rightarrow 0} \frac{f(x)}{x} = 1$, तो $f(3)$ बराबर है _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002

Question Number : 74 Question Id : 40503611229 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

If the equation of a plane P , passing through the intersection of the planes, $x + 4y - z + 7 = 0$ and $3x + y + 5z = 8$ is $ax + by + 6z = 15$ for some $a, b \in \mathbb{R}$, then the distance of the point $(3, 2, -1)$ from the plane P is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002

Question Number : 74 Question Id : 40503611229 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

किन्हीं $a, b \in \mathbb{R}$ के लिए, समतल P का समीकरण, जो समतलों, $x + 4y - z + 7 = 0$ तथा $3x + y + 5z = 8$ के प्रतिच्छेदन से होकर जाता है, $ax + by + 6z = 15$ है, तो बिन्दु $(3, 2, -1)$ की समतल P से दूरी बराबर है _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002

Question Number : 75 Question Id : 40503611230 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

The probability of a man hitting a target is $\frac{1}{10}$. The least number of shots required, so that the probability of his hitting the target at least once is greater than $\frac{1}{4}$, is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002

Question Number : 75 Question Id : 40503611230 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

एक व्यक्ति के एक लक्ष्य को भेदने की प्रायिकता

$\frac{1}{10}$ है। उसके कम से कम एक बार लक्ष्य को भेदने

की प्रायिकता $\frac{1}{4}$ से अधिक होने के लिये, आवश्यक

शॉटों (shots) की कम से कम संख्या है _____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002