

National Testing Agency

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BTECH

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Mathematics

Section Id :	405036411
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 :	405036789
Question Shuffling Allowed :	Yes

Question Number : 51 Question Id : 40503611281 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 $\bigcup_{i=1}^{50} X_i = \bigcup_{i=1}^n Y_i = T$, where each X_i

contains 10 elements and each Y_i contains 5 elements. If each element of the set T is an element of exactly 20 of sets X_i 's and exactly 6 of sets Y_i 's, then n is equal to :

Options :

40503640946. 15

40503640947. 30

40503640948. 45

40503640949. 50

Question Number : 51 Question Id : 40503611281 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 $\bigcup_{i=1}^{50} X_i = \bigcup_{i=1}^n Y_i = T$ है, जहाँ प्रत्येक X_i में

10 अवयव हैं तथा प्रत्येक Y_i में 5 अवयव हैं। यदि T का प्रत्येक अवयव ठीक 20, X_i समुच्चयों का एक अवयव है तथा ठीक 6, Y_i समुच्चयों का एक अवयव है, तो n का मान है :

Options :

40503640946. 15

40503640947. 30

40503640948. 45

40503640949. 50

Question Number : 52 Question Id : 40503611282 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 $\lambda \neq 0$ be in $\mathbb{R}$. If α and β are the roots of the equation, $x^2 - x + 2\lambda = 0$ and α and γ are the roots of the equation, $3x^2 - 10x + 27\lambda = 0$, then $\frac{\beta\gamma}{\lambda}$ is equal to :

Options :

40503640950. 36

40503640951. 27

40503640952. 18

40503640953. 9

Question Number : 52 Question Id : 40503611282 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 $\lambda \neq 0$, $\mathbb{R}$ में है। यदि α तथा β समीकरण $x^2 - x + 2\lambda = 0$ के मूल हैं और α तथा γ , समीकरण $3x^2 - 10x + 27\lambda = 0$ के मूल हैं, तो $\frac{\beta\gamma}{\lambda}$ बराबर है :

Options :

40503640950. 36

40503640951. 27

40503640952. 18

40503640953. 9

Question Number : 53 Question Id : 40503611283 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 and b are real numbers such that

$$(2 + \alpha)^4 = a + b\alpha, \text{ where } \alpha = \frac{-1 + i\sqrt{3}}{2},$$

then a + b is equal to :

Options :

40503640954. 9

40503640955. 24

40503640956. 33

40503640957. 57

**Question Number : 53 Question Id : 40503611283 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 तथा b ऐसी वास्तविक संख्याएँ है कि

$$(2 + \alpha)^4 = a + b\alpha \text{ है, जहाँ } \alpha = \frac{-1 + i\sqrt{3}}{2} \text{ है, तो}$$

a + b का मान है :

Options :

40503640954. 9

40503640955. 24

40503640956. 33

40503640957. 57

**Question Number : 54 Question Id : 40503611284 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 the system of equations

$$x + y + z = 2$$

$$2x + 4y - z = 6$$

$$3x + 2y + \lambda z = \mu$$

has infinitely many solutions, then :

Options :

40503640958. $\lambda - 2\mu = -5$

40503640959. $\lambda + 2\mu = 14$

40503640960. $2\lambda - \mu = 5$

40503640961. $2\lambda + \mu = 14$

**Question Number : 54 Question Id : 40503611284 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 समीकरणों के निकाय

$$x + y + z = 2$$

$$2x + 4y - z = 6$$

$$3x + 2y + \lambda z = \mu$$

के अनन्त हल हैं, तो :

Options :

40503640958. $\lambda - 2\mu = -5$

40503640959. $\lambda + 2\mu = 14$

40503640960. $2\lambda - \mu = 5$

40503640961. $2\lambda + \mu = 14$

**Question Number : 55 Question Id : 40503611285 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

Suppose the vectors x_1 , x_2 and x_3 are the solutions of the system of linear equations, $Ax=b$ when the vector b on the right side is equal to b_1 , b_2 and b_3 respectively. If

$$x_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, x_2 = \begin{bmatrix} 0 \\ 2 \\ 1 \end{bmatrix}, x_3 = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}, b_1 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix},$$

$$b_2 = \begin{bmatrix} 0 \\ 2 \\ 0 \end{bmatrix} \text{ and } b_3 = \begin{bmatrix} 0 \\ 0 \\ 2 \end{bmatrix}, \quad \text{then the}$$

determinant of A is equal to :

Options :

40503640962. $\frac{1}{2}$

40503640963. 2

40503640964. $\frac{3}{2}$

40503640965. 4

Question Number : 55 Question Id : 40503611285 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 सदिश x_1, x_2 तथा x_3 , रैखिक समीकरण निकाय $Ax = b$ के हल हैं, जबकि दाईं ओर का सदिश b , क्रमशः b_1, b_2 तथा b_3 के बराबर है। यदि

$$x_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, x_2 = \begin{bmatrix} 0 \\ 2 \\ 1 \end{bmatrix}, x_3 = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}, b_1 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix},$$

$$b_2 = \begin{bmatrix} 0 \\ 2 \\ 0 \end{bmatrix} \text{ तथा } b_3 = \begin{bmatrix} 0 \\ 0 \\ 2 \end{bmatrix} \text{ हैं, तो } A \text{ के सारणिक}$$

का मान है :

Options :

40503640962. $\frac{1}{2}$

40503640963. 2

40503640964. $\frac{3}{2}$

40503640965. 4

Question Number : 56 Question Id : 40503611286 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 for some positive integer n , the coefficients of three consecutive terms in the binomial expansion of $(1+x)^{n+5}$ are in the ratio 5 : 10 : 14, then the largest coefficient in this expansion is :

Options :

40503640966. 252

40503640967. 330

40503640968. 462

40503640969. 792

Question Number : 56 Question Id : 40503611286 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 किसी धनपूर्णांक n के लिए, $(1+x)^{n+5}$ के द्विपद प्रसार में तीन क्रमागत पदों के गुणांक $5 : 10 : 14$ के अनुपात में हैं, तो इस प्रसार में सब से बड़ा गुणांक है :

Options :

40503640966. 252

40503640967. 330

40503640968. 462

40503640969. 792

Question Number : 57 Question Id : 40503611287 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 $a_1, a_2, \dots, a_n$ be a given A.P. whose common difference is an integer and $S_n = a_1 + a_2 + \dots + a_n$. If $a_1 = 1, a_n = 300$ and $15 \leq n \leq 50$, then the ordered pair (S_{n-4}, a_{n-4}) is equal to :

Options :

40503640970. (2490, 248)

40503640971. (2480, 249)

40503640972. (2490, 249)

40503640973. (2480, 248)

Question Number : 57 Question Id : 40503611287 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 $a_1, a_2, \dots, a_n$ एक दी गई समांतर श्रेणी है,
जिसका सार्वअंतर एक पूर्णांक है तथा
 $S_n = a_1 + a_2 + \dots + a_n$ है। यदि $a_1 = 1, a_n = 300$
तथा $15 \leq n \leq 50$ हैं, तो क्रमित युग्म
(S_{n-4}, a_{n-4}) बराबर है :

Options :

40503640970. (2490, 248)

40503640971. (2480, 249)

40503640972. (2490, 249)

40503640973. (2480, 248)

Question Number : 58 Question Id : 40503611288 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 $f : (0, \infty) \rightarrow (0, \infty)$ be a differentiable
function such that $f(1) = e$ and

$$\lim_{t \rightarrow x} \frac{t^2 f^2(x) - x^2 f^2(t)}{t - x} = 0.$$

If $f(x) = 1$, then x is equal to :

Options :

40503640974. e

40503640975. $\frac{1}{e}$

40503640976. $2e$

40503640977. $\frac{1}{2e}$

Question Number : 58 Question Id : 40503611288 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 $f : (0, \infty) \rightarrow (0, \infty)$ एक ऐसा अवकलनीय फलन है कि $f(1) = e$ तथा

$$\lim_{t \rightarrow x} \frac{t^2 f^2(x) - x^2 f^2(t)}{t - x} = 0 \text{ हैं। यदि } f(x) = 1$$

है, तो x का मान है :

Options :

40503640974. e

40503640975. $\frac{1}{e}$

40503640976. $2e$

40503640977. $\frac{1}{2e}$

Question Number : 59 Question Id : 40503611289 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

$$\text{The function } f(x) = \begin{cases} \frac{\pi}{4} + \tan^{-1}x, & |x| \leq 1 \\ \frac{1}{2}(|x| - 1), & |x| > 1 \end{cases}$$

is :

Options :

both continuous and differentiable

40503640978. on $\mathbb{R} - \{1\}$.

continuous on $\mathbb{R} - \{-1\}$ and
40503640979. differentiable on $\mathbb{R} - \{-1, 1\}$.

continuous on $\mathbb{R} - \{1\}$ and
40503640980. differentiable on $\mathbb{R} - \{-1, 1\}$.

both continuous and differentiable
40503640981. on $\mathbb{R} - \{-1\}$.

Question Number : 59 Question Id : 40503611289 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

$$\text{फलन } f(x) = \begin{cases} \frac{\pi}{4} + \tan^{-1}x, & |x| \leq 1 \\ \frac{1}{2} (|x| - 1), & |x| > 1 \end{cases} :$$

Options :

40503640978. $\mathbb{R} - \{1\}$ में संतत और अवकलनीय, दोनों, है।

40503640979. $\mathbb{R} - \{-1\}$ में संतत तथा $\mathbb{R} - \{-1, 1\}$ में अवकलनीय है।

40503640980. $\mathbb{R} - \{1\}$ में संतत तथा $\mathbb{R} - \{-1, 1\}$ में अवकलनीय है।

40503640981. $\mathbb{R} - \{-1\}$ में संतत और अवकलनीय, दोनों, है।

Question Number : 60 Question Id : 40503611290 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 minimum value of $2^{\sin x} + 2^{\cos x}$ is :

Options :

40503640982. $2^{1 - \frac{1}{\sqrt{2}}}$

40503640983. $2^{-1+\sqrt{2}}$

40503640984. $2^{-1+\frac{1}{\sqrt{2}}}$

40503640985. $2^{1-\sqrt{2}}$

Question Number : 60 Question Id : 40503611290 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

$2^{\sin x} + 2^{\cos x}$ का न्यूनतम मान है :

Options :

40503640982. $2^{1-\frac{1}{\sqrt{2}}}$

40503640983. $2^{-1+\sqrt{2}}$

40503640984. $2^{-1+\frac{1}{\sqrt{2}}}$

40503640985. $2^{1-\sqrt{2}}$

Question Number : 61 Question Id : 40503611291 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

$$\int_{\pi/6}^{\pi/3} \tan^3 x \cdot \sin^2 3x (2 \sec^2 x \cdot \sin^2 3x + 3 \tan x \cdot \sin 6x) dx \text{ is}$$

equal to :

Options :

40503640986. $\frac{7}{18}$

40503640987. $-\frac{1}{9}$

40503640988. $\frac{9}{2}$

40503640989. $-\frac{1}{18}$

**Question Number : 61 Question Id : 40503611291 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**

समाकल

$$\int_{\pi/6}^{\pi/3} \tan^3 x \cdot \sin^2 3x (2 \sec^2 x \cdot \sin^2 3x + 3 \tan x \cdot \sin 6x) dx$$

का मान है :

Options :

40503640986. $\frac{7}{18}$

40503640987. $-\frac{1}{9}$

40503640988. $\frac{9}{2}$

40503640989. $-\frac{1}{18}$

**Question Number : 62 Question Id : 40503611292 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 area (in sq. units) of the largest rectangle ABCD whose vertices A and B lie on the x -axis and vertices C and D lie on the parabola, $y = x^2 - 1$ below the x -axis, is :

Options :

40503640990. $\frac{2}{3\sqrt{3}}$

40503640991. $\frac{1}{3\sqrt{3}}$

40503640992. $\frac{4}{3\sqrt{3}}$

40503640993. $\frac{4}{3}$

Question Number : 62 Question Id : 40503611292 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

उस सबसे बड़ी आयत ABCD, जिसके शीर्ष बिंदु A तथा B, x -अक्ष पर स्थित हैं तथा शीर्ष बिंदु C तथा D, x -अक्ष के नीचे, परवलय $y = x^2 - 1$ पर स्थित हैं, का क्षेत्रफल (वर्ग इकाइयों में) है :

Options :

40503640990. $\frac{2}{3\sqrt{3}}$

40503640991. $\frac{1}{3\sqrt{3}}$

40503640992. $\frac{4}{3\sqrt{3}}$

40503640993. $\frac{4}{3}$

Question Number : 63 Question Id : 40503611293 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 solution of the differential equation

$$\frac{dy}{dx} - \frac{y + 3x}{\log_e(y + 3x)} + 3 = 0 \text{ is :}$$

(where C is a constant of integration.)

Options :

40503640994. $x - \log_e(y + 3x) = C$

40503640995. $x - 2\log_e(y + 3x) = C$

40503640996. $x - \frac{1}{2}(\log_e(y + 3x))^2 = C$

40503640997. $y + 3x - \frac{1}{2}(\log_e x)^2 = C$

Question Number : 63 Question Id : 40503611293 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

अवकल समीकरण

$$\frac{dy}{dx} - \frac{y + 3x}{\log_e(y + 3x)} + 3 = 0 \text{ का हल है :}$$

(जहाँ C एक समाकलन अचर है।)

Options :

40503640994. $x - \log_e(y + 3x) = C$

40503640995. $x - 2\log_e(y + 3x) = C$

40503640996. $x - \frac{1}{2}(\log_e(y + 3x))^2 = C$

40503640997. $y + 3x - \frac{1}{2}(\log_e x)^2 = C$

Question Number : 64 Question Id : 40503611294 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 the perpendicular bisector of the line segment joining the points P(1, 4) and Q(k, 3) has y-intercept equal to -4, then a value of k is :

Options :

40503640998. $\sqrt{14}$

40503640999. -2

40503641000. $\sqrt{15}$

40503641001. -4

Question Number : 64 Question Id : 40503611294 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 बिंदुओं P(1, 4) तथा Q(k, 3) को मिलाने वाले रेखाखण्ड के लंबसमद्विभाजक का y-अंतःखण्ड -4 है, तो k का एक मान है :

Options :

40503640998. $\sqrt{14}$

40503640999. -2

40503641000. $\sqrt{15}$

40503641001. -4

**Question Number : 65 Question Id : 40503611295 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 circle passing through the intersection of the circles, $x^2 + y^2 - 6x = 0$ and $x^2 + y^2 - 4y = 0$, having its centre on the line, $2x - 3y + 12 = 0$, also passes through the point :

Options :

40503641002. $(1, -3)$

40503641003. $(-3, 1)$

40503641004. $(-3, 6)$

40503641005. $(-1, 3)$

**Question Number : 65 Question Id : 40503611295 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

वृत्तों $x^2 + y^2 - 6x = 0$ तथा $x^2 + y^2 - 4y = 0$ के प्रतिच्छेदन बिंदुओं से हो कर जाने वाला वह वृत्त जिसका केंद्र, रेखा $2x - 3y + 12 = 0$ पर स्थित है, निम्न में से जिस बिंदु से भी हो कर जाता है, वह है :

Options :

40503641002. $(1, -3)$

40503641003. $(-3, 1)$

40503641004. $(-3, 6)$

40503641005. $(-1, 3)$

Question Number : 66 Question Id : 40503611296 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 $x=4$ be a directrix to an ellipse whose centre is at the origin and its eccentricity is

$\frac{1}{2}$. If $P(1, \beta)$, $\beta > 0$ is a point on this ellipse,

then the equation of the normal to it at P is :

Options :

40503641006. $4x - 3y = 2$

40503641007. $4x - 2y = 1$

40503641008. $8x - 2y = 5$

40503641009. $7x - 4y = 1$

Question Number : 66 Question Id : 40503611296 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 $x=4$ एक ऐसे दीर्घवृत्त की एक नियता है, जिसका

केंद्र मूल बिंदु पर है तथा जिसकी उत्केंद्रता $\frac{1}{2}$ है। यदि

$P(1, \beta)$, $\beta > 0$, इस दीर्घवृत्त पर स्थित एक बिंदु है, तो इसके P पर खींचे गए अभिलंब का समीकरण है :

Options :

40503641006. $4x - 3y = 2$

40503641007. $4x - 2y = 1$

40503641008. $8x - 2y = 5$

40503641009. $7x - 4y = 1$

Question Number : 67 Question Id : 40503611297 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 distance of the point $(1, -2, 3)$ from
the plane $x - y + z = 5$ measured parallel to
the line $\frac{x}{2} = \frac{y}{3} = \frac{z}{-6}$ is :

Options :

40503641010. $\frac{1}{7}$

40503641011. 1

40503641012. 7

40503641013. $\frac{7}{5}$

Question Number : 67 Question Id : 40503611297 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

बिंदु $(1, -2, 3)$ की समतल $x - y + z = 5$ से रेखा
 $\frac{x}{2} = \frac{y}{3} = \frac{z}{-6}$ के समांतर मापी गई दूरी है :

Options :

40503641010. $\frac{1}{7}$

40503641011. 1

40503641012. 7

40503641013. $\frac{7}{5}$

Question Number : 68 Question Id : 40503611298 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

In a game two players A and B take turns in throwing a pair of fair dice starting with player A and total of scores on the two dice, in each throw is noted. A wins the game if he throws a total of 6 before B throws a total of 7 and B wins the game if he throws a total of 7 before A throws a total of six. The game stops as soon as either of the players wins. The probability of A winning the game is :

Options :

40503641014. $\frac{5}{6}$

40503641015. $\frac{5}{31}$

40503641016. $\frac{31}{61}$

40503641017. $\frac{30}{61}$

Question Number : 68 Question Id : 40503611298 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 खेल में दो खिलाड़ी A तथा B बारी बारी से अनभिन्नत पासों के युग्म को फेंकते हैं, जबकि खिलाड़ी A खेल आरम्भ करता है, तथा प्रत्येक बार दोनों पासों पर आए अंकों का योग नोट किया जाता है। यदि B द्वारा फेंके गए पासों के अंकों का योग 7 आने से पहले A द्वारा फेंके गए पासों के अंकों का योग 6 आ जाता है, तो A जीतता है जबकि A द्वारा फेंके गए पासों के अंकों का योग 6 आने से पहले, B द्वारा फेंके गए पासों के अंकों का योग 7 आ जाता है, तो B जीतता है। किसी भी एक खिलाड़ी के जीतने पर खेल समाप्त हो जाता है। A के खेल को जीतने की प्रायिकता है :

Options :

40503641014. $\frac{5}{6}$

40503641015. $\frac{5}{31}$

40503641016. $\frac{31}{61}$

40503641017. $\frac{30}{61}$

Question Number : 69 Question Id : 40503611299 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 angle of elevation of a cloud C from a point P, 200 m above a still lake is 30° . If the angle of depression of the image of C in the lake from the point P is 60° , then PC (in m) is equal to :

Options :

40503641018. 100

40503641019. $200\sqrt{3}$

40503641020. 400

40503641021. $400\sqrt{3}$

Question Number : 69 Question Id : 40503611299 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 स्थिर जल वाली झील के तल से 200 मीटर की ऊँचाई पर स्थित एक बिंदु P से एक बादल C का उन्नयन कोण 30° है। यदि C के झील में प्रतिबिंब का P से अवनमन कोण 60° है, तो PC (मीटरों में) है :

Options :

40503641018. 100

40503641019. $200\sqrt{3}$

40503641020. 400

40503641021. $400\sqrt{3}$

Question Number : 70 Question Id : 40503611300 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

Contrapositive of the statement :

'If a function f is differentiable at a , then it is also continuous at a ', is :

Options :

40503641022. If a function f is continuous at a , then it is differentiable at a .

40503641023. If a function f is continuous at a , then it is not differentiable at a .

40503641024. If a function f is not continuous at a ,
then it is not differentiable at a .

40503641025. If a function f is not continuous at a ,
then it is differentiable at a .

Question Number : 70 Question Id : 40503611300 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

कथन,

‘यदि एक फलन f , a पर अवकलनीय है, तो यह a पर
संतत भी है’

का प्रतिधनात्मक कथन है :

Options :

40503641022. यदि एक फलन f , a पर संतत है, तो यह a पर
अवकलनीय है।

40503641023. यदि एक फलन f , a पर संतत है, तो यह a पर
अवकलनीय नहीं है।

40503641024. यदि एक फलन f , a पर संतत नहीं है, तो यह a
पर अवकलनीय नहीं है।

40503641025. यदि एक फलन f , a पर संतत नहीं है, तो यह a
पर अवकलनीय है।

Sub-Section Number :

2

Sub-Section Id :

405036790

Question Shuffling Allowed :

Yes

Question Number : 71 Question Id : 40503611301 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

If the variance of the following frequency distribution :

Class	:	10-20	20-30	30-40
-------	---	-------	-------	-------

Frequency	:	2	x	2
-----------	---	---	-----	---

is 50, then x 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 : 40503611301 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

यदि निम्न बारंबारता बंटन

वर्ग	:	10-20	20-30	30-40
------	---	-------	-------	-------

बारंबारता	:	2	x	2
-----------	---	---	-----	---

का प्रसरण 50 है, तो x का मान 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 : 40503611302 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

A test consists of 6 multiple choice questions, each having 4 alternative answers of which only one is correct. The number of ways, in which a candidate answers all six questions such that exactly four of the answers are correct, 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 : 72 Question Id : 40503611302 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

एक परीक्षा में 6 बहुविकल्पी प्रश्न हैं तथा प्रत्येक प्रश्न के उत्तर के लिए 4 विकल्प हैं जिनमें से केवल एक सही है। एक परीक्षार्थी द्वारा सभी 6 प्रश्नों के उत्तर इस प्रकार देने, ताकि उसके ठीक 4 प्रश्नों के उत्तर सही हों, के तरीकों की 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

Question Number : 73 Question Id : 40503611303 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

Let $\{x\}$ and $[x]$ denote the fractional part of x and the greatest integer $\leq x$ respectively of a real number x . If

$$\int_0^n \{x\} dx, \int_0^n [x] dx \quad \text{and} \quad 10(n^2 - n),$$

$(n \in \mathbb{N}, n > 1)$ are three consecutive terms of a G.P., then n 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 : 40503611303 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

माना $\{x\}$ तथा $[x]$, क्रमशः एक वास्तविक संख्या x के भिन्नात्मक भाग तथा महत्तम पूर्णांक $\leq x$, को दर्शाते हैं। यदि $\int_0^n \{x\} dx$, $\int_0^n [x] dx$ तथा $10(n^2 - n)$, ($n \in \mathbb{N}$, $n > 1$) एक गुणोत्तर श्रेणी के तीन क्रमागत पद हैं, तो n का मान 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 : 40503611304 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

Let PQ be a diameter of the circle $x^2 + y^2 = 9$.
If α and β are the lengths of the perpendiculars from P and Q on the straight line, $x + y = 2$ respectively, then the maximum value of $\alpha\beta$ 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 : 40503611304 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

माना PQ वृत्त $x^2 + y^2 = 9$ का एक व्यास है। यदि P तथा Q से रेखा $x + y = 2$ पर खींचे गए लंबों की लंबाइयाँ क्रमशः α तथा β हैं, तो $\alpha\beta$ का अधिकतम मान 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 : 40503611305 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

If $\vec{a} = 2\hat{i} + \hat{j} + 2\hat{k}$, then the value of

$$\left| \hat{i} \times (\vec{a} \times \hat{i}) \right|^2 + \left| \hat{j} \times (\vec{a} \times \hat{j}) \right|^2 +$$

$$\left| \hat{k} \times (\vec{a} \times \hat{k}) \right|^2 \text{ is equal to } \underline{\hspace{2cm}}.$$

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 : 40503611305 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

यदि $\vec{a} = 2\hat{i} + \hat{j} + 2\hat{k}$ है, तो

$$\left| \hat{i} \times (\vec{a} \times \hat{i}) \right|^2 + \left| \hat{j} \times (\vec{a} \times \hat{j}) \right|^2 +$$

$$\left| \hat{k} \times (\vec{a} \times \hat{k}) \right|^2 \text{ का मान है } \underline{\hspace{2cm}}।$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002