

National Testing Agency

Question Paper Name :	BTECH E 2nd Sep 2020 Shift 1
Subject Name :	BTECH E
Creation Date :	2020-09-02 15:14:44
Duration :	180
Total Marks :	300
Display Marks:	Yes
Share Answer Key With Delivery Engine :	Yes
Actual Answer Key :	Yes

BTECH

Group Number :	1
Group Id :	405036114
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 :	405036384
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 :	405036735
Question Shuffling Allowed :	Yes

Question Number : 51 Question Id : 40503610606 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 $R = \{(x, y) : x, y \in \mathbb{Z}, x^2 + 3y^2 \leq 8\}$ is a relation on the set of integers $\mathbb{Z}$, then the domain of R^{-1} is :

Options :

40503638651. $\{-2, -1, 0, 1, 2\}$

40503638652. $\{-2, -1, 1, 2\}$

40503638653. $\{-1, 0, 1\}$

40503638654. $\{0, 1\}$

Question Number : 51 Question Id : 40503610606 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 $R = \{(x, y) : x, y \in \mathbb{Z}, x^2 + 3y^2 \leq 8\}$, पूर्णाकों के समुच्चय $\mathbb{Z}$ में एक संबंध है, तो R^{-1} का प्रान्त है :

Options :

40503638651. $\{-2, -1, 0, 1, 2\}$

40503638652. $\{-2, -1, 1, 2\}$

40503638653. $\{-1, 0, 1\}$

40503638654. $\{0, 1\}$

Question Number : 52 Question Id : 40503610607 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 the equation,
 $5x^2 + 6x - 2 = 0$. If $S_n = \alpha^n + \beta^n$, $n = 1, 2, 3, \dots$,
then :

Options :

40503638655. $6S_6 + 5S_5 = 2S_4$

40503638656. $5S_6 + 6S_5 = 2S_4$

40503638657. $5S_6 + 6S_5 + 2S_4 = 0$

40503638658. $6S_6 + 5S_5 + 2S_4 = 0$

Question Number : 52 Question Id : 40503610607 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 $5x^2 + 6x - 2 = 0$ के मूल हैं। यदि $S_n = \alpha^n + \beta^n$, $n = 1, 2, 3, \dots$ है, तो :

Options :

40503638655. $6S_6 + 5S_5 = 2S_4$

40503638656. $5S_6 + 6S_5 = 2S_4$

40503638657. $5S_6 + 6S_5 + 2S_4 = 0$

40503638658. $6S_6 + 5S_5 + 2S_4 = 0$

Question Number : 53 Question Id : 40503610608 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 $\left(\frac{1 + \sin \frac{2\pi}{9} + i \cos \frac{2\pi}{9}}{1 + \sin \frac{2\pi}{9} - i \cos \frac{2\pi}{9}} \right)^3$ is :

Options :

40503638659. $\frac{1}{2}(\sqrt{3} - i)$

40503638660. $\frac{1}{2}(1 - i\sqrt{3})$

40503638661. $-\frac{1}{2}(1 - i\sqrt{3})$

40503638662. $-\frac{1}{2}(\sqrt{3} - i)$

Question Number : 53 Question Id : 40503610608 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

$\left(\frac{1 + \sin \frac{2\pi}{9} + i \cos \frac{2\pi}{9}}{1 + \sin \frac{2\pi}{9} - i \cos \frac{2\pi}{9}} \right)^3$ का मान है :

Options :

40503638659. $\frac{1}{2}(\sqrt{3} - i)$

40503638660. $\frac{1}{2}(1 - i\sqrt{3})$

40503638661. $-\frac{1}{2}(1 - i\sqrt{3})$

40503638662. $-\frac{1}{2}(\sqrt{3} - i)$

Question Number : 54 Question Id : 40503610609 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 be a 2×2 real matrix with entries from $\{0, 1\}$ and $|A| \neq 0$. Consider the following two statements :

(P) If $A \neq I_2$, then $|A| = -1$

(Q) If $|A| = 1$, then $\text{tr}(A) = 2$,

where I_2 denotes 2×2 identity matrix and $\text{tr}(A)$ denotes the sum of the diagonal entries of A . Then :

Options :

40503638663. (P) is true and (Q) is false

40503638664. (P) is false and (Q) is true

40503638665. Both (P) and (Q) are false

40503638666. Both (P) and (Q) are true

Question Number : 54 Question Id : 40503610609 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 एक 2×2 का वास्तविक आव्यूह है जिसके अवयव $\{0, 1\}$ में से हैं तथा $|A| \neq 0$ है। निम्न दो कथनों पर विचार कीजिए :

(P) यदि $A \neq I_2$, तो $|A| = -1$ है

(Q) यदि $|A| = 1$, तो $\text{tr}(A) = 2$ है,

जहाँ I_2 एक 2×2 के तत्समक आव्यूह (identity matrix) को दर्शाता है तथा $\text{tr}(A)$, आव्यूह A के विकर्ण के अवयवों के योगफल को दर्शाता है। तो :

Options :

40503638663. (P) सत्य है तथा (Q) असत्य है।

40503638664. (P) असत्य है तथा (Q) सत्य है।

40503638665. (P) तथा (Q) दोनों असत्य हैं।

40503638666. (P) तथा (Q) दोनों सत्य हैं।

Question Number : 55 Question Id : 40503610610 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 S be the set of all $\lambda \in \mathbb{R}$ for which the system of linear equations

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

$$x - 2y + \lambda z = -4$$

$$x + \lambda y + z = 4$$

has no solution. Then the set S

Options :

40503638667. is an empty set.

40503638668. is a singleton.

40503638669. contains exactly two elements.

40503638670. contains more than two elements.

Question Number : 55 Question Id : 40503610610 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 S , ऐसे सभी $\lambda \in \mathbb{R}$ का समुच्चय है, जिनके लिए
रैखिक समीकरण निकाय

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

$$x - 2y + \lambda z = -4$$

$$x + \lambda y + z = 4$$

का कोई हल नहीं है, तो समुच्चय S

Options :

40503638667. एक रिक्त समुच्चय है।

40503638668. एक एकल अवयव वाला समुच्चय है।

40503638669. में मात्र दो अवयव हैं।

40503638670. में दो से अधिक अवयव हैं।

Question Number : 56 Question Id : 40503610611 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 $\alpha > 0, \beta > 0$ be such that $\alpha^3 + \beta^2 = 4$. If the maximum value of the term independent of x in the binomial expansion of $\left(\alpha x^{\frac{1}{9}} + \beta x^{-\frac{1}{6}}\right)^{10}$ is $10k$, then k is equal to :

Options :

40503638671. 84

40503638672. 176

40503638673. 336

40503638674. 352

Question Number : 56 Question Id : 40503610611 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 $\alpha > 0, \beta > 0$ इस प्रकार हैं कि $\alpha^3 + \beta^2 = 4$ है।

यदि $\left(\alpha x^{\frac{1}{9}} + \beta x^{-\frac{1}{6}}\right)^{10}$ के द्विपद प्रसार में x से स्वतंत्र पद का अधिकतम मान $10k$ है, तो k का मान है :

Options :

40503638671. 84

40503638672. 176

40503638673. 336

40503638674. 352

Question Number : 57 Question Id : 40503610612 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 sum of the first three terms of a G.P. is
S and their product is 27. Then all such
S lie in :

Options :

40503638675. $[-3, \infty)$

40503638676. $(-\infty, -3] \cup [9, \infty)$

40503638677. $(-\infty, -9] \cup [3, \infty)$

40503638678. $(-\infty, 9]$

Question Number : 57 Question Id : 40503610612 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 गुणोत्तर श्रेणी के प्रथम तीन पदों का योगफल S है तथा गुणनफल 27 है, तो ऐसे सभी S जिसमें स्थित हैं, वह है :

Options :

40503638675. $[-3, \infty)$

40503638676. $(-\infty, -3] \cup [9, \infty)$

40503638677. $(-\infty, -9] \cup [3, \infty)$

40503638678. $(-\infty, 9]$

Question Number : 58 Question Id : 40503610613 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 $|x| < 1$, $|y| < 1$ and $x \neq y$, then the sum to infinity of the following series $(x+y) + (x^2+xy+y^2) + (x^3+x^2y+xy^2+y^3) + \dots$ is :

Options :

40503638679. $\frac{x + y + xy}{(1+x)(1+y)}$

40503638680. $\frac{x + y + xy}{(1-x)(1-y)}$

$$\frac{x + y - xy}{(1 - x)(1 - y)}$$

40503638681.

$$\frac{x + y - xy}{(1 + x)(1 + y)}$$

40503638682.

Question Number : 58 Question Id : 40503610613 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 $|x| < 1$, $|y| < 1$ तथा $x \neq y$ हैं, तो निम्न श्रेणी
 $(x + y) + (x^2 + xy + y^2) + (x^3 + x^2y + xy^2 + y^3) + \dots$
 के अनन्त पदों का योगफल है :

Options :

$$\frac{x + y + xy}{(1 + x)(1 + y)}$$

40503638679.

$$\frac{x + y + xy}{(1 - x)(1 - y)}$$

40503638680.

$$\frac{x + y - xy}{(1 - x)(1 - y)}$$

40503638681.

$$\frac{x + y - xy}{(1 + x)(1 + y)}$$

40503638682.

Question Number : 59 Question Id : 40503610614 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 function $f(x)$ defined by

$$f(x) = \begin{cases} ae^x + be^{-x}, & -1 \leq x < 1 \\ cx^2 & , \quad 1 \leq x \leq 3 \\ ax^2 + 2cx & , \quad 3 < x \leq 4 \end{cases}$$

be continuous for some $a, b, c \in \mathbb{R}$ and

$f'(0) + f'(2) = e$, then the value of a is :

Options :

40503638683. $\frac{e}{e^2 - 3e + 13}$

40503638684. $\frac{e}{e^2 + 3e + 13}$

40503638685. $\frac{e}{e^2 - 3e - 13}$

40503638686. $\frac{1}{e^2 - 3e + 13}$

Question Number : 59 Question Id : 40503610614 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 $f(x) = \begin{cases} ae^x + be^{-x}, & -1 \leq x < 1 \\ cx^2 & , \quad 1 \leq x \leq 3 \\ ax^2 + 2cx & , \quad 3 < x \leq 4 \end{cases}$

द्वारा परिभाषित फलन $f(x)$, किसी $a, b, c \in \mathbb{R}$ के लिए संतत है तथा $f'(0) + f'(2) = e$ है, तो a का मान है :

Options :

40503638683. $\frac{e}{e^2 - 3e + 13}$

40503638684. $\frac{e}{e^2 + 3e + 13}$

40503638685. $\frac{e}{e^2 - 3e - 13}$

40503638686. $\frac{1}{e^2 - 3e + 13}$

Question Number : 60 Question Id : 40503610615 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 tangent to the curve $y = x + \sin y$ at a point (a, b) is parallel to the line joining

$\left(0, \frac{3}{2}\right)$ and $\left(\frac{1}{2}, 2\right)$, then :

Options :

40503638687. $|b - a| = 1$

40503638688. $b = a$

40503638689. $|a + b| = 1$

40503638690. $b = \frac{\pi}{2} + a$

Question Number : 60 Question Id : 40503610615 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 वक्र $y = x + \sin y$ के एक बिंदु (a, b) पर खींची

गई स्पर्श रेखा, बिंदुओं $\left(0, \frac{3}{2}\right)$ तथा $\left(\frac{1}{2}, 2\right)$ को

मिलाने वाली रेखा के समांतर है, तो :

Options :

40503638687. $|b - a| = 1$

40503638688. $b = a$

40503638689. $|a + b| = 1$

40503638690. $b = \frac{\pi}{2} + a$

Question Number : 61 Question Id : 40503610616 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 $p(x)$ be a polynomial of degree three that has a local maximum value 8 at $x=1$ and a local minimum value 4 at $x=2$; then $p(0)$ is equal to :

Options :

40503638691. -12

40503638692. -24

40503638693. 6

40503638694. 12

Question Number : 61 Question Id : 40503610616 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 $p(x)$ घात तीन का एक ऐसा बहुपद है, जिसका स्थानीय अधिकतम मान 8, $x=1$ पर है तथा स्थानीय न्यूनतम मान 4, $x=2$ पर है; तो $p(0)$ बराबर है :

Options :

40503638691. -12

40503638692. -24

40503638693. 6

40503638694. 12

Question Number : 62 Question Id : 40503610617 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

Area (in sq. units) of the region outside

$\frac{|x|}{2} + \frac{|y|}{3} = 1$ and inside the ellipse

$\frac{x^2}{4} + \frac{y^2}{9} = 1$ is :

Options :

40503638695. $3(4 - \pi)$

40503638696. $6(4 - \pi)$

40503638697. $6(\pi - 2)$

40503638698. $3(\pi - 2)$

Question Number : 62 Question Id : 40503610617 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

$\frac{|x|}{2} + \frac{|y|}{3} = 1$ के बाह्य भाग और दीर्घवृत्त

$\frac{x^2}{4} + \frac{y^2}{9} = 1$ के अन्तः भाग के क्षेत्र का क्षेत्रफल

(वर्ग इकाइयों में) है :

Options :

40503638695. $3(4 - \pi)$

40503638696. $6(4 - \pi)$

40503638697. $6(\pi - 2)$

40503638698. $3(\pi - 2)$

Question Number : 63 Question Id : 40503610618 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,

$$\frac{2 + \sin x}{y + 1} \cdot \frac{dy}{dx} = -\cos x, y > 0, y(0) = 1. \text{ If}$$

$y(\pi) = a$ and $\frac{dy}{dx}$ at $x = \pi$ is b , then the

ordered pair (a, b) is equal to :

Options :

40503638699. $\left(2, \frac{3}{2}\right)$

40503638700. $(1, 1)$

40503638701. $(1, -1)$

40503638702. $(2, 1)$

Question Number : 63 Question Id : 40503610618 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 $y = y(x)$, अवकल समीकरण

$$\frac{2 + \sin x}{y + 1} \cdot \frac{dy}{dx} = -\cos x, y > 0, y(0) = 1, \text{ का}$$

हल है। यदि $y(\pi) = a$ है तथा $x = \pi$ पर $\frac{dy}{dx} = b$ है,

तो क्रमित युग्म (a, b) बराबर है :

Options :

40503638699. $\left(2, \frac{3}{2}\right)$

40503638700. $(1, 1)$

40503638701. $(1, -1)$

40503638702. (2, 1)

Question Number : 64 Question Id : 40503610619 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 $P(h, k)$ be a point on the curve $y = x^2 + 7x + 2$, nearest to the line, $y = 3x - 3$. Then the equation of the normal to the curve at P is :

Options :

40503638703. $x - 3y + 22 = 0$

40503638704. $x + 3y - 62 = 0$

40503638705. $x + 3y + 26 = 0$

40503638706. $x - 3y - 11 = 0$

Question Number : 64 Question Id : 40503610619 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 $P(h, k)$ वक्र $y = x^2 + 7x + 2$ पर स्थित एक बिंदु है, जो कि रेखा $y = 3x - 3$ के निकटतम है। तो बिंदु P पर वक्र के अभिलंब का समीकरण है :

Options :

40503638703. $x - 3y + 22 = 0$

40503638704. $x + 3y - 62 = 0$

40503638705. $x + 3y + 26 = 0$

40503638706. $x - 3y - 11 = 0$

Question Number : 65 Question Id : 40503610620 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 line parallel to the straight line $2x - y = 0$

is tangent to the hyperbola $\frac{x^2}{4} - \frac{y^2}{2} = 1$

at the point (x_1, y_1) . Then $x_1^2 + 5y_1^2$ is equal to :

Options :

40503638707. 10

40503638708. 8

40503638709. 6

40503638710. 5

Question Number : 65 Question Id : 40503610620 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

सरल रेखा $2x - y = 0$ के समानांतर खींची गई एक

रेखा अतिपरवलय $\frac{x^2}{4} - \frac{y^2}{2} = 1$ के बिंदु (x_1, y_1)

पर स्पर्श रेखा है, तो $x_1^2 + 5y_1^2$ का मान है :

Options :

40503638707. 10

40503638708. 8

40503638709. 6

40503638710. 5

Question Number : 66 Question Id : 40503610621 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 plane passing through the points $(1, 2, 1)$, $(2, 1, 2)$ and parallel to the line, $2x = 3y$, $z = 1$ also passes through the point :

Options :

40503638711. $(2, 0, -1)$

40503638712. $(-2, 0, 1)$

40503638713. $(0, 6, -2)$

40503638714. $(0, -6, 2)$

Question Number : 66 Question Id : 40503610621 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

बिंदुओं $(1, 2, 1)$ तथा $(2, 1, 2)$ से होकर जाने वाला
तथा रेखा $2x = 3y, z = 1$ के समांतर समतल, निम्न में
से जिस अन्य बिंदु से भी होकर जाता है, वह है :

Options :

40503638711. $(2, 0, -1)$

40503638712. $(-2, 0, 1)$

40503638713. $(0, 6, -2)$

40503638714. $(0, -6, 2)$

Question Number : 67 Question Id : 40503610622 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 $X = \{x \in \mathbb{N} : 1 \leq x \leq 17\}$ and
 $Y = \{ax + b : x \in X \text{ and } a, b \in \mathbb{R}, a > 0\}$. If
mean and variance of elements of Y are 17
and 216 respectively then $a + b$ is equal to :

Options :

40503638715. ⁻²⁷

40503638716. ⁷

40503638717. ⁻⁷

40503638718. ⁹

Question Number : 67 Question Id : 40503610622 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 $X = \{x \in \mathbb{N} : 1 \leq x \leq 17\}$ तथा $Y = \{ax + b : x \in X \text{ तथा } a, b \in \mathbb{R}, a > 0\}$ हैं। यदि Y के अवयवों के माध्य तथा प्रसरण क्रमशः 17 तथा 216 हैं, तो $a + b$ बराबर है :

Options :

40503638715. ⁻²⁷

40503638716. ⁷

40503638717. ⁻⁷

40503638718. ⁹

Question Number : 68 Question Id : 40503610623 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

Box I contains 30 cards numbered 1 to 30 and Box II contains 20 cards numbered 31 to 50. A box is selected at random and a card is drawn from it. The number on the card is found to be a non-prime number. The probability that the card was drawn from Box I is :

Options :

40503638719. $\frac{8}{17}$

40503638720. $\frac{4}{17}$

40503638721. $\frac{2}{5}$

40503638722. $\frac{2}{3}$

Question Number : 68 Question Id : 40503610623 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

बक्से I में 30 कार्ड हैं जिन पर 1 से 30 तक की संख्याएँ अंकित हैं जबकि बक्से II में 20 कार्ड हैं जिन पर 31 से 50 तक की संख्याएँ अंकित हैं। यादृच्छया एक बक्सा चुना जाता है, तथा उसमें से एक कार्ड निकाला जाता है। यह पाया जाता है कि इस कार्ड की अंकित संख्या अभाज्य संख्या नहीं है। इस कार्ड के बक्से I से निकाले जाने की प्रायिकता है :

Options :

40503638719. $\frac{8}{17}$

40503638720. $\frac{4}{17}$

40503638721. $\frac{2}{5}$

40503638722. $\frac{2}{3}$

Question Number : 69 Question Id : 40503610624 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 domain of the function

$$f(x) = \sin^{-1}\left(\frac{|x| + 5}{x^2 + 1}\right) \text{ is}$$

$(-\infty, -a] \cup [a, \infty)$. Then a is equal to :

Options :

40503638723. $\frac{\sqrt{17}}{2}$

40503638724. $\frac{1 + \sqrt{17}}{2}$

40503638725. $\frac{\sqrt{17} - 1}{2}$

40503638726. $\frac{\sqrt{17}}{2} + 1$

Question Number : 69 Question Id : 40503610624 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

फलन $f(x) = \sin^{-1}\left(\frac{|x| + 5}{x^2 + 1}\right)$ का प्रांत

$(-\infty, -a] \cup [a, \infty)$ है। तो a का मान है :

Options :

40503638723. $\frac{\sqrt{17}}{2}$

40503638724. $\frac{1 + \sqrt{17}}{2}$

40503638725. $\frac{\sqrt{17} - 1}{2}$

40503638726. $\frac{\sqrt{17}}{2} + 1$

Question Number : 70 Question Id : 40503610625 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 contrapositive of the statement "If I reach the station in time, then I will catch the train" is :

Options :

40503638727. If I do not reach the station in time, then I will catch the train.

40503638728. If I do not reach the station in time, then I will not catch the train.

40503638729. If I will catch the train, then I reach the station in time.

40503638730. If I will not catch the train, then I do not reach the station in time.

Question Number : 70 Question Id : 40503610625 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 मैं समय पर स्टेशन पहुँचता हूँ, तो मैं रेलगाड़ी पकड़ लूंगा” का प्रतिघनात्मक कथन है :

Options :

40503638727. “यदि मैं स्टेशन समय पर नहीं पहुँचता, तो मैं रेलगाड़ी पकड़ लूंगा”।

40503638728. “यदि मैं स्टेशन समय पर नहीं पहुँचता, तो मैं रेलगाड़ी नहीं पकड़ पाऊंगा”।

40503638729. “यदि मैं रेलगाड़ी पकड़ लूंगा, तो मैं समय पर स्टेशन पहुँचता हूँ।”

40503638730. “यदि मैं रेलगाड़ी नहीं पकड़ूँगा, तो मैं समय पर स्टेशन नहीं पहुँचता हूँ।”

Sub-Section Number :

2

Sub-Section Id :

405036736

Question Shuffling Allowed :

Yes

Question Number : 71 Question Id : 40503610626 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

If the letters of the word ‘MOTHER’ be permuted and all the words so formed (with or without meaning) be listed as in a dictionary, then the position of the word ‘MOTHER’ 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 : 71 Question Id : 40503610626 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

यदि शब्द 'MOTHER' के अक्षरों का क्रम परिवर्तन किया जाए तथा इस प्रकार बने सभी शब्दों (अर्थ सहित अथवा अर्थविहीन) को शब्दकोश के अनुसार सूचीबद्ध किया जाए, तो शब्द 'MOTHER' की स्थिति 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 : 40503610627 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

If

$$\lim_{x \rightarrow 1} \frac{x + x^2 + x^3 + \dots + x^n - n}{x - 1} = 820, (n \in \mathbf{N})$$

then the value of 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 : 72 Question Id : 40503610627 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

यदि

$$\lim_{x \rightarrow 1} \frac{x + x^2 + x^3 + \dots + x^n - n}{x - 1} = 820, (n \in \mathbf{N})$$

है, 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 : 73 Question Id : 40503610628 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

The integral $\int_0^2 ||x - 1| - x| dx$ 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 : 40503610628 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

समाकल $\int_0^2 ||x-1|-x|dx$ 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 : 40503610629 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

The number of integral values of k for which the line, $3x + 4y = k$ intersects the circle, $x^2 + y^2 - 2x - 4y + 4 = 0$ at two distinct points 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 : 40503610629 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

k के पूर्णांकीय मानों की संख्या, जिनके लिए सरल रेखा $3x + 4y = k$ वृत्त $x^2 + y^2 - 2x - 4y + 4 = 0$ को दो भिन्न बिंदुओं पर काटती है, 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 : 40503610630 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

Let $\vec{a}$, $\vec{b}$ and $\vec{c}$ be three unit vectors such

that $|\vec{a} - \vec{b}|^2 + |\vec{a} - \vec{c}|^2 = 8$. Then

$|\vec{a} + 2\vec{b}|^2 + |\vec{a} + 2\vec{c}|^2$ 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 : 75 Question Id : 40503610630 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

माना $\vec{a}$, $\vec{b}$ तथा $\vec{c}$ तीन ऐसे मात्रक सदिश हैं, कि

$$|\vec{a} - \vec{b}|^2 + |\vec{a} - \vec{c}|^2 = 8 \text{ है, तो}$$

$$|\vec{a} + 2\vec{b}|^2 + |\vec{a} + 2\vec{c}|^2 \text{ बराबर है}$$

_____।

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002