

National Testing Agency

Question Paper Name:	BTECH 8th Jan 2020 Shift 1
Subject Name:	BTECH
Creation Date:	2020-01-08 15:09:15
Duration:	180
Total Marks:	300
Display Marks:	Yes

BTECH

Group Number :	1
Group Id :	40503618
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 :	40503659
Section Number :	3
Section type :	Online
Mandatory or Optional:	Mandatory
Number of Questions:	25
Number of Questions to be attempted:	25
Section Marks:	100

Sub-Section Number:	1
Sub-Section Id:	40503690
Question Shuffling Allowed :	Yes

Question Number : 51 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

$$f(x) = \frac{8^{2x} - 8^{-2x}}{8^{2x} + 8^{-2x}}, x \in (-1, 1) \text{ का व्युत्क्रम}$$

फलन है _____.

Options :

1. $\frac{1}{4} \log_e \left(\frac{1+x}{1-x} \right)$

2. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1-x}{1+x} \right)$

3. $\frac{1}{4} \log_e \left(\frac{1-x}{1+x} \right)$

4. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1+x}{1-x} \right)$

Question Number : 51 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

$$f(x) = \frac{8^{2x} - 8^{-2x}}{8^{2x} + 8^{-2x}}, x \in (-1, 1) \text{ નું વ્યસ્ત}$$

વિધેય _____ છે.

Options :

1. $\frac{1}{4} \log_e \left(\frac{1+x}{1-x} \right)$

2. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1-x}{1+x} \right)$

3. $\frac{1}{4} \log_e \left(\frac{1-x}{1+x} \right)$

4. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1+x}{1-x} \right)$

Question Number : 51 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

The inverse function of

$$f(x) = \frac{8^{2x} - 8^{-2x}}{8^{2x} + 8^{-2x}}, x \in (-1, 1), \text{ is}$$

_____.

Options :

1. $\frac{1}{4} \log_e \left(\frac{1+x}{1-x} \right)$

2. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1-x}{1+x} \right)$

3. $\frac{1}{4} \log_e \left(\frac{1-x}{1+x} \right)$

4. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1+x}{1-x} \right)$

Question Number : 52 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

If the equation, $x^2 + bx + 45 = 0$ ($b \in \mathbb{R}$) has conjugate complex roots and they satisfy

$$|z + 1| = 2\sqrt{10}, \text{ then :}$$

Options :

1. $b^2 + b = 12$

2. $b^2 - b = 42$

3. $b^2 - b = 30$

4. $b^2 + b = 72$

Question Number : 52 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

यदि समीकरण $x^2 + bx + 45 = 0$, ($b \in \mathbb{R}$) के संयुग्मी सम्मिश्र मूल हैं, जो $|z + 1| = 2\sqrt{10}$ को संतुष्ट करते हैं, तो :

Options :

1. $b^2 + b = 12$

2. $b^2 - b = 42$

3. $b^2 - b = 30$

4. $b^2 + b = 72$

Question Number : 52 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

જો સમીકરણ $x^2 + bx + 45 = 0$ ($b \in \mathbb{R}$) ની બીજ,
અનુબદ્ધ સંકર સંખ્યાઓ હોય અને તે $|z + 1| = 2\sqrt{10}$
નું સમાધાન કરે તો :

Options :

1. $b^2 + b = 12$

2. $b^2 - b = 42$

3. $b^2 - b = 30$

4. $b^2 + b = 72$

Question Number : 53 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

For which of the following ordered pairs

(μ, δ) , the system of linear equations

$$x + 2y + 3z = 1$$

$$3x + 4y + 5z = \mu$$

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

is inconsistent ?

Options :

1. $(1, 0)$

2. $(3, 4)$

3. $(4, 3)$

4. $(4, 6)$

Question Number : 53 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

निम्न में से किस क्रमित युग्म (μ, δ) के लिए रेखिक
समीकरण निकाय

$$x + 2y + 3z = 1$$

$$3x + 4y + 5z = \mu$$

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

असंगत (inconsistent) है ?

Options :

1. (1, 0)

2. (3, 4)

3. (4, 3)

4. (4, 6)

Question Number : 53 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

નીચેના માંથી કઈ ક્રમયુક્ત જોડ (μ, δ) માટે સુરેખ
સમીકરણ સંહિતિ

$$x + 2y + 3z = 1$$

$$3x + 4y + 5z = \mu$$

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

સુસંગત નથી ?

Options :

1. (1, 0)

2. (3, 4)

3. (4, 3)

4. (4, 6)

Question Number : 54 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Let two points be $A(1, -1)$ and $B(0, 2)$. If a point $P(x', y')$ be such that the area of $\Delta PAB = 5$ sq. units and it lies on the line, $3x + y - 4\lambda = 0$, then a value of λ is :

Options :

1. 1

2. 4

3. -3

4. 3

Question Number : 54 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

माना $A(1, -1)$ तथा $B(0, 2)$ दो बिन्दु हैं। यदि एक बिंदु $P(x', y')$ इस प्रकार है कि ΔPAB का क्षेत्रफल $= 5$ वर्ग इकाई है तथा यह रेखा $3x + y - 4\lambda = 0$ पर स्थित है, तो λ का एक मान है :

Options :

1. 1

2. 4

3. -3

4. 3

Question Number : 54 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

ધારો કે બે બિંદુઓ $A(1, -1)$ અને $B(0, 2)$ છે. જો $P(x', y')$ એવું બિંદુ હોય કે જે રેખા $3x + y - 4\lambda = 0$ પર આવેલું હોય અને ΔPAB નું ક્ષેત્રફળ $= 5$ થો. એકમ હોય, તો λ ની કિંમત _____ છે.

Options :

1. 1

2. 4

3. -3

4. 3

Question Number : 55 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

If a , b and c are the greatest values of

${}^{19}C_p$, ${}^{20}C_q$ and ${}^{21}C_r$ respectively, then :

Options :

1. $\frac{a}{11} = \frac{b}{22} = \frac{c}{21}$

2. $\frac{a}{10} = \frac{b}{11} = \frac{c}{42}$

3. $\frac{a}{10} = \frac{b}{11} = \frac{c}{21}$

4. $\frac{a}{11} = \frac{b}{22} = \frac{c}{42}$

Question Number : 55 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

यदि a, b तथा c क्रमशः $^{19}C_p$, $^{20}C_q$ तथा $^{21}C_r$ के अधिकतम मान हैं, तो :

Options :

1. $\frac{a}{11} = \frac{b}{22} = \frac{c}{21}$

2. $\frac{a}{10} = \frac{b}{11} = \frac{c}{42}$

3. $\frac{a}{10} = \frac{b}{11} = \frac{c}{21}$

4. $\frac{a}{11} = \frac{b}{22} = \frac{c}{42}$

Question Number : 55 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

જો a, b અને c એ અનુક્રમે $^{19}C_p$, $^{20}C_q$ અને $^{21}C_r$ ની મહત્તમ કિંમતો હોય, તો :

Options :

1. $\frac{a}{11} = \frac{b}{22} = \frac{c}{21}$

2. $\frac{a}{10} = \frac{b}{11} = \frac{c}{42}$

3. $\frac{a}{10} = \frac{b}{11} = \frac{c}{21}$

4. $\frac{a}{11} = \frac{b}{22} = \frac{c}{42}$

Question Number : 56 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be such that for all $x \in \mathbb{R}$
 $(2^{1+x} + 2^{1-x}), f(x)$ and $(3^x + 3^{-x})$ are in A.P.,
 then the minimum value of $f(x)$ is :

Options :

1. 0

2. 2

3. 3

4. 4

Question Number : 56 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

माना $f : \mathbb{R} \rightarrow \mathbb{R}$ इस प्रकार है कि सभी $x \in \mathbb{R}$ के
 लिए $(2^{1+x} + 2^{1-x}), f(x)$ तथा $(3^x + 3^{-x})$ एक
 समांतर श्रेणी में हैं, तो $f(x)$ का न्यूनतम मान है :

Options :

1. 0

2. 2

3. 3

4. 4

Question Number : 56 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

ધારો કે $f : \mathbb{R} \rightarrow \mathbb{R}$ એવું છે કે જેથી પ્રત્યેક $x \in \mathbb{R}$
માટે $(2^{1+x} + 2^{1-x}), f(x)$ અને $(3^x + 3^{-x})$ સમાંતર
શ્રેણી (A.P.) માં હોય, તો $f(x)$ ની ન્યૂનતમ કિંમત
_____ છે.

Options :

1. 0

2. 2

3. 3

4. 4

Question Number : 57 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

$\lim_{x \rightarrow 0} \left(\frac{3x^2 + 2}{7x^2 + 2} \right)^{1/x^2}$ is equal to :

Options :

1. e

2. e²

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

4. $\frac{1}{e^2}$

Question Number : 57 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

$$\lim_{x \rightarrow 0} \left(\frac{3x^2 + 2}{7x^2 + 2} \right)^{1/x^2} \text{ बराबर है :}$$

Options :

1. e

2. e^2

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

4. $\frac{1}{e^2}$

Question Number : 57 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

$$\lim_{x \rightarrow 0} \left(\frac{3x^2 + 2}{7x^2 + 2} \right)^{1/x^2} = \underline{\hspace{2cm}} .$$

Options :

1. e

2. e^2

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

4. $\frac{1}{e^2}$

Question Number : 58 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Let $f(x) = x \cos^{-1}(-\sin|x|)$, $x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$,

then which of the following is true ?

Options :

1. f is not differentiable at $x=0$

2. $f'(0) = -\frac{\pi}{2}$

3. f' is decreasing in $\left(-\frac{\pi}{2}, 0\right)$ and
increasing in $\left(0, \frac{\pi}{2}\right)$

4. f' is increasing in $\left(-\frac{\pi}{2}, 0\right)$ and
decreasing in $\left(0, \frac{\pi}{2}\right)$

Question Number : 58 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

माना $f(x) = x \cos^{-1}(-\sin|x|)$, $x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

है, तो निम्न में से कौन सा सत्य है ?

Options :

1. $f, x=0$ પર અવકલનીય નહીં છે.

2. $f'(0) = -\frac{\pi}{2}$

3. $f', \left(-\frac{\pi}{2}, 0\right)$ મેં હ્રાસમાન છે તથા $\left(0, \frac{\pi}{2}\right)$ મેં વર્ધમાન છે.

4. $f', \left(-\frac{\pi}{2}, 0\right)$ મેં વર્ધમાન છે તથા $\left(0, \frac{\pi}{2}\right)$ મેં હ્રાસમાન છે.

Question Number : 58 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

જો $f(x) = x \cos^{-1}(-\sin|x|), x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right],$

તો નીચેનામાંથી કયું સાચું છે?

Options :

1. $f, x=0$ આગળ વિકલનીય નથી.

2. $f'(0) = -\frac{\pi}{2}$

3. f' એ $\left(-\frac{\pi}{2}, 0\right)$ માં ઘટતું અને $\left(0, \frac{\pi}{2}\right)$ માં વધતું છે.

$$f' \text{ એ } \left(-\frac{\pi}{2}, 0 \right) \text{ માં વધતું અને } \left(0, \frac{\pi}{2} \right)$$

4. માં ઘટતું છે.

Question Number : 59 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

If c is a point at which Rolle's theorem holds for the function,

$$f(x) = \log_e \left(\frac{x^2 + \alpha}{7x} \right) \text{ in the interval}$$

$[3, 4]$, where $\alpha \in \mathbb{R}$, then $f''(c)$ is equal to :

Options :

1. $\frac{\sqrt{3}}{7}$

2. $\frac{1}{12}$

3. $-\frac{1}{24}$

4. $-\frac{1}{12}$

Question Number : 59 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

यदि c एक बिंदु है जिस पर, अंतराल $[3, 4]$ में,

$$\text{फलन } f(x) = \log_e \left(\frac{x^2 + \alpha}{7x} \right) \text{ पर रोले प्रमेय}$$

लागू होता है, जहाँ $\alpha \in \mathbb{R}$ है, तो $f''(c)$ बराबर है :

Options :

1. $\frac{\sqrt{3}}{7}$

2. $\frac{1}{12}$

3. $-\frac{1}{24}$

4. $-\frac{1}{12}$

Question Number : 59 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

જો c એ એવું બિંદુ હોય કે જે વિધેય

$$f(x) = \log_e \left(\frac{x^2 + \alpha}{7x} \right) \text{ માટે અંતરાલ } [3, 4] \text{ માં}$$

રોલના પ્રમેયનું પાલન કરે, જ્યાં $\alpha \in \mathbb{R}$ તો

$$f''(c) = \underline{\hspace{2cm}}.$$

Options :

1. $\frac{\sqrt{3}}{7}$

2. $\frac{1}{12}$

3. $-\frac{1}{24}$

4. $-\frac{1}{12}$

Question Number : 60 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

If

$$\int \frac{\cos x \, dx}{\sin^3 x (1 + \sin^6 x)^{\frac{2}{3}}} = f(x) (1 + \sin^6 x)^{\frac{1}{\lambda}} + c$$

where c is a constant of integration, then

$\lambda f\left(\frac{\pi}{3}\right)$ is equal to :

Options :

1. $\frac{9}{8}$

2. $-\frac{9}{8}$

3. 2

4. -2

Question Number : 60 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

यदि

$$\int \frac{\cos x \, dx}{\sin^3 x (1 + \sin^6 x)^{\frac{2}{3}}} = f(x) (1 + \sin^6 x)^{\frac{1}{\lambda}} + c$$

है, जहाँ c एक समाकलन अचर है, तो $\lambda f\left(\frac{\pi}{3}\right)$ का

मान है :

Options :

1. $\frac{9}{8}$

2. $-\frac{9}{8}$

3. 2

4. -2

Question Number : 60 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

જો

$$\int \frac{\cos x \, dx}{\sin^3 x (1 + \sin^6 x)^{2/3}} = f(x) (1 + \sin^6 x)^{1/3} + c,$$

જ્યાં c એ સંકલનનો અચળાંક હોય, તો

$$\lambda f\left(\frac{\pi}{3}\right) = \underline{\hspace{2cm}}.$$

Options :

1. $\frac{9}{8}$

2. $-\frac{9}{8}$

3. 2

4. -2

Question Number : 61 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

For $a > 0$, let the curves $C_1 : y^2 = ax$ and $C_2 : x^2 = ay$ intersect at origin O and a point P. Let the line $x = b$ ($0 < b < a$) intersect the chord OP and the x -axis at points Q and R, respectively. If the line $x = b$ bisects the area bounded by the curves, C_1 and C_2 , and the area of $\Delta OQR = \frac{1}{2}$, then 'a' satisfies the equation :

Options :

1. $x^6 + 6x^3 - 4 = 0$

2. $x^6 - 12x^3 + 4 = 0$

3. $x^6 - 12x^3 - 4 = 0$

4. $x^6 - 6x^3 + 4 = 0$

Question Number : 61 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

$a > 0$ के लिए, माना वक्र $C_1 : y^2 = ax$ तथा $C_2 : x^2 = ay$, मूलबिंदु O तथा एक बिंदु P पर काटते हैं। माना रेखा $x = b$, ($0 < b < a$), जीवा OP तथा x - अक्ष को क्रमशः बिंदुओं Q तथा R पर काटती है। यदि रेखा $x = b$, वक्रों C_1 तथा C_2 द्वारा परिवद्ध क्षेत्र को समद्विभाजित करती है तथा ΔOQR का क्षेत्रफल $= \frac{1}{2}$ है, तो 'a' जिस समीकरण को संतुष्ट करता है, वह है :

Options :

1. $x^6 + 6x^3 - 4 = 0$

2. $x^6 - 12x^3 + 4 = 0$

3. $x^6 - 12x^3 - 4 = 0$

4. $x^6 - 6x^3 + 4 = 0$

Question Number : 61 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ધારો કે $a > 0$ માટે વક્રો $C_1 : y^2 = ax$ અને $C_2 : x^2 = ay$ પરસ્પર ઉગમબિંદુ O અને બિંદુ P આગળ છેદે છે. ધારોકે રેખા $x = b$ ($0 < b < a$) એ, જીવા OP અને x - અક્ષને અનુક્રમે બિંદુઓ Q અને R માં છેદે છે. જો રેખા $x = b$ એ વક્રો C_1 અને C_2 દ્વારા આવૃત્ત પ્રદેશના ક્ષેત્રફળને દુભાગે અને ΔOQR નું ક્ષેત્રફળ $= \frac{1}{2}$ હોય, તો 'a' એ _____ સમીકરણનું સમાધાન કરે.

Options :

1. $x^6 + 6x^3 - 4 = 0$

2. $x^6 - 12x^3 + 4 = 0$

3. $x^6 - 12x^3 - 4 = 0$

4. $x^6 - 6x^3 + 4 = 0$

Question Number : 62 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

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

$$\sqrt{1-x^2} \frac{dy}{dx} + \sqrt{1-y^2} = 0, |x| < 1.$$

If $y\left(\frac{1}{2}\right) = \frac{\sqrt{3}}{2}$, then $y\left(\frac{-1}{\sqrt{2}}\right)$ is equal to :

Options :

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

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

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

4. $-\frac{\sqrt{3}}{2}$

Question Number : 62 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

माना $y = y(x)$, अवकल समीकरण

$$\sqrt{1-x^2} \frac{dy}{dx} + \sqrt{1-y^2} = 0, |x| < 1 \text{ का एक}$$

हल है। यदि $y\left(\frac{1}{2}\right) = \frac{\sqrt{3}}{2}$ है, तो $y\left(\frac{-1}{\sqrt{2}}\right)$ बराबर है :

Options :

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

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

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

4. $-\frac{\sqrt{3}}{2}$

Question Number : 62 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

ધારો કે $y=y(x)$ એ વિકલ સમીકરણ

$$\sqrt{1-x^2} \frac{dy}{dx} + \sqrt{1-y^2} = 0, |x| < 1 \text{ નો ઉકેલ}$$

છે. જો $y\left(\frac{1}{2}\right) = \frac{\sqrt{3}}{2}$, તો

$y\left(\frac{-1}{\sqrt{2}}\right) = \underline{\hspace{2cm}}.$

Options :

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

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

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

4. $-\frac{\sqrt{3}}{2}$

Question Number : 63 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

The locus of a point which divides the line segment joining the point $(0, -1)$ and a point on the parabola, $x^2 = 4y$, internally in the ratio $1 : 2$, is :

Options :

1. $4x^2 - 3y = 2$

2. $x^2 - 3y = 2$

3. $9x^2 - 12y = 8$

4. $9x^2 - 3y = 2$

Question Number : 63 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

बिंदु $(0, -1)$ तथा परवलय $x^2 = 4y$ पर स्थित एक बिंदु को मिलाने वाले रेखाखण्ड का $1 : 2$ के अनुपात में अंतःविभाजन करने वाले बिंदु का बिंदुपथ है :

Options :

1. $4x^2 - 3y = 2$

2. $x^2 - 3y = 2$

3. $9x^2 - 12y = 8$

4. $9x^2 - 3y = 2$

Question Number : 63 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

બિંદુ $(0, -1)$ અને પરવલય $x^2 = 4y$ પરના બિંદુને જોડતા રેખાખંડનું, $1 : 2$ ગુણોત્તરમાં અંતઃ વિભાજન કરતા બિંદુનો બિંદુપથ _____ છે.

Options :

1. $4x^2 - 3y = 2$

2. $x^2 - 3y = 2$

3. $9x^2 - 12y = 8$

4. $9x^2 - 3y = 2$

Question Number : 64 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Let the line $y = mx$ and the ellipse $2x^2 + y^2 = 1$ intersect at a point P in the first quadrant. If the normal to this ellipse at P

meets the co-ordinate axes at $\left(-\frac{1}{3\sqrt{2}}, 0\right)$

and $(0, \beta)$, then β is equal to :

Options :

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

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

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

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

Question Number : 64 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

માના રેખા $y = mx$ તથા દીર્ઘવૃત્ત $2x^2 + y^2 = 1$, પ્રથમ ચતુર્થાંશ મેં સ્થિત એક બિંદુ P પર કાટતે હૈં. યદિ ઇસ દીર્ઘવૃત્ત કા P પર અભિલંબ, નિર્દેશાંક અક્ષોં કો ક્રમશઃ

$\left(-\frac{1}{3\sqrt{2}}, 0\right)$ તથા $(0, \beta)$ પર મિલતા હૈ, તો β કા

માન હૈ :

Options :

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

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

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

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

Question Number : 64 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ધારો કે રેખા $y = mx$ અને ઉપવલય $2x^2 + y^2 = 1$, પ્રથમ ચરણમાં પરસ્પર P બિંદુએ છેદે છે. જો આ ઉપવલયનો બિંદુ P આગળ નો અભિલંબ, યામાક્ષોને

$\left(-\frac{1}{3\sqrt{2}}, 0\right)$ અને $(0, \beta)$ બિંદુઓ એ મળે, તો

$\beta =$ _____ .

Options :

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

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

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

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

Question Number : 65 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The shortest distance between the lines

$$\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1} \text{ and}$$

$$\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4} \text{ is :}$$

Options :

1. $2\sqrt{30}$

2. $3\sqrt{30}$

3. 3

4. $\frac{7}{2}\sqrt{30}$

Question Number : 65 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

रेखाओं $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$ तथा

$\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$ के बीच की न्यूनतम

दूरी है :

Options :

1. $2\sqrt{30}$

2. $3\sqrt{30}$

3. 3

4. $\frac{7}{2}\sqrt{30}$

Question Number : 65 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

रेखाओं $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$ અને

$\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$ વચ્ચેનું લઘુત્તમ અંતર
_____ છે.

Options :

1. $2\sqrt{30}$

2. $3\sqrt{30}$

3. 3

4. $\frac{7}{2}\sqrt{30}$

Question Number : 66 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Let the volume of a parallelopiped whose coterminous edges are given by

$$\vec{u} = \hat{i} + \hat{j} + \lambda\hat{k}, \vec{v} = \hat{i} + \hat{j} + 3\hat{k} \text{ and}$$

$$\vec{w} = 2\hat{i} + \hat{j} + \hat{k} \text{ be 1 cu. unit. If } \theta \text{ be the}$$

angle between the edges $\vec{u}$ and $\vec{w}$, then $\cos\theta$ can be :

Options :

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

2. $\frac{7}{6\sqrt{6}}$

3. $\frac{7}{6\sqrt{3}}$

4. $\frac{5}{3\sqrt{3}}$

Question Number : 66 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

માના એક સમાન્તર ષટ્ફલક, જિસકે એક હી શીર્ષ સે
 હોકર જાને વાલે કિનારે $\vec{u} = \hat{i} + \hat{j} + \lambda\hat{k}$,
 $\vec{v} = \hat{i} + \hat{j} + 3\hat{k}$ તથા $\vec{w} = 2\hat{i} + \hat{j} + \hat{k}$
 દ્વારા પ્રદત્ત હૈં, કા આયતન 1 ઘન ઇકાઈ હૈ. યદિ કિનારોં
 $\vec{u}$ તથા $\vec{w}$ કે બીચ કા કોણ θ હૈ, તો $\cos\theta$ હો સકતા
 હૈ :

Options :

1. $\frac{5}{7}$
2. $\frac{7}{6\sqrt{6}}$
3. $\frac{7}{6\sqrt{3}}$
4. $\frac{5}{3\sqrt{3}}$

Question Number : 66 Question Type : MCQ Option Shuffling : Yes
 Correct Marks : 4 Wrong Marks : 1

જેની સંતંન બાજુઓ (coterminous edges)

$$\vec{u} = \hat{i} + \hat{j} + \lambda\hat{k}, \quad \vec{v} = \hat{i} + \hat{j} + 3\hat{k} \quad \text{અને}$$

$$\vec{w} = 2\hat{i} + \hat{j} + \hat{k} \quad \text{હોય તેવા સમાંતર ફલકનું ઘનફળ}$$

1 ઘન એકમ છે. જો θ એ બાજુઓ $\vec{u}$ અને $\vec{w}$
 વચ્ચેનો ખૂણો હોય, તો $\cos\theta$ નું મૂલ્ય _____
 હોઈ શકે.

Options :

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

2. $\frac{7}{6\sqrt{6}}$

3. $\frac{7}{6\sqrt{3}}$

4. $\frac{5}{3\sqrt{3}}$

Question Number : 67 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

The mean and the standard deviation (s.d.) of 10 observations are 20 and 2 respectively. Each of these 10 observations is multiplied by p and then reduced by q , where $p \neq 0$ and $q \neq 0$. If the new mean and new s.d. become half of their original values, then q is equal to :

Options :

1. -5

2. 10

3. -10

4. -20

Question Number : 67 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

10 પ્રેક્ષણોં કે માધ્ય તથા માનક વિચલન ક્રમશઃ 20 તથા 2 હૈં. ઇન 10 પ્રેક્ષણોં મેં સે પ્રત્યેક કો p સે ગુણા કરને કે પશ્ચાત પ્રત્યેક મેં સે q કમ કિયા ગયા, જહાં $p \neq 0$ તથા $q \neq 0$ હૈં. યદિ ના માધ્ય તથા માનક વિચલન કે માન અપને મૂલ માનોં કે આધે હૈં, તો q કા માન હૈં :

Options :

1. -5

2. 10

3. -10

4. -20

Question Number : 67 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

10 અવલોકનો નો મધ્યક અને પ્રમાણિત વિચલન (s.d.) અનુક્રમે 20 અને 2 છે. આ 10 માંના પ્રત્યેક અવલોકનને p વડે ગુણીને q બાદ કરવામાં આવે છે, જ્યાં $p \neq 0$ અને $q \neq 0$. જો નવો મધ્યક અને નવું પ્રમાણિત વિચલન, તેમની મૂળ કિંમતો કરતાં અડધાં થાય, તો $q = \underline{\hspace{2cm}}$.

Options :

1. -5

2. 10

3. -10

4. -20

Question Number : 68 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Let A and B be two independent events

such that $P(A) = \frac{1}{3}$ and $P(B) = \frac{1}{6}$. Then,

which of the following is TRUE ?

Options :

1. $P(A/(A \cup B)) = \frac{1}{4}$

2. $P(A/B) = \frac{2}{3}$

3. $P(A/B') = \frac{1}{3}$

4. $P(A'/B') = \frac{1}{3}$

Question Number : 68 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

माना A तथा B दो ऐसी स्वतंत्र घटनाएँ हैं कि

$P(A) = \frac{1}{3}$ तथा $P(B) = \frac{1}{6}$ हैं, तो निम्न में से कौन

सा सत्य है?

Options :

1. $P(A/(A \cup B)) = \frac{1}{4}$

2. $P(A/B) = \frac{2}{3}$

3. $P(A/B') = \frac{1}{3}$

4. $P(A'/B') = \frac{1}{3}$

Question Number : 68 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

જો A અને B એ, બે એવી નિરપેક્ષ ઘટનાઓ છે કે

જે થી $P(A) = \frac{1}{3}$ અને $P(B) = \frac{1}{6}$ હોય, તો

નીચેનામાંથી કયું સાચું છે?

Options :

1. $P(A/(A \cup B)) = \frac{1}{4}$

2. $P(A/B) = \frac{2}{3}$

3. $P(A/B') = \frac{1}{3}$

4. $P(A'/B') = \frac{1}{3}$

Question Number : 69 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Let

$$f(x) = \left(\sin(\tan^{-1}x) + \sin(\cot^{-1}x) \right)^2 - 1 \quad ,$$

$$|x| > 1. \text{ If } \frac{dy}{dx} = \frac{1}{2} \frac{d}{dx} \left(\sin^{-1}(f(x)) \right) \text{ and}$$

$$y(\sqrt{3}) = \frac{\pi}{6}, \text{ then } y(-\sqrt{3}) \text{ is equal to :}$$

Options :

1. $-\frac{\pi}{6}$

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

3. $\frac{5\pi}{6}$

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

Question Number : 69 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

माना

$$f(x) = \left(\sin(\tan^{-1}x) + \sin(\cot^{-1}x) \right)^2 - 1 \quad ,$$

$$|x| > 1 \text{ है। यदि } \frac{dy}{dx} = \frac{1}{2} \frac{d}{dx} \left(\sin^{-1}(f(x)) \right)$$

$$\text{तथा } y(\sqrt{3}) = \frac{\pi}{6} \text{ हैं, तो } y(-\sqrt{3}) \text{ का मान है :}$$

Options :

1. $-\frac{\pi}{6}$

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

3. $\frac{5\pi}{6}$

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

Question Number : 69 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ધારો કે

$$f(x) = \left(\sin(\tan^{-1}x) + \sin(\cot^{-1}x) \right)^2 - 1 \quad ,$$

$$|x| > 1. \quad \text{જો } \frac{dy}{dx} = \frac{1}{2} \frac{d}{dx} \left(\sin^{-1}(f(x)) \right) \quad \text{અને}$$

$$y(\sqrt{3}) = \frac{\pi}{6}, \quad \text{તો } y(-\sqrt{3}) = \underline{\hspace{2cm}}.$$

Options :

1. $-\frac{\pi}{6}$

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

3. $\frac{5\pi}{6}$

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

Question Number : 70 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Which one of the following is a tautology ?

Options :

1. $P \wedge (P \vee Q)$

2. $P \vee (P \wedge Q)$

3. $(P \wedge (P \rightarrow Q)) \rightarrow Q$

4. $Q \rightarrow (P \wedge (P \rightarrow Q))$

Question Number : 70 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

નિમ્ન મેં સે કૌન સા કથન ઇક પુનરુક્તિ હૈ?

Options :

1. $P \wedge (P \vee Q)$

2. $P \vee (P \wedge Q)$

3. $(P \wedge (P \rightarrow Q)) \rightarrow Q$

4. $Q \rightarrow (P \wedge (P \rightarrow Q))$

Question Number : 70 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

નીચેનામાંથી કયું નિત્યસત્ય છે?

Options :

1. $P \wedge (P \vee Q)$

2. $P \vee (P \wedge Q)$

3. $(P \wedge (P \rightarrow Q)) \rightarrow Q$

4. $Q \rightarrow (P \wedge (P \rightarrow Q))$

Sub-Section Number:	2
Sub-Section Id:	40503691
Question Shuffling Allowed :	Yes

Question Number : 71 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The least positive value of 'a' for which the equation, $2x^2 + (a - 10)x + \frac{33}{2} = 2a$ has real roots is _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

8 to 8

Question Number : 71 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

'a' का वह न्यूनतम धनात्मक मान, जिसके लिए समीकरण $2x^2 + (a - 10)x + \frac{33}{2} = 2a$ के वास्तविक मूल हैं, है _____।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

8 to 8

Question Number : 71 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

સમીકરણ $2x^2 + (a - 10)x + \frac{33}{2} = 2a$ ને
વાસ્તવિક બીજો હોય તેવી 'a' ની લઘુત્તમ ધન કિંમત
_____ છે.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

8 to 8

Question Number : 72 **Question Type :** SA

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

The number of all 3×3 matrices A, with
enteries from the set $\{-1, 0, 1\}$ such that
the sum of the diagonal elements of AA^T is
3, is _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

672 to 672

Question Number : 72 **Question Type :** SA

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

ऐसे सभी 3×3 आव्यूहों A की संख्या, जिनके अवयव
समुच्चय $\{-1, 0, 1\}$ से हैं तथा AA^T के विकर्ण के
अवयवों का योगफल 3 है, है _____।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

672 to 672

Question Number : 72 **Question Type :** SA

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

જેના ઘટકો ગણ $\{-1, 0, 1\}$ માંથી હોય અને AA^T
ના વિકર્ણના ઘટકોનો સરવાળો 3 હોય તેવા તમામ 3×3
શ્રેણિકો A ની સંખ્યા _____ છે.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

672 to 672

Question Number : 73 **Question Type :** SA

Correct Marks : 4 Wrong Marks : 0

The sum $\sum_{k=1}^{20} (1 + 2 + 3 + \dots + k)$ is

_____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

1540 to 1540

Question Number : 73 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

योगफल $\sum_{k=1}^{20} (1 + 2 + 3 + \dots + k)$ है

_____।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

1540 to 1540

Question Number : 73 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

सरवाणो $\sum_{k=1}^{20} (1 + 2 + 3 + \dots + k)$

= _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

1540 to 1540

Question Number : 74 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let the normal at a point P on the curve $y^2 - 3x^2 + y + 10 = 0$ intersect the y-axis at $\left(0, \frac{3}{2}\right)$. If m is the slope of the tangent at P to the curve, then |m| is equal to

_____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

4 to 4

Question Number : 74 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

माना वक्र $y^2 - 3x^2 + y + 10 = 0$ के बिंदु P पर
खींचा गया अभिलंब, y- अक्ष को $\left(0, \frac{3}{2}\right)$ पर काटता
है। यदि P पर वक्र की स्पर्श रेखा का ढाल m है, तो
 $|m|$ बराबर है _____।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

4 to 4

Question Number : 74 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ધારો કે વક્ર $y^2 - 3x^2 + y + 10 = 0$ ના બિંદુ P આગળનો
અભિલંબ, y-અક્ષને $\left(0, \frac{3}{2}\right)$ આગળ છેદે છે. જો P
આગળ વક્રના સ્પર્શકનો ઢાળ m હોય, તો
 $|m| = \underline{\hspace{2cm}}$.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

4 to 4

Question Number : 75 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

An urn contains 5 red marbles, 4 black
marbles and 3 white marbles. Then the
number of ways in which 4 marbles can be
drawn so that at the most three of them are
red is _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

490 to 490

Question Number : 75 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

एक कलश में 5 लाल मार्बल, 4 काले मार्बल तथा 3 सफेद मार्बल हैं, तो इसमें से 4 मार्बल इस प्रकार निकालने ताकि उनमें से अधिक से अधिक तीन लाल रंग के हों, के तरीकों की संख्या है _____ ।

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :

490 to 490

Question Number : 75 **Question Type :** SA
Correct Marks : 4 **Wrong Marks :** 0

એક ઘડા માં 5 લાલ લખોટીઓ, 4 કાળી લખોટીઓ અને 3 સફેદ લખોટીઓ છે. જેમાં વધુમાં વધુ ત્રણ લખોટીઓ લાલ હોય તે રીતે 4 લખોટીઓ પસંદ કરવાની રીતોની સંખ્યા _____ છે.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Possible Answers :

490 to 490