

National Testing Agency

Question Paper Name:	BTECH 9th Jan 2020 Shift 2
Subject Name:	BTECH
Creation Date:	2020-01-09 18:52:48
Duration:	180
Total Marks:	300
Display Marks:	Yes

BTECH

Group Number :	1
Group Id :	40503627
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 :	40503686
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:	405036144
Question Shuffling Allowed :	Yes

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

Correct Marks : 4 Wrong Marks : 1

If $A = \{x \in \mathbb{R} : |x| < 2\}$ and

$B = \{x \in \mathbb{R} : |x - 2| \geq 3\}$; then :

Options :

1. $A - B = [-1, 2)$

2. $B - A = \mathbb{R} - (-2, 5)$

3. $A \cap B = (-2, -1)$

4. $A \cup B = \mathbb{R} - (2, 5)$

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

यदि $A = \{x \in \mathbb{R} : |x| < 2\}$ तथा
 $B = \{x \in \mathbb{R} : |x - 2| \geq 3\}$, तो :

Options :

1. $A - B = [-1, 2)$

2. $B - A = \mathbb{R} - (-2, 5)$

3. $A \cap B = (-2, -1)$

4. $A \cup B = \mathbb{R} - (2, 5)$

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

જો $A = \{x \in \mathbb{R} : |x| < 2\}$ અને
 $B = \{x \in \mathbb{R} : |x - 2| \geq 3\}$ હોય, તો :

Options :

1. $A - B = [-1, 2)$

2. $B - A = R - (-2, 5)$

3. $A \cap B = (-2, -1)$

4. $A \cup B = R - (2, 5)$

Question Number : 52 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Let $a, b \in \mathbb{R}$, $a \neq 0$ be such that the equation,
 $ax^2 - 2bx + 5 = 0$ has a repeated root α ,
which is also a root of the equation,
 $x^2 - 2bx - 10 = 0$. If β is the other root of
this equation, then $\alpha^2 + \beta^2$ is equal to :

Options :

1. 24

2. 25

3. 26

4. 28

Question Number : 52 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

माना $a, b \in \mathbb{R}$, $a \neq 0$ इस प्रकार हैं कि समीकरण
 $ax^2 - 2bx + 5 = 0$ का α पुनरावृत्त मूल है, जो
समीकरण $x^2 - 2bx - 10 = 0$ का भी एक मूल है।
यदि β इस समीकरण का दूसरा मूल है, तो $\alpha^2 + \beta^2$
बराबर है :

Options :

1. 24

2. 25

3. 26

4. 28

Question Number : 52 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

ધારો કે $a, b \in \mathbb{R}$, $a \neq 0$ એવાં છે કે જેથી સમીકરણ
 $ax^2 - 2bx + 5 = 0$ ને પુનરાવર્તિત બીજ α હોય, કે જે
સમીકરણ $x^2 - 2bx - 10 = 0$ નું પણ એક બીજ છે.
જો β એ આ સમીકરણનું બીજું બીજ હોય, તો
 $\alpha^2 + \beta^2 = \underline{\hspace{2cm}}$.

Options :

1. 24

2. 25

3. 26

4. 28

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

If z be a complex number satisfying
 $|\operatorname{Re}(z)| + |\operatorname{Im}(z)| = 4$, then $|z|$ cannot be :

Options :

1. $\sqrt{7}$

2. $\sqrt{8}$

3. $\sqrt{10}$

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

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

Correct Marks : 4 Wrong Marks : 1

यदि z एक ऐसी सम्मिश्र संख्या है जो

$|\operatorname{Re}(z)| + |\operatorname{Im}(z)| = 4$ को सन्तुष्ट करती है, तो $|z|$

नहीं हो सकता :

Options :

1. $\sqrt{7}$

2. $\sqrt{8}$

3. $\sqrt{10}$

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

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

Correct Marks : 4 Wrong Marks : 1

જો z એ એવી સંકર સંખ્યા છે કે જે $|\operatorname{Re}(z)| + |\operatorname{Im}(z)| = 4$

નું સમાધાન કરે, તો $|z|$ નીચેનામાંથી કયું ન હોઈ શકે ?

Options :

1. $\sqrt{7}$

2. $\sqrt{8}$

3. $\sqrt{10}$

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

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

Correct Marks : 4 Wrong Marks : 1

Let $a - 2b + c = 1$.

If $f(x) = \begin{vmatrix} x+a & x+2 & x+1 \\ x+b & x+3 & x+2 \\ x+c & x+4 & x+3 \end{vmatrix}$, then :

Options :

1. $f(50) = -501$

2. $f(-50) = 501$

3. $f(50) = 1$

4. $f(-50) = -1$

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

Correct Marks : 4 Wrong Marks : 1

माना $a - 2b + c = 1$ है। यदि

$$f(x) = \begin{vmatrix} x+a & x+2 & x+1 \\ x+b & x+3 & x+2 \\ x+c & x+4 & x+3 \end{vmatrix} \text{ है, तो :}$$

Options :

1. $f(50) = -501$

2. $f(-50) = 501$

3. $f(50) = 1$

4. $f(-50) = -1$

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

Correct Marks : 4 Wrong Marks : 1

ધારો કે $a - 2b + c = 1$ છે. જો

$$f(x) = \begin{vmatrix} x+a & x+2 & x+1 \\ x+b & x+3 & x+2 \\ x+c & x+4 & x+3 \end{vmatrix} \text{ હોય, તો}$$

Options :

1. $f(50) = -501$

2. $f(-50) = 501$

3. $f(50) = 1$

4. $f(-50) = -1$

Question Number : 55 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

The following system of linear equations

$$7x + 6y - 2z = 0$$

$$3x + 4y + 2z = 0$$

$$x - 2y - 6z = 0, \text{ has}$$

Options :

1. no solution.

2. only the trivial solution.

3. infinitely many solutions, (x, y, z) satisfying $y = 2z$.

4. infinitely many solutions, (x, y, z) satisfying $x = 2z$.

Question Number : 55 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

रैखिक समीकरणों के निम्न निकाय

$$7x + 6y - 2z = 0$$

$$3x + 4y + 2z = 0$$

$$x - 2y - 6z = 0$$

Options :

1. का कोई हल नहीं है।

2. का केवल तुच्छ हल है।

3. $y = 2z$ को सन्तुष्ट करने वाले अनन्त हल (x, y, z) हैं।

4. $x = 2z$ को सन्तुष्ट करने वाले अनन्त हल (x, y, z) हैं।

Question Number : 55 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

નીચેની સુરેખ સમીકરણ સંહિતિ

$$7x + 6y - 2z = 0$$

$$3x + 4y + 2z = 0$$

$$x - 2y - 6z = 0, \text{ ને}$$

Options :

1. ઉકેલ નથી.

2. ફક્ત અત્યોચ્ચ (trivial) હોય તેવો જ ઉકેલ છે.

3. $y = 2z$ નું સમાધાન કરે તેવા અનંત ઉકેલો (x, y, z) છે.

4. $x = 2z$ નું સમાધાન કરે તેવા અનંત ઉકેલો (x, y, z) છે.

Question Number : 56 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

In the expansion of $\left(\frac{x}{\cos\theta} + \frac{1}{x\sin\theta}\right)^{16}$, if

l_1 is the least value of the term independent of x when $\frac{\pi}{8} \leq \theta \leq \frac{\pi}{4}$ and l_2 is the least value of the term independent of x when $\frac{\pi}{16} \leq \theta \leq \frac{\pi}{8}$, then the ratio $l_2 : l_1$ is equal to :

Options :

1. 1 : 16

2. 1 : 8

3. 16 : 1

4. 8 : 1

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

Correct Marks : 4 Wrong Marks : 1

$\left(\frac{x}{\cos\theta} + \frac{1}{x\sin\theta}\right)^{16}$ के प्रसार में, यदि x से स्वतंत्र

पद का निम्नतम मान l_1 है जब $\frac{\pi}{8} \leq \theta \leq \frac{\pi}{4}$ तथा x

से स्वतंत्र पद का निम्नतम मान l_2 है जब

$\frac{\pi}{16} \leq \theta \leq \frac{\pi}{8}$, तो अनुपात $l_2 : l_1$ बराबर है :

Options :

1. 1 : 16

2. 1 : 8

3. 16 : 1

4. 8 : 1

Question Number : 56 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

જો $\left(\frac{x}{\cos\theta} + \frac{1}{x \sin\theta} \right)^{16}$ ના વિસ્તરણમાં, જ્યારે

$\frac{\pi}{8} \leq \theta \leq \frac{\pi}{4}$ હોય ત્યારે x થી સ્વતંત્ર પદની લઘુત્તમ

કિંમત l_1 અને જ્યારે $\frac{\pi}{16} \leq \theta \leq \frac{\pi}{8}$ હોય ત્યારે x થી

સ્વતંત્ર પદની લઘુત્તમ કિંમત l_2 હોય, તો ગુણોત્તર $l_2 : l_1$
= _____.

Options :

1. 1 : 16

2. 1 : 8

3. 16 : 1

4. 8 : 1

Question Number : 57 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

Let a_n be the n^{th} term of a G.P. of positive

terms. If $\sum_{n=1}^{100} a_{2n+1} = 200$ and

$\sum_{n=1}^{100} a_{2n} = 100$, then $\sum_{n=1}^{200} a_n$ is equal to :

Options :

1. 300

2. 150

3. 175

4. 225

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

Correct Marks : 4 Wrong Marks : 1

माना धनात्मक पदों की एक गुणोत्तर श्रेणी का n वां

पद a_n है। यदि $\sum_{n=1}^{100} a_{2n+1} = 200$ तथा

$\sum_{n=1}^{100} a_{2n} = 100$, तो $\sum_{n=1}^{200} a_n$ बराबर है :

Options :

1. 300

2. 150

3. 175

4. 225

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

Correct Marks : 4 Wrong Marks : 1

ધારો કે a_n એ ધન પદોની એક સમગુણોત્તર શ્રેણી (G.P.)

નું n મું પદ છે. જો $\sum_{n=1}^{100} a_{2n+1} = 200$ અને

$$\sum_{n=1}^{100} a_{2n} = 100 \quad \text{હોય, તો} \quad \sum_{n=1}^{200} a_n = \underline{\hspace{2cm}}.$$

Options :

1. 300

2. 150

3. 175

4. 225

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

Correct Marks : 4 Wrong Marks : 1

Let $[t]$ denote the greatest integer $\leq t$ and

$$\lim_{x \rightarrow 0} x \left[\frac{4}{x} \right] = A. \quad \text{Then the function,}$$

$f(x) = [x^2] \sin(\pi x)$ is discontinuous, when x is equal to :

Options :

1. $\sqrt{A}$

2. $\sqrt{A+1}$

3. $\sqrt{A+5}$

4. $\sqrt{A+21}$

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

માના $[t]$ મહત્તમ પૂર્ણાંક $\leq t$ કો દર્શાતા હૈ તથા

$$\lim_{x \rightarrow 0} x \left[\frac{4}{x} \right] = A \text{ હૈ। તો ફલન } f(x) = [x^2] \sin(\pi x)$$

અસંતત હૈ, જબ x બરાબર હૈ :

Options :

1. $\sqrt{A}$

2. $\sqrt{A+1}$

3. $\sqrt{A+5}$

4. $\sqrt{A+21}$

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

ધારો કે $[t]$ એ મોટામાં મોટો પૂર્ણાંક $\leq t$ છે, અને

$$\lim_{x \rightarrow 0} x \left[\frac{4}{x} \right] = A \text{ છે. નીચેના પૈકી } x \text{ ની કિંમત કઇ}$$

હોય, તો વિધેય $f(x) = [x^2] \sin(\pi x)$ એ અસતત થાય ?

Options :

1. $\sqrt{A}$

2. $\sqrt{A+1}$

3. $\sqrt{A+5}$

4. $\sqrt{A+21}$

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

If $x = 2\sin\theta - \sin 2\theta$ and $y = 2\cos\theta - \cos 2\theta$,

$\theta \in [0, 2\pi]$, then $\frac{d^2y}{dx^2}$ at $\theta = \pi$ is :

Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.

Options :

1. $-\frac{3}{8}$

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

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

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

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

यदि $x = 2\sin\theta - \sin 2\theta$ तथा $y = 2\cos\theta - \cos 2\theta$,

$\theta \in [0, 2\pi]$ हैं, तो $\theta = \pi$ पर $\frac{d^2y}{dx^2}$ का मान है :

Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.

Options :

1. $-\frac{3}{8}$

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

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

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

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

Correct Marks : 4 Wrong Marks : 1

જો $x = 2\sin\theta - \sin 2\theta$ અને $y = 2\cos\theta - \cos 2\theta$,

$\theta \in [0, 2\pi]$ હોય, તો $\theta = \pi$ અંગત

$\frac{d^2y}{dx^2} = \underline{\hspace{2cm}}.$

Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.

Options :

1. $-\frac{3}{8}$

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

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

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

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

Let f and g be differentiable functions on $\mathbb{R}$ such that $f \circ g$ is the identity function. If for some $a, b \in \mathbb{R}$, $g'(a) = 5$ and $g(a) = b$, then $f'(b)$ is equal to :

Options :

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

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

3. 1

4. 5

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

माना $\mathbb{R}$ पर अवकलनीय फलन f तथा g इस प्रकार हैं कि $f \circ g$ तत्समक फलन है। यदि किसी $a, b \in \mathbb{R}$ के लिए $g'(a) = 5$ तथा $g(a) = b$ हैं, तो $f'(b)$ बराबर है :

Options :

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

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

3. 1

4. 5

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

ધારો કે f અને g એ $\mathbb{R}$ પરનાં એવાં વિકલનીય વિધેયો છે કે જેથી $f \circ g$ એ તદ્દેવ વિધેય થાય. જો કોઈ $a, b \in \mathbb{R}$ માટે $g'(a) = 5$ અને $g(a) = b$ હોય, તો $f'(b) = \underline{\hspace{2cm}}$.

Options :

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

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

3. 1

4. 5

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

Let a function $f: [0, 5] \rightarrow \mathbb{R}$ be continuous, $f(1) = 3$ and F be defined as :

$$F(x) = \int_1^x t^2 g(t) dt, \text{ where } g(t) = \int_1^t f(u) du.$$

Then for the function F , the point $x = 1$ is :

Options :

1. not a critical point.
2. a point of local maxima.
3. a point of local minima.
4. a point of inflection.

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

माना एक फलन $f: [0, 5] \rightarrow \mathbb{R}$ संतत है, $f(1) = 3$ है

तथा F , $F(x) = \int_1^x t^2 g(t) dt$ द्वारा परिभाषित है, जहाँ

$g(t) = \int_1^t f(u) du$ है, तो फलन F के लिए, बिन्दु $x = 1$

एक :

Options :

1. क्रांतिक बिन्दु नहीं है।
2. स्थानीय उच्चिष्ठ बिन्दु है।
3. स्थानीय निम्ननिष्ठ बिन्दु है।

4. નતિ પરિવર્તન (inflection) બિન્દુ છે।

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

Correct Marks : 4 Wrong Marks : 1

ધારો કે વિધેય $f: [0, 5] \rightarrow \mathbb{R}$ સતત છે, $f(1) = 3$ અને

$$F(x) = \int_1^x t^2 g(t) dt, \text{ જ્યાં } g(t) = \int_1^t f(u) du \text{ દ્વારા}$$

વ્યાખ્યાયિત વિધેય F છે. તો વિધેય F માટે, બિંદુ $x = 1$ એ :

Options :

1. નિર્ણાયક બિંદુ નથી.

2. સ્થાનીય મહત્તમ માટેનું બિંદુ છે.

3. સ્થાનીય ન્યૂનતમ માટેનું બિંદુ છે.

4. નતિબિંદુ છે.

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

Correct Marks : 4 Wrong Marks : 1

$$\text{If } \int \frac{d\theta}{\cos^2 \theta (\tan 2\theta + \sec 2\theta)} =$$

$\lambda \tan \theta + 2 \log_e |f(\theta)| + C$ where C is a constant of integration, then the ordered pair $(\lambda, f(\theta))$ is equal to :

Options :

1. $(-1, 1 + \tan \theta)$

2. $(1, 1 - \tan\theta)$

3. $(-1, 1 - \tan\theta)$

4. $(1, 1 + \tan\theta)$

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

यदि $\int \frac{d\theta}{\cos^2\theta(\tan 2\theta + \sec 2\theta)} =$

$\lambda \tan\theta + 2 \log_e |f(\theta)| + C$ है, जहाँ C एक समाकलन-
अचर है, तो क्रमित युग्म $(\lambda, f(\theta))$ बराबर है :

Options :

1. $(-1, 1 + \tan\theta)$

2. $(1, 1 - \tan\theta)$

3. $(-1, 1 - \tan\theta)$

4. $(1, 1 + \tan\theta)$

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

જો $\int \frac{d\theta}{\cos^2\theta(\tan 2\theta + \sec 2\theta)} =$

$\lambda \tan\theta + 2 \log_e |f(\theta)| + C$. જ્યાં C એ સંકલનનો
અચરો છે, તો ક્રમયુક્ત જોડ $(\lambda, f(\theta)) =$ _____.

Options :

1. $(-1, 1 + \tan\theta)$

2. $(1, 1 - \tan\theta)$

3. $(-1, 1 - \tan\theta)$

4. $(1, 1 + \tan\theta)$

Question Number : 63 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

$$\text{Given : } f(x) = \begin{cases} x & , 0 \leq x < \frac{1}{2} \\ \frac{1}{2} & , x = \frac{1}{2} \\ 1 - x & , \frac{1}{2} < x \leq 1 \end{cases}$$

and $g(x) = \left(x - \frac{1}{2}\right)^2, x \in \mathbb{R}$. Then the area

(in sq. units) of the region bounded by the curves, $y = f(x)$ and $y = g(x)$ between the lines, $2x = 1$ and $2x = \sqrt{3}$, is :

Options :

1. $\frac{1}{2} - \frac{\sqrt{3}}{4}$

2. $\frac{1}{3} + \frac{\sqrt{3}}{4}$

3. $\frac{1}{2} + \frac{\sqrt{3}}{4}$

4. $\frac{\sqrt{3}}{4} - \frac{1}{3}$

Question Number : 63 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

दिया है $f(x) = \begin{cases} x & , 0 \leq x < \frac{1}{2} \\ \frac{1}{2} & , x = \frac{1}{2} \\ 1 - x & , \frac{1}{2} < x \leq 1 \end{cases}$

तथा $g(x) = \left(x - \frac{1}{2}\right)^2, x \in \mathbb{R}$; तो रेखाओं $2x = 1$

तथा $2x = \sqrt{3}$ के बीच, वक्रों $y = f(x)$ तथा $y = g(x)$ द्वारा प्रतिबद्ध क्षेत्र का क्षेत्रफल (वर्ग इकाइयों में) है :

Options :

1. $\frac{1}{2} - \frac{\sqrt{3}}{4}$

2. $\frac{1}{3} + \frac{\sqrt{3}}{4}$

3. $\frac{1}{2} + \frac{\sqrt{3}}{4}$

4. $\frac{\sqrt{3}}{4} - \frac{1}{3}$

Question Number : 63 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

$$f(x) = \begin{cases} x & , 0 \leq x < \frac{1}{2} \\ \frac{1}{2} & , x = \frac{1}{2} \\ 1-x & , \frac{1}{2} < x \leq 1 \end{cases}$$

અને $g(x) = \left(x - \frac{1}{2}\right)^2$, $x \in \mathbb{R}$ આપેલ છે. તો

રેખાઓ $2x=1$ અને $2x=\sqrt{3}$ ની વચ્ચે, વક્રો $y=f(x)$ અને $y=g(x)$ વડે ઘેરાયેલા પ્રદેશનું ક્ષેત્રફળ (ચો.એકમમાં) કેટલું થાય?

Options :

1. $\frac{1}{2} - \frac{\sqrt{3}}{4}$

2. $\frac{1}{3} + \frac{\sqrt{3}}{4}$

3. $\frac{1}{2} + \frac{\sqrt{3}}{4}$

4. $\frac{\sqrt{3}}{4} - \frac{1}{3}$

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

If $\frac{dy}{dx} = \frac{xy}{x^2 + y^2}$; $y(1)=1$; then a value of

x satisfying $y(x)=e$ is :

Options :

1. $\sqrt{2} e$

2. $\sqrt{3} e$

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

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

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

Correct Marks : 4 Wrong Marks : 1

यदि $\frac{dy}{dx} = \frac{xy}{x^2 + y^2}$, $y(1) = 1$ है, तो $y(x) = e$

को सन्तुष्ट करने वाला x का एक मान है :

Options :

1. $\sqrt{2} e$

2. $\sqrt{3} e$

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

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

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

Correct Marks : 4 Wrong Marks : 1

જો $\frac{dy}{dx} = \frac{xy}{x^2 + y^2}$, $y(1) = 1$ હોય, તો $y(x) = e$

નું સમાધાન કરતી x ની એક કિંમત _____ છે.

Options :

1. $\sqrt{2} e$

2. $\sqrt{3} e$

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

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

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

Correct Marks : 4 Wrong Marks : 1

The length of the minor axis (along y -axis)

of an ellipse in the standard form is $\frac{4}{\sqrt{3}}$. If

this ellipse touches the line, $x + 6y = 8$; then
its eccentricity is :

Options :

1. $\frac{1}{3} \sqrt{\frac{11}{3}}$

2. $\frac{1}{2} \sqrt{\frac{11}{3}}$

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

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

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

Correct Marks : 4 Wrong Marks : 1

मानक रूप में एक दीर्घवृत्त के लघु अक्ष (y -अक्ष के अनुदिश) की लम्बाई $\frac{4}{\sqrt{3}}$ है। यदि यह दीर्घवृत्त, रेखा $x + 6y = 8$ को स्पर्श करता है, तो इसकी उत्केन्द्रता है :

Options :

1. $\frac{1}{3} \sqrt{\frac{11}{3}}$

2. $\frac{1}{2} \sqrt{\frac{11}{3}}$

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

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

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

Correct Marks : 4 Wrong Marks : 1

એક પ્રમાણિત ઉપવલયની ગૌણ અક્ષ (y -અક્ષ પર) ની લંબાઈ $\frac{4}{\sqrt{3}}$ છે. જો આ ઉપવલય, રેખા $x + 6y = 8$ ને સ્પર્શે, તો તેની ઉત્કેન્દ્રતા _____ હોય.

Options :

1. $\frac{1}{3} \sqrt{\frac{11}{3}}$

2. $\frac{1}{2} \sqrt{\frac{11}{3}}$

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

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

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

Correct Marks : 4 Wrong Marks : 1

If one end of a focal chord AB of the parabola $y^2 = 8x$ is at $A\left(\frac{1}{2}, -2\right)$, then the equation of the tangent to it at B is :

Options :

1. $2x + y - 24 = 0$

2. $x + 2y + 8 = 0$

3. $x - 2y + 8 = 0$

4. $2x - y - 24 = 0$

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

Correct Marks : 4 Wrong Marks : 1

यदि परवलय $y^2 = 8x$ की एक नाभि जीवा AB का एक छोर $A\left(\frac{1}{2}, -2\right)$ पर है, तो B पर इसकी स्पर्श-रेखा का समीकरण है :

Options :

1. $2x + y - 24 = 0$

2. $x + 2y + 8 = 0$

3. $x - 2y + 8 = 0$

4. $2x - y - 24 = 0$

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

Correct Marks : 4 Wrong Marks : 1

જો પરવલય $y^2 = 8x$ ની નાભિ જીવા AB નું એક

અંત્યબિંદુ $A\left(\frac{1}{2}, -2\right)$ હોય, તો તેના B આગળના

સ્પર્શકનું સમીકરણ _____ છે.

Options :

1. $2x + y - 24 = 0$

2. $x + 2y + 8 = 0$

3. $x - 2y + 8 = 0$

4. $2x - y - 24 = 0$

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

Correct Marks : 4 Wrong Marks : 1

A random variable X has the following probability distribution :

X :	1	2	3	4	5
$P(X)$:	K^2	$2K$	K	$2K$	$5K^2$

Then $P(X > 2)$ is equal to :

Options :

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

2. $\frac{7}{12}$

3. $\frac{23}{36}$

4. $\frac{1}{36}$

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

Correct Marks : 4 Wrong Marks : 1

एक यादृच्छिक चर X का प्रायिकता बंटन निम्न है :

X :	1	2	3	4	5
$P(X)$:	K^2	$2K$	K	$2K$	$5K^2$

तो $P(X > 2)$ बराबर है :

Options :

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

2. $\frac{7}{12}$

3. $\frac{23}{36}$

4. $\frac{1}{36}$

Question Number : 67 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

એક યાદચ્છિક X ચલનું સંભાવના વિતરણ નીચે મુજબ

છે :

X :	1	2	3	4	5
$P(X)$:	K^2	$2K$	K	$2K$	$5K^2$

તો $P(X > 2) =$ _____.

Options :

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

2. $\frac{7}{12}$

3. $\frac{23}{36}$

4. $\frac{1}{36}$

Question Number : 68 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

If 10 different balls are to be placed in 4 distinct boxes at random, then the probability that two of these boxes contain exactly 2 and 3 balls is :

Options :

1. $\frac{945}{2^{10}}$

2. $\frac{965}{2^{11}}$

3. $\frac{945}{2^{11}}$

4. $\frac{965}{2^{10}}$

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

Correct Marks : 4 Wrong Marks : 1

यदि 10 भिन्न गेंदें, 4 भिन्न बक्सों में यादृच्छया रखी जानी हैं, तो इनमें से दो बक्सों में मात्र 2 तथा 3 गेंदों के होने की प्रायिकता है :

Options :

1. $\frac{945}{2^{10}}$

2. $\frac{965}{2^{11}}$

3. $\frac{945}{2^{11}}$

4. $\frac{965}{2^{10}}$

Question Number : 68 Question Type : MCQ Option Shuffling : Yes
Correct Marks : 4 Wrong Marks : 1

જો 10 ભિન્ન દડાઓને, 4 ભિન્ન ખોખાં માં યાદચ્છિક રીતે મૂકવાના હોય, તો આમાંના બે ખોખાં માં બરાબર 2 અને 3 દડા હોય તેની સંભાવના કેટલી થાય?

Options :

1. $\frac{945}{2^{10}}$

2. $\frac{965}{2^{11}}$

3. $\frac{945}{2^{11}}$

4. $\frac{965}{2^{10}}$

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

If $x = \sum_{n=0}^{\infty} (-1)^n \tan^{2n} \theta$ and $y = \sum_{n=0}^{\infty} \cos^{2n} \theta$,

for $0 < \theta < \frac{\pi}{4}$, then :

Options :

1. $y(1+x) = 1$

2. $y(1-x)=1$

3. $x(1-y)=1$

4. $x(1+y)=1$

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

Correct Marks : 4 Wrong Marks : 1

यदि $0 < \theta < \frac{\pi}{4}$ के लिए, $x = \sum_{n=0}^{\infty} (-1)^n \tan^{2n} \theta$

तथा $y = \sum_{n=0}^{\infty} \cos^{2n} \theta$ हैं, तो :

Options :

1. $y(1+x)=1$

2. $y(1-x)=1$

3. $x(1-y)=1$

4. $x(1+y)=1$

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

Correct Marks : 4 Wrong Marks : 1

જો $0 < \theta < \frac{\pi}{4}$ માટે $x = \sum_{n=0}^{\infty} (-1)^n \tan^{2n} \theta$ અને

$y = \sum_{n=0}^{\infty} \cos^{2n} \theta$ હોય, તો :

Options :

1. $y(1+x)=1$

2. $y(1-x)=1$

3. $x(1-y)=1$

4. $x(1+y)=1$

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

Correct Marks : 4 Wrong Marks : 1

If $p \rightarrow (p \wedge \sim q)$ is false, then the truth values of p and q are respectively :

Options :

1. F, F

2. T, F

3. F, T

4. T, T

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

Correct Marks : 4 Wrong Marks : 1

यदि $p \rightarrow (p \wedge \sim q)$ असत्य है, तो p तथा q के क्रमशः सत्यमान हैं :

Options :

1. F, F

2. T, F

3. F, T

4. T, T

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

Correct Marks : 4 Wrong Marks : 1

જો $p \rightarrow (p \wedge \sim q)$ અસત્ય હોય, તો p અને q ની સત્યાર્થતા મૂલ્યો અનુક્રમે _____ છે.

Options :

1. F, F

2. T, F

3. F, T

4. T, T

Sub-Section Number:

2

Sub-Section Id:

405036145

Question Shuffling Allowed :

Yes

Question Number : 71 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If $C_r \equiv {}^{25}C_r$ and

$C_0 + 5 \cdot C_1 + 9 \cdot C_2 + \dots + (101) \cdot C_{25} = 2^{25} \cdot k,$
then k is equal to _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

51 to 51

Question Number : 71 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

यदि $C_r \equiv {}^{25}C_r$ तथा

$C_0 + 5 \cdot C_1 + 9 \cdot C_2 + \dots + (101) \cdot C_{25} = 2^{25} \cdot k$, तो
k बराबर है _____।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

51 to 51

Question Number : 71 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

જો $C_r \equiv {}^{25}C_r$ અને

$C_0 + 5 \cdot C_1 + 9 \cdot C_2 + \dots + (101) \cdot C_{25} = 2^{25} \cdot k$
હોય, તો $k =$ _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

51 to 51

Question Number : 72 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The number of terms common to the two
A.P.'s 3, 7, 11,, 407 and 2, 9, 16,, 709 is
_____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

14 to 14

Question Number : 72 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

दो समांतर श्रेढ़ियों 3, 7, 11,, 407 तथा 2, 9, 16,
..., 709 में उभयनिष्ठ (common) पदों की संख्या है
_____।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

14 to 14

Question Number : 72 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

બે સમાંતર શ્રેણીઓ (A.P.'s) 3, 7, 11,, 407
અને 2, 9, 16,, 709 માં સામાન્ય પદોની સંખ્યા
_____ છે.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

14 to 14

Question Number : 73 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the curves, $x^2 - 6x + y^2 + 8 = 0$ and
 $x^2 - 8y + y^2 + 16 - k = 0$, ($k > 0$) touch each
other at a point, then the largest value of k
is _____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

36 to 36

Question Number : 73 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

यदि वक्र $x^2 - 6x + y^2 + 8 = 0$ तथा
 $x^2 - 8y + y^2 + 16 - k = 0$, ($k > 0$) एक दूसरे को
एक बिन्दु पर स्पर्श करते हैं, तो k का अधिकतम मान
है _____ ।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

36 to 36

Question Number : 73 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

જો વક્રો $x^2 - 6x + y^2 + 8 = 0$ અને
 $x^2 - 8y + y^2 + 16 - k = 0$ ($k > 0$) પરસ્પર એક
બિંદુએ સ્પર્શે તો k ની મહત્તમ કિંમત _____ છે.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

36 to 36

Question Number : 74 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the distance between the plane,
 $23x - 10y - 2z + 48 = 0$ and the plane
containing the lines

$$\frac{x+1}{2} = \frac{y-3}{4} = \frac{z+1}{3}$$

$$\text{and } \frac{x+3}{2} = \frac{y+2}{6} = \frac{z-1}{\lambda} \quad (\lambda \in \mathbb{R})$$

is equal to $\frac{k}{\sqrt{633}}$, then k is equal to

_____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

3 to 3

Question Number : 74 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

यदि समतल $23x - 10y - 2z + 48 = 0$ तथा रेखाओं

$$\frac{x+1}{2} = \frac{y-3}{4} = \frac{z+1}{3}$$

$$\text{और } \frac{x+3}{2} = \frac{y+2}{6} = \frac{z-1}{\lambda} \quad (\lambda \in \mathbb{R})$$

को अंतर्विष्ट करने वाले समतल के बीच की दूरी $\frac{k}{\sqrt{633}}$

है, तो k बराबर है _____।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

3 to 3

Question Number : 74 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

જો સમતલ $23x - 10y - 2z + 48 = 0$ અને રેખાઓ

$$\frac{x+1}{2} = \frac{y-3}{4} = \frac{z+1}{3}$$

તથા $\frac{x+3}{2} = \frac{y+2}{6} = \frac{z-1}{\lambda} \ (\lambda \in \mathbb{R})$ ને

સમાપતા સમતલ વચ્ચેનું અંતર $\frac{k}{\sqrt{633}}$ હોય, તો $k =$

_____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

3 to 3

Question Number : 75 **Question Type :** SA

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

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

$$|\vec{a}| = \sqrt{3}, |\vec{b}| = 5, \vec{b} \cdot \vec{c} = 10 \text{ and the}$$

angle between $\vec{b}$ and $\vec{c}$ is $\frac{\pi}{3}$. If $\vec{a}$ is

perpendicular to the vector $\vec{b} \times \vec{c}$, then

$$|\vec{a} \times (\vec{b} \times \vec{c})| \text{ is equal to } \underline{\hspace{2cm}}.$$

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

30 to 30

Question Number : 75 **Question Type :** SA

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

माना तीन सदिश $\vec{a}$, $\vec{b}$ तथा $\vec{c}$ इस प्रकार हैं कि

$$|\vec{a}| = \sqrt{3}, |\vec{b}| = 5, \vec{b} \cdot \vec{c} = 10 \text{ तथा}$$

$\vec{b}$ और $\vec{c}$ के बीच का कोण $\frac{\pi}{3}$ है। यदि $\vec{a}$, सदिश

$\vec{b} \times \vec{c}$ पर लम्बवत है, तो $|\vec{a} \times (\vec{b} \times \vec{c})|$ बराबर है _____ ।

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

30 to 30

Question Number : 75 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ધારો કે $\vec{a}$, $\vec{b}$ અને $\vec{c}$ એ એવા ત્રણ સદિશો છે કે

જેથી $|\vec{a}| = \sqrt{3}$, $|\vec{b}| = 5$, $\vec{b} \cdot \vec{c} = 10$ તથા

$\vec{b}$ અને $\vec{c}$ વચ્ચેનો ખૂણો $\frac{\pi}{3}$ છે. જો $\vec{a}$ એ

$\vec{b} \times \vec{c}$ ને લંબ હોય, તો $|\vec{a} \times (\vec{b} \times \vec{c})| =$
_____.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Possible Answers :

30 to 30