

National Testing Agency

Question Paper Name :	BTECH E 3rd Sep 2020 Shift 2
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BTECH

Group Number :	1
Group Id :	405036120
Group Maximum Duration :	0
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Show Attended Group? :	No
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Break time :	0
Group Marks :	300
Is this Group for Examiner? :	No

Mathematics

Section Id :	405036402
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 :	405036771
Question Shuffling Allowed :	Yes

Question Number : 51 Question Id : 40503611056 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 R_1 and R_2 be two relations defined as follows :

$R_1 = \{(a, b) \in \mathbb{R}^2 : a^2 + b^2 \in \mathbb{Q}\}$ and

$R_2 = \{(a, b) \in \mathbb{R}^2 : a^2 + b^2 \notin \mathbb{Q}\}$, where $\mathbb{Q}$ is the set of all rational numbers. Then :

Options :

40503640181. R_1 and R_2 are both transitive.

40503640182. R_1 is transitive but R_2 is not transitive.

40503640183. R_2 is transitive but R_1 is not transitive.

40503640184. Neither R_1 nor R_2 is transitive.

Question Number : 51 Question Id : 40503611056 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

दो सम्बन्ध R_1 तथा R_2 नीचे दिए गए हैं :

$R_1 = \{(a, b) \in \mathbb{R}^2 : a^2 + b^2 \in \mathbb{Q}\}$ तथा

$R_2 = \{(a, b) \in \mathbb{R}^2 : a^2 + b^2 \notin \mathbb{Q}\}$, जहाँ $\mathbb{Q}$ सभी परिमेय संख्याओं का समुच्चय है, तो :

Options :

40503640181. R_1 और R_2 दोनों संक्रामक हैं।

40503640182. R_1 संक्रामक है परन्तु R_2 संक्रामक नहीं है।

40503640183. R_2 संक्रामक है परन्तु R_1 संक्रामक नहीं है।

40503640184. R_1 तथा R_2 में से कोई भी संक्रामक नहीं है।

Question Number : 52 Question Id : 40503611057 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 set of all real values of λ for which the quadratic equations,

$(\lambda^2 + 1)x^2 - 4\lambda x + 2 = 0$ always have exactly one root in the interval $(0, 1)$ is :

Options :

40503640185. $(-3, -1)$

40503640186. $(0, 2)$

40503640187. $(1, 3]$

40503640188. (2, 4]

Question Number : 52 Question Id : 40503611057 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

λ की उन सभी वास्तविक संख्याओं का समुच्चय,
जिनके लिए द्विघात समीकरणों,
 $(\lambda^2 + 1)x^2 - 4\lambda x + 2 = 0$, का अंतराल $(0, 1)$ में
सदैव मात्र एक ही मूल है, है :

Options :

40503640185. $(-3, -1)$

40503640186. $(0, 2)$

40503640187. $(1, 3]$

40503640188. $(2, 4]$

Question Number : 53 Question Id : 40503611058 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 z_1, z_2 are complex numbers such that
 $\operatorname{Re}(z_1) = |z_1 - 1|$, $\operatorname{Re}(z_2) = |z_2 - 1|$ and
 $\arg(z_1 - z_2) = \frac{\pi}{6}$, then $\operatorname{Im}(z_1 + z_2)$ is
equal to :

Options :

40503640189. $\frac{\sqrt{3}}{2}$

40503640190. $\frac{1}{\sqrt{3}}$

40503640191. $2\sqrt{3}$

40503640192.

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

Question Number : 53 Question Id : 40503611058 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 z_1 तथा z_2 दो ऐसी सम्मिश्र संख्याएँ हैं, जिनके लिए $\operatorname{Re}(z_1) = |z_1 - 1|$, $\operatorname{Re}(z_2) = |z_2 - 1|$ तथा $\arg(z_1 - z_2) = \frac{\pi}{6}$ हैं, तो $\operatorname{Im}(z_1 + z_2)$ बराबर है :

Options :

40503640189. $\frac{\sqrt{3}}{2}$

40503640190. $\frac{1}{\sqrt{3}}$

40503640191. $2\sqrt{3}$

40503640192. $\frac{2}{\sqrt{3}}$

Question Number : 54 Question Id : 40503611059 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 3×3 matrix such that

$$\operatorname{adj} A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 0 & 2 \\ 1 & -2 & -1 \end{bmatrix} \text{ and}$$

$$B = \operatorname{adj}(\operatorname{adj} A).$$

If $|A| = \lambda$ and $|(B^{-1})^T| = \mu$, then the ordered pair, $(|\lambda|, \mu)$ is equal to :

Options :

40503640193. $\left(9, \frac{1}{81}\right)$

40503640194. $\left(3, \frac{1}{81}\right)$

40503640195. $(3, 81)$

40503640196. $\left(9, \frac{1}{9}\right)$

Question Number : 54 Question Id : 40503611059 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 3×3 आव्यूह है, जिसके लिए

$$\text{adj } A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 0 & 2 \\ 1 & -2 & -1 \end{bmatrix} \text{ तथा } B = \text{adj}(\text{adj } A)$$

हैं। यदि $|A| = \lambda$ तथा $|(B^{-1})^T| = \mu$ हैं, तो क्रमित युग्म, $(|\lambda|, \mu)$ बराबर है :

Options :

40503640193. $\left(9, \frac{1}{81}\right)$

40503640194. $\left(3, \frac{1}{81}\right)$

40503640195. $(3, 81)$

40503640196. $\left(9, \frac{1}{9}\right)$

Question Number : 55 Question Id : 40503611060 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 term independent of x in the expansion of $\left(\frac{3}{2}x^2 - \frac{1}{3x}\right)^9$ is k , then $18k$ is equal to :

Options :

40503640197. 7

40503640198. 5

40503640199. 9

40503640200. 11

Question Number : 55 Question Id : 40503611060 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 $\left(\frac{3}{2}x^2 - \frac{1}{3x}\right)^9$ के विस्तार में, x से स्वतंत्र पद k है, तो $18k$ बराबर है :

Options :

40503640197. 7

40503640198. 5

40503640199. 9

40503640200. 11

Question Number : 56 Question Id : 40503611061 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 sum of the series

$$20 + 19\frac{3}{5} + 19\frac{1}{5} + 18\frac{4}{5} + \dots \text{ upto } n^{\text{th}}$$

term is 488 and the n^{th} term is negative,
then :

Options :

40503640201. $n = 60$

40503640202. $n = 41$

40503640203. n^{th} term is $-4\frac{2}{5}$

40503640204. n^{th} term is -4

**Question Number : 56 Question Id : 40503611061 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 श्रेणी

$$20 + 19\frac{3}{5} + 19\frac{1}{5} + 18\frac{4}{5} + \dots \text{ का } n^{\text{th}} \text{ पद}$$

तक, योगफल 488 और n^{th} पद ऋणात्मक है,
तो :

Options :

40503640201. $n = 60$

40503640202. $n = 41$

40503640203. n^{th} पद $-4\frac{2}{5}$ है

40503640204. n^{th} पद -4 है

**Question Number : 57 Question Id : 40503611062 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

$$\lim_{x \rightarrow a} \frac{(a + 2x)^{\frac{1}{3}} - (3x)^{\frac{1}{3}}}{(3a + x)^{\frac{1}{3}} - (4x)^{\frac{1}{3}}} \quad (a \neq 0) \text{ is equal to :}$$

Options :

40503640205. $\left(\frac{2}{3}\right)^{\frac{4}{3}}$

40503640206. $\left(\frac{2}{9}\right) \left(\frac{2}{3}\right)^{\frac{1}{3}}$

40503640207. $\left(\frac{2}{9}\right)^{\frac{4}{3}}$

40503640208. $\left(\frac{2}{3}\right) \left(\frac{2}{9}\right)^{\frac{1}{3}}$

**Question Number : 57 Question Id : 40503611062 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

$$\lim_{x \rightarrow a} \frac{(a + 2x)^{\frac{1}{3}} - (3x)^{\frac{1}{3}}}{(3a + x)^{\frac{1}{3}} - (4x)^{\frac{1}{3}}} \quad (a \neq 0) \text{ बराबर है :}$$

Options :

40503640205. $\left(\frac{2}{3}\right)^{\frac{4}{3}}$

40503640206. $\left(\frac{2}{9}\right) \left(\frac{2}{3}\right)^{\frac{1}{3}}$

40503640207. $\left(\frac{2}{9}\right)^{\frac{4}{3}}$

$$\left(\frac{2}{3}\right) \left(\frac{2}{9}\right)^{\frac{1}{3}}$$

40503640208.

Question Number : 58 Question Id : 40503611063 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 $f(x)$ is a polynomial of degree four, having critical points at $-1, 0, 1$. If $T = \{x \in \mathbb{R} \mid f(x) = f(0)\}$, then the sum of squares of all the elements of T is :

Options :

40503640209. 4

40503640210. 2

40503640211. 6

40503640212. 8

Question Number : 58 Question Id : 40503611063 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 $f(x)$, घात 4 का एक बहुपद है जिसके क्रान्तिक बिन्दु $-1, 0, 1$ हैं। यदि $T = \{x \in \mathbb{R} \mid f(x) = f(0)\}$, तो T के सभी अवयवों के वर्गों का योगफल है :

Options :

40503640209. 4

40503640210. 2

40503640211. 6

40503640212. 8

Question Number : 59 Question Id : 40503611064 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 surface area of a cube is increasing at a rate of $3.6 \text{ cm}^2/\text{sec}$, retaining its shape; then the rate of change of its volume (in cm^3/sec), when the length of a side of the cube is 10 cm, is :

Options :

40503640213. 10

40503640214. 9

40503640215. 18

40503640216. 20

Question Number : 59 Question Id : 40503611064 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 अपने रूप को बनाए रखते हुए, एक घन का पृष्ठ क्षेत्रफल $3.6 \text{ cm}^2/\text{sec}$ की दर से बढ़ रहा है, तो इसके आयतन के परिवर्तन की दर (cm^3/sec में), जब घन की एक भुजा की लम्बाई 10 cm है, है :

Options :

40503640213. 10

40503640214. 9

40503640215. 18

40503640216. 20

Question Number : 60 Question Id : 40503611065 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 $\int \sin^{-1}\left(\sqrt{\frac{x}{1+x}}\right) dx = A(x)\tan^{-1}(\sqrt{x}) +$

$B(x) + C$, where C is a constant of integration, then the ordered pair $(A(x), B(x))$ can be :

Options :

40503640217. $(x + 1, -\sqrt{x})$

40503640218. $(x + 1, \sqrt{x})$

40503640219. $(x - 1, -\sqrt{x})$

40503640220. $(x - 1, \sqrt{x})$

Question Number : 60 Question Id : 40503611065 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

$$\int \sin^{-1}\left(\sqrt{\frac{x}{1+x}}\right) dx = A(x)\tan^{-1}(\sqrt{x}) +$$

$B(x) + C$ है, जहाँ C एक समाकलन अचर है, तो क्रमित युग्म $(A(x), B(x))$ हो सकता है :

Options :

40503640217. $(x + 1, -\sqrt{x})$

40503640218. $(x + 1, \sqrt{x})$

40503640219. $(x - 1, -\sqrt{x})$

40503640220. $(x - 1, \sqrt{x})$

Question Number : 61 Question Id : 40503611066 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 value of the integral

$$\int_0^{1/2} \frac{x^2}{(1-x^2)^{3/2}} dx$$

is $\frac{k}{6}$, then k is equal to :

Options :

40503640221. $2\sqrt{3} + \pi$

40503640222. $2\sqrt{3} - \pi$

40503640223. $3\sqrt{2} - \pi$

40503640224. $3\sqrt{2} + \pi$

Question Number : 61 Question Id : 40503611066 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 समाकल $\int_0^{1/2} \frac{x^2}{(1-x^2)^{3/2}} dx$ का मान $\frac{k}{6}$

है, तो k बराबर है :

Options :

40503640221. $2\sqrt{3} + \pi$

40503640222. $2\sqrt{3} - \pi$

40503640223. $3\sqrt{2} - \pi$

40503640224. $3\sqrt{2} + \pi$

Question Number : 62 Question Id : 40503611067 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 $x^3 dy + xy \, dx = x^2 dy + 2y \, dx$; $y(2) = e$ and
 $x > 1$, then $y(4)$ is equal to :

Options :

40503640225. $\frac{3}{2} + \sqrt{e}$

40503640226. $\frac{1}{2} + \sqrt{e}$

40503640227. $\frac{\sqrt{e}}{2}$

40503640228. $\frac{3}{2}\sqrt{e}$

Question Number : 62 Question Id : 40503611067 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 $x^3 dy + xy \, dx = x^2 dy + 2y \, dx$; $y(2) = e$
तथा $x > 1$, तो $y(4)$ बराबर है :

Options :

40503640225. $\frac{3}{2} + \sqrt{e}$

40503640226. $\frac{1}{2} + \sqrt{e}$

40503640227. $\frac{\sqrt{e}}{2}$

40503640228. $\frac{3}{2}\sqrt{e}$

Question Number : 63 Question Id : 40503611068 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 ΔABC has vertices $A(-1, 7)$, $B(-7, 1)$
and $C(5, -5)$, then its orthocentre has
coordinates :

Options :

40503640229. $\left(-\frac{3}{5}, \frac{3}{5}\right)$

40503640230. $\left(\frac{3}{5}, -\frac{3}{5}\right)$

40503640231. $(-3, 3)$

40503640232. $(3, -3)$

Question Number : 63 Question Id : 40503611068 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 एक त्रिभुज ABC के शीर्ष बिन्दु $A(-1, 7)$,
 $B(-7, 1)$ तथा $C(5, -5)$ हैं, तो इसके लम्ब-केन्द्र
के निर्देशांक हैं :

Options :

40503640229. $\left(-\frac{3}{5}, \frac{3}{5}\right)$

40503640230. $\left(\frac{3}{5}, -\frac{3}{5}\right)$

40503640231. $(-3, 3)$

40503640232. $(3, -3)$

Question Number : 64 Question Id : 40503611069 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 the latus rectum of the parabola $y^2 = 4x$ be the common chord to the circles C_1 and C_2 each of them having radius $2\sqrt{5}$. Then, the distance between the centres of the circles C_1 and C_2 is :

Options :

40503640233. $4\sqrt{5}$

40503640234. 8

40503640235. $8\sqrt{5}$

40503640236. 12

Question Number : 64 Question Id : 40503611069 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 परवलय $y^2 = 4x$ की नाभिलम्ब जीवा, दो वृत्तों, C_1 तथा C_2 की उभयनिष्ठ जीवा है, जबकि वृत्तों में से प्रत्येक का अर्धव्यास $2\sqrt{5}$ है, तो वृत्तों C_1 एवं C_2 के केन्द्र बिन्दुओं के बीच की दूरी है :

Options :

40503640233. $4\sqrt{5}$

40503640234. 8

40503640235. $8\sqrt{5}$

40503640236. 12

Question Number : 65 Question Id : 40503611070 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 e_1 and e_2 be the eccentricities of the

ellipse, $\frac{x^2}{25} + \frac{y^2}{b^2} = 1$ ($b < 5$) and the

hyperbola, $\frac{x^2}{16} - \frac{y^2}{b^2} = 1$ respectively

satisfying $e_1 e_2 = 1$. If α and β are the distances between the foci of the ellipse and the foci of the hyperbola respectively, then the ordered pair (α, β) is equal to :

Options :

40503640237. $\left(\frac{24}{5}, 10\right)$

40503640238. $(8, 10)$

40503640239. $\left(\frac{20}{3}, 12\right)$

40503640240. $(8, 12)$

Question Number : 65 Question Id : 40503611070 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 दीर्घवृत्त, $\frac{x^2}{25} + \frac{y^2}{b^2} = 1$ ($b < 5$) तथा

अतिपरवलय $\frac{x^2}{16} - \frac{y^2}{b^2} = 1$ की उत्केन्द्रताएँ

क्रमशः e_1 तथा e_2 हैं और $e_1 e_2 = 1$ है। यदि दीर्घवृत्त और अतिपरवलय के नाभिकेन्द्रों के बीच की दूरियाँ क्रमशः α तथा β हैं, तो क्रमित युग्म (α, β) बराबर है :

Options :

40503640237. $\left(\frac{24}{5}, 10\right)$

40503640238. $(8, 10)$

40503640239. $\left(\frac{20}{3}, 12\right)$

40503640240. $(8, 12)$

Question Number : 66 Question Id : 40503611071 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 which bisects the line joining the points $(4, -2, 3)$ and $(2, 4, -1)$ at right angles also passes through the point :

Options :

40503640241. $(4, 0, 1)$

40503640242. $(4, 0, -1)$

40503640243. $(0, -1, 1)$

40503640244. $(0, 1, -1)$

Question Number : 66 Question Id : 40503611071 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

वह समतल, जो बिन्दुओं $(4, -2, 3)$ तथा $(2, 4, -1)$ को मिलाने वाली सरल रेखा को लम्ब समद्विभाजित करता है, निम्न में से किस बिन्दु से भी होकर जाता है?

Options :

40503640241. $(4, 0, 1)$

40503640242. $(4, 0, -1)$

40503640243. $(0, -1, 1)$

40503640244. $(0, 1, -1)$

Question Number : 67 Question Id : 40503611072 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_i ($1 \leq i \leq 10$) be ten observations of a

random variable X . If $\sum_{i=1}^{10} (x_i - p) = 3$ and

$\sum_{i=1}^{10} (x_i - p)^2 = 9$ where $0 \neq p \in \mathbb{R}$, then

the standard deviation of these observations is :

Options :

40503640245. $\frac{9}{10}$

40503640246. $\frac{7}{10}$

40503640247. $\frac{4}{5}$

40503640248. $\sqrt{\frac{3}{5}}$

Question Number : 67 Question Id : 40503611072 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 यादृच्छिक चर X के दस प्रेक्षण x_i ($1 \leq i \leq 10$)

हैं। यदि $\sum_{i=1}^{10} (x_i - p) = 3$ तथा $\sum_{i=1}^{10} (x_i - p)^2 = 9$,

जबकि $0 \neq p \in \mathbb{R}$ है, तो इन प्रेक्षणों का मानक विचलन है :

Options :

40503640245. $\frac{9}{10}$

40503640246. $\frac{7}{10}$

40503640247. $\frac{4}{5}$

40503640248. $\sqrt{\frac{3}{5}}$

Question Number : 68 Question Id : 40503611073 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 probability that a randomly chosen
5-digit number is made from exactly two
digits is :

Options :

40503640249. $\frac{121}{10^4}$

40503640250. $\frac{134}{10^4}$

40503640251. $\frac{150}{10^4}$

40503640252. $\frac{135}{10^4}$

Question Number : 68 Question Id : 40503611073 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

यादृच्छया चुनी गई पाँच अंकों की एक संख्या के मात्र दो अंकों से बनाई गई होने की प्रायिकता है :

Options :

40503640249. $\frac{121}{10^4}$

40503640250. $\frac{134}{10^4}$

40503640251. $\frac{150}{10^4}$

40503640252. $\frac{135}{10^4}$

Question Number : 69 Question Id : 40503611074 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 $a, b, c \in \mathbb{R}$ be such that $a^2 + b^2 + c^2 = 1$. If

$$a \cos \theta = b \cos \left(\theta + \frac{2\pi}{3} \right) = c \cos \left(\theta + \frac{4\pi}{3} \right),$$

where $\theta = \frac{\pi}{9}$, then the angle between the

vectors $a\hat{i} + b\hat{j} + c\hat{k}$ and $b\hat{i} + c\hat{j} + a\hat{k}$ is :

Options :

40503640253. $\frac{2\pi}{3}$

40503640254. 0

40503640255. $\frac{\pi}{2}$

40503640256. $\frac{\pi}{9}$

Question Number : 69 Question Id : 40503611074 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 $a, b, c \in \mathbb{R}$, जिनके लिए $a^2 + b^2 + c^2 = 1$ है।

यदि $a \cos \theta = b \cos \left(\theta + \frac{2\pi}{3} \right) = c \cos \left(\theta + \frac{4\pi}{3} \right)$ है,

जबकि $\theta = \frac{\pi}{9}$ है, तो सदिशों $a \hat{i} + b \hat{j} + c \hat{k}$ तथा

$b \hat{i} + c \hat{j} + a \hat{k}$ के बीच का कोण है :

Options :

40503640253. $\frac{2\pi}{3}$

40503640254. 0

40503640255. $\frac{\pi}{2}$

40503640256. $\frac{\pi}{9}$

Question Number : 70 Question Id : 40503611075 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, q, r be three statements such that the truth value of $(p \wedge q) \rightarrow (\sim q \vee r)$ is F. Then the truth values of p, q, r are respectively :

Options :

40503640257. T, T, T

40503640258. F, T, F

40503640259. T, T, F

40503640260. T, F, T

Question Number : 70 Question Id : 40503611075 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, q तथा r ऐसे तीन कथन हैं कि कथन $(p \wedge q) \rightarrow (\sim q \vee r)$ का सत्यमान F है, तो p, q, r के क्रमशः सत्यमान हैं :

Options :

40503640257. T, T, T

40503640258. F, T, F

40503640259. T, T, F

40503640260. T, F, T

Sub-Section Number :

2

Sub-Section Id :

405036772

Question Shuffling Allowed :

Yes

Question Number : 71 Question Id : 40503611076 Question Type : SA Display Question Number : Yes Correct Marks : 4 Wrong Marks : 0

Let S be the set of all integer solutions,
(x, y, z), of the system of equations

$$x - 2y + 5z = 0$$

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

$$-7x + 14y + 9z = 0$$

such that $15 \leq x^2 + y^2 + z^2 \leq 150$. Then,
the number of elements in the set S 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 : 40503611076 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

यदि समीकरण निकाय

$$x - 2y + 5z = 0$$

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

$$-7x + 14y + 9z = 0$$

के पूर्णांकीय हलों (x, y, z) का समुच्चय S है, जिनके
लिए $15 \leq x^2 + y^2 + z^2 \leq 150$; तो S के अवयवों
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 : 72 Question Id : 40503611077 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

The total number of 3 - digit numbers,
whose sum of digits is 10, 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 : 40503611077 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

तीन अंकों की संख्याओं, जिनके अंकों का योगफल
10 है, की कुल 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 : 40503611078 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

If m arithmetic means (A.Ms) and three
geometric means (G.Ms) are inserted
between 3 and 243 such that 4th A.M. is
equal to 2nd G.M., then m 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 : 40503611078 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

यदि 3 तथा 243 के बीच m समान्तर माध्य तथा तीन
गुणोत्तर माध्य इस प्रकार डाले गए हैं कि चौथा समान्तर
माध्य दूसरे गुणोत्तर माध्य के बराबर है, तो m 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 : 40503611079 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

If the tangent to the curve, $y = e^x$ at a point (c, e^c) and the normal to the parabola, $y^2 = 4x$ at the point $(1, 2)$ intersect at the same point on the x -axis, then the value of c 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 : 40503611079 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

यदि वक्र, $y = e^x$ के बिन्दु (c, e^c) पर स्पर्श रेखा तथा परवलय $y^2 = 4x$ के बिन्दु $(1, 2)$ पर अभिलम्ब दोनों x -अक्ष के एक ही बिन्दु से होकर जाते हैं, तो c 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 : 75 Question Id : 40503611080 Question Type : SA Display Question Number : Yes
Correct Marks : 4 Wrong Marks : 0

Let a plane P contain two lines

$$\vec{r} = \hat{i} + \lambda(\hat{i} + \hat{j}), \lambda \in \mathbb{R} \text{ and}$$

$$\vec{r} = -\hat{j} + \mu(\hat{j} - \hat{k}), \mu \in \mathbb{R}.$$

If $Q(\alpha, \beta, \gamma)$ is the foot of the perpendicular drawn from the point $M(1, 0, 1)$ to P, then $3(\alpha + \beta + \gamma)$ equals _____.

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 : 40503611080 Question Type : SA Display Question Number : Yes

Correct Marks : 4 Wrong Marks : 0

माना दो रेखाएँ

$$\vec{r} = \hat{i} + \lambda(\hat{i} + \hat{j}), \lambda \in \mathbb{R} \text{ तथा}$$

$$\vec{r} = -\hat{j} + \mu(\hat{j} - \hat{k}), \mu \in \mathbb{R}, \text{ एक समतल P}$$

पर स्थित हैं। यदि बिन्दु $M(1, 0, 1)$ से समतल P पर डाले गए लम्ब का पाद, बिन्दु $Q(\alpha, \beta, \gamma)$ है, तो $3(\alpha + \beta + \gamma)$ 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