

# 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 :

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

$R_2 = \{(a, b) \in \mathbb{R}^2 : a^2 + b^2 \notin \mathbb{Q}\}$ , 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  $\lambda$  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**

$\lambda$  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  $3 \times 3$  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  $3 \times 3$  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  $n^{\text{th}}$  term is negative,  
then :

**Options :**

40503640201.  $n = 60$

40503640202.  $n = 41$

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

40503640204.  $n^{\text{th}}$  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  $n^{\text{th}}$  पद ऋणात्मक है,  
तो :

**Options :**

40503640201.  $n = 60$

40503640202.  $n = 41$

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

40503640204.  $n^{\text{th}}$  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  $T = \{x \in \mathbf{R} \mid f(x) = f(0)\}$ , 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  $T = \{x \in \mathbf{R} \mid f(x) = f(0)\}$ , 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  $\text{cm}^3/\text{sec}$ ), 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 ( $\text{cm}^3/\text{sec}$  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

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

$B(x) + C$ , 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  $\Delta ABC$  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 ractum 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  $\alpha$  and  $\beta$  are the distances between the foci of the ellipse and the foci of the hyperbola respectively, then the ordered pair  $(\alpha, \beta)$  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  $\alpha$  तथा  $\beta$  हैं, तो क्रमित युग्म  $(\alpha, \beta)$  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  $0 \neq p \in \mathbf{R}$ , 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 4<sup>th</sup> A.M. is equal to 2<sup>nd</sup> 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

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

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

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

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

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

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