

# Mathematics

Section Id :	405036411
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 :	405036789
Question Shuffling Allowed :	Yes

**Question Number : 51 Question Id : 40503611281 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  $\bigcup_{i=1}^{50} X_i = \bigcup_{i=1}^n Y_i = T$ , where each  $X_i$

contains 10 elements and each  $Y_i$  contains 5 elements. If each element of the set  $T$  is an element of exactly 20 of sets  $X_i$ 's and exactly 6 of sets  $Y_i$ 's, then  $n$  is equal to :

**Options :**

40503640946. 15

40503640947. 30

40503640948. 45

40503640949. 50

**Question Number : 51 Question Id : 40503611281 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  $\bigcup_{i=1}^{50} X_i = \bigcup_{i=1}^n Y_i = T$  है, जहाँ प्रत्येक  $X_i$  में

10 अवयव हैं तथा प्रत्येक  $Y_i$  में 5 अवयव हैं। यदि  $T$  का प्रत्येक अवयव ठीक 20,  $X_i$  समुच्चयों का एक अवयव है तथा ठीक 6,  $Y_i$  समुच्चयों का एक अवयव है, तो  $n$  का मान है :

**Options :**

40503640946. 15

40503640947. 30

40503640948. 45

40503640949. 50

**Question Number : 52 Question Id : 40503611282 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  $\lambda \neq 0$  be in  $\mathbb{R}$ . If  $\alpha$  and  $\beta$  are the roots of the equation,  $x^2 - x + 2\lambda = 0$  and  $\alpha$  and  $\gamma$  are the roots of the equation,  $3x^2 - 10x + 27\lambda = 0$ , then  $\frac{\beta\gamma}{\lambda}$  is equal to :

**Options :**

40503640950. 36

40503640951. 27

40503640952. 18

40503640953. 9

**Question Number : 52 Question Id : 40503611282 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  $\lambda \neq 0$ ,  $\mathbb{R}$  में है। यदि  $\alpha$  तथा  $\beta$  समीकरण  $x^2 - x + 2\lambda = 0$  के मूल हैं और  $\alpha$  तथा  $\gamma$ , समीकरण  $3x^2 - 10x + 27\lambda = 0$  के मूल हैं, तो  $\frac{\beta\gamma}{\lambda}$  बराबर है :

**Options :**

40503640950. 36

40503640951. 27

40503640952. 18

40503640953. 9

**Question Number : 53 Question Id : 40503611283 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 and b are real numbers such that

$$(2 + \alpha)^4 = a + b\alpha, \text{ where } \alpha = \frac{-1 + i\sqrt{3}}{2},$$

then a + b is equal to :

**Options :**

40503640954. 9

40503640955. 24

40503640956. 33

40503640957. 57

**Question Number : 53 Question Id : 40503611283 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 a तथा b ऐसी वास्तविक संख्याएँ है कि

$$(2 + \alpha)^4 = a + b\alpha \text{ है, जहाँ } \alpha = \frac{-1 + i\sqrt{3}}{2} \text{ है, तो}$$

a + b का मान है :

**Options :**

40503640954. 9

40503640955. 24

40503640956. 33

40503640957. 57

**Question Number : 54 Question Id : 40503611284 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 system of equations

$$x + y + z = 2$$

$$2x + 4y - z = 6$$

$$3x + 2y + \lambda z = \mu$$

has infinitely many solutions, then :

**Options :**

40503640958.  $\lambda - 2\mu = -5$

40503640959.  $\lambda + 2\mu = 14$

40503640960.  $2\lambda - \mu = 5$

40503640961.  $2\lambda + \mu = 14$

**Question Number : 54 Question Id : 40503611284 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 समीकरणों के निकाय

$$x + y + z = 2$$

$$2x + 4y - z = 6$$

$$3x + 2y + \lambda z = \mu$$

के अनन्त हल हैं, तो :

**Options :**

40503640958.  $\lambda - 2\mu = -5$

40503640959.  $\lambda + 2\mu = 14$

40503640960.  $2\lambda - \mu = 5$

40503640961.  $2\lambda + \mu = 14$

**Question Number : 55 Question Id : 40503611285 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 the vectors  $x_1$ ,  $x_2$  and  $x_3$  are the solutions of the system of linear equations,  $Ax = b$  when the vector  $b$  on the right side is equal to  $b_1$ ,  $b_2$  and  $b_3$  respectively. If

$$x_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, x_2 = \begin{bmatrix} 0 \\ 2 \\ 1 \end{bmatrix}, x_3 = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}, b_1 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix},$$

$$b_2 = \begin{bmatrix} 0 \\ 2 \\ 0 \end{bmatrix} \text{ and } b_3 = \begin{bmatrix} 0 \\ 0 \\ 2 \end{bmatrix}, \text{ then the}$$

determinant of  $A$  is equal to :

**Options :**

40503640962.  $\frac{1}{2}$

40503640963. 2

40503640964.  $\frac{3}{2}$

40503640965. 4

**Question Number : 55 Question Id : 40503611285 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 सदिश  $x_1, x_2$  तथा  $x_3$ , रेखिक समीकरण निकाय  $Ax = b$  के हल हैं, जबकि दाईं ओर का सदिश  $b$ , क्रमशः  $b_1, b_2$  तथा  $b_3$  के बराबर है। यदि

$$x_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, x_2 = \begin{bmatrix} 0 \\ 2 \\ 1 \end{bmatrix}, x_3 = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}, b_1 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix},$$

$$b_2 = \begin{bmatrix} 0 \\ 2 \\ 0 \end{bmatrix} \text{ तथा } b_3 = \begin{bmatrix} 0 \\ 0 \\ 2 \end{bmatrix} \text{ हैं, तो } A \text{ के सारणिक}$$

का मान है :

**Options :**

40503640962.  $\frac{1}{2}$

40503640963. 2

40503640964.  $\frac{3}{2}$

40503640965. 4

**Question Number : 56 Question Id : 40503611286 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 for some positive integer  $n$ , the coefficients of three consecutive terms in the binomial expansion of  $(1 + x)^{n+5}$  are in the ratio 5 : 10 : 14, then the largest coefficient in this expansion is :

**Options :**

40503640966. 252

40503640967. 330

40503640968. 462

40503640969. 792

**Question Number : 56 Question Id : 40503611286 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 किसी धनपूर्णांक  $n$  के लिए,  $(1+x)^{n+5}$  के द्विपद प्रसार में तीन क्रमागत पदों के गुणांक 5 : 10 : 14 के अनुपात में हैं, तो इस प्रसार में सब से बड़ा गुणांक है :

**Options :**

40503640966. 252

40503640967. 330

40503640968. 462

40503640969. 792

**Question Number : 57 Question Id : 40503611287 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  $a_1, a_2, \dots, a_n$  be a given A.P. whose common difference is an integer and  $S_n = a_1 + a_2 + \dots + a_n$ . If  $a_1 = 1, a_n = 300$  and  $15 \leq n \leq 50$ , then the ordered pair  $(S_{n-4}, a_{n-4})$  is equal to :

**Options :**

40503640970. (2490, 248)

40503640971. (2480, 249)

40503640972. (2490, 249)

40503640973. (2480, 248)



Question Number : 57 Question Id : 40503611287 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  $a_1, a_2, \dots, a_n$  एक दी गई समांतर श्रेणी है,  
जिसका सार्वअंतर एक पूर्णांक है तथा  
 $S_n = a_1 + a_2 + \dots + a_n$  है। यदि  $a_1 = 1, a_n = 300$   
तथा  $15 \leq n \leq 50$  हैं, तो क्रमित युग्म  
( $S_{n-4}, a_{n-4}$ ) बराबर है :

Options :

40503640970. (2490, 248)

40503640971. (2480, 249)

40503640972. (2490, 249)

40503640973. (2480, 248)

Question Number : 58 Question Id : 40503611288 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  $f : (0, \infty) \rightarrow (0, \infty)$  be a differentiable  
function such that  $f(1) = e$  and

$$\lim_{t \rightarrow x} \frac{t^2 f^2(x) - x^2 f^2(t)}{t - x} = 0.$$

If  $f(x) = 1$ , then  $x$  is equal to :

Options :

40503640974.  $e$

40503640975.  $\frac{1}{e}$

40503640976.  $2e$

40503640977.  $\frac{1}{2e}$

**Question Number : 58 Question Id : 40503611288 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  $f : (0, \infty) \rightarrow (0, \infty)$  एक ऐसा अवकलनीय फलन है कि  $f(1) = e$  तथा

$$\lim_{t \rightarrow x} \frac{t^2 f^2(x) - x^2 f^2(t)}{t - x} = 0 \text{ हैं। यदि } f(x) = 1$$

है, तो  $x$  का मान है :

**Options :**

40503640974.  $e$

40503640975.  $\frac{1}{e}$

40503640976.  $2e$

40503640977.  $\frac{1}{2e}$

**Question Number : 59 Question Id : 40503611289 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**

$$\text{The function } f(x) = \begin{cases} \frac{\pi}{4} + \tan^{-1}x, & |x| \leq 1 \\ \frac{1}{2}(|x| - 1), & |x| > 1 \end{cases}$$

is :

**Options :**

40503640978. both continuous and differentiable on  $\mathbb{R} - \{1\}$ .

40503640979. continuous on  $\mathbb{R} - \{-1\}$  and differentiable on  $\mathbb{R} - \{-1, 1\}$ .

40503640980. continuous on  $\mathbb{R} - \{1\}$  and differentiable on  $\mathbb{R} - \{-1, 1\}$ .

40503640981. both continuous and differentiable on  $\mathbb{R} - \{-1\}$ .

**Question Number : 59 Question Id : 40503611289 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**

$$\text{फलन } f(x) = \begin{cases} \frac{\pi}{4} + \tan^{-1}x, & |x| \leq 1 \\ \frac{1}{2} (|x| - 1), & |x| > 1 \end{cases} :$$

**Options :**

40503640978.  $\mathbb{R} - \{1\}$  में संतत और अवकलनीय, दोनों, है।

40503640979.  $\mathbb{R} - \{-1\}$  में संतत तथा  $\mathbb{R} - \{-1, 1\}$  में अवकलनीय है।

40503640980.  $\mathbb{R} - \{1\}$  में संतत तथा  $\mathbb{R} - \{-1, 1\}$  में अवकलनीय है।

40503640981.  $\mathbb{R} - \{-1\}$  में संतत और अवकलनीय, दोनों, है।

**Question Number : 60 Question Id : 40503611290 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 minimum value of  $2^{\sin x} + 2^{\cos x}$  is :

**Options :**

40503640982.  $2^{1 - \frac{1}{\sqrt{2}}}$

40503640983.  $2^{-1+\sqrt{2}}$

40503640984.  $2^{-1+\frac{1}{\sqrt{2}}}$

40503640985.  $2^{1-\sqrt{2}}$

**Question Number : 60 Question Id : 40503611290 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**

$2^{\sin x} + 2^{\cos x}$  का न्यूनतम मान है :

**Options :**

40503640982.  $2^{1-\frac{1}{\sqrt{2}}}$

40503640983.  $2^{-1+\sqrt{2}}$

40503640984.  $2^{-1+\frac{1}{\sqrt{2}}}$

40503640985.  $2^{1-\sqrt{2}}$

**Question Number : 61 Question Id : 40503611291 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 integral

$$\int_{\pi/6}^{\pi/3} \tan^3 x \cdot \sin^2 3x (2\sec^2 x \cdot \sin^2 3x + 3\tan x \cdot \sin 6x) dx \text{ is}$$

equal to :

**Options :**

40503640986.  $\frac{7}{18}$

40503640987.  $-\frac{1}{9}$

40503640988.  $\frac{9}{2}$

40503640989.  $-\frac{1}{18}$

**Question Number : 61 Question Id : 40503611291 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**

समाकल

$$\int_{\pi/6}^{\pi/3} \tan^3 x \cdot \sin^2 3x (2 \sec^2 x \cdot \sin^2 3x + 3 \tan x \cdot \sin 6x) dx$$

का मान है :

**Options :**

40503640986.  $\frac{7}{18}$

40503640987.  $-\frac{1}{9}$

40503640988.  $\frac{9}{2}$

40503640989.  $-\frac{1}{18}$

**Question Number : 62 Question Id : 40503611292 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 area (in sq. units) of the largest rectangle ABCD whose vertices A and B lie on the  $x$ -axis and vertices C and D lie on the parabola,  $y = x^2 - 1$  below the  $x$ -axis, is :

Options :

40503640990.  $\frac{2}{3\sqrt{3}}$

40503640991.  $\frac{1}{3\sqrt{3}}$

40503640992.  $\frac{4}{3\sqrt{3}}$

40503640993.  $\frac{4}{3}$

Question Number : 62 Question Id : 40503611292 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

उस सबसे बड़ी आयत ABCD, जिसके शीर्ष बिंदु A तथा B,  $x$ -अक्ष पर स्थित हैं तथा शीर्ष बिंदु C तथा D,  $x$ -अक्ष के नीचे, परवलय  $y = x^2 - 1$  पर स्थित हैं, का क्षेत्रफल (वर्ग इकाइयों में) है :

Options :

40503640990.  $\frac{2}{3\sqrt{3}}$

40503640991.  $\frac{1}{3\sqrt{3}}$

40503640992.  $\frac{4}{3\sqrt{3}}$

40503640993.

$\frac{4}{3}$

Question Number : 63 Question Id : 40503611293 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 solution of the differential equation

$$\frac{dy}{dx} - \frac{y + 3x}{\log_e(y + 3x)} + 3 = 0 \text{ is :}$$

(where C is a constant of integration.)

Options :

40503640994.  $x - \log_e(y + 3x) = C$

40503640995.  $x - 2\log_e(y + 3x) = C$

40503640996.  $x - \frac{1}{2}(\log_e(y + 3x))^2 = C$

40503640997.  $y + 3x - \frac{1}{2}(\log_e x)^2 = C$

Question Number : 63 Question Id : 40503611293 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

अवकल समीकरण

$$\frac{dy}{dx} - \frac{y + 3x}{\log_e(y + 3x)} + 3 = 0 \text{ का हल है :}$$

(जहाँ C एक समाकलन अचर है।)

Options :

40503640994.  $x - \log_e(y + 3x) = C$

40503640995.  $x - 2\log_e(y + 3x) = C$



40503640996.  $x - \frac{1}{2}(\log_e(y + 3x))^2 = C$

40503640997.  $y + 3x - \frac{1}{2}(\log_e x)^2 = C$

**Question Number : 64 Question Id : 40503611294 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 perpendicular bisector of the line segment joining the points P(1, 4) and Q(k, 3) has y-intercept equal to -4, then a value of k is :

**Options :**

40503640998.  $\sqrt{14}$

40503640999.  $-2$

40503641000.  $\sqrt{15}$

40503641001.  $-4$

**Question Number : 64 Question Id : 40503611294 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 बिंदुओं P(1, 4) तथा Q(k, 3) को मिलाने वाले रेखाखण्ड के लंबसमद्विभाजक का y-अंतःखण्ड -4 है, तो k का एक मान है :

**Options :**

40503640998.  $\sqrt{14}$

40503640999.  $-2$

40503641000.  $\sqrt{15}$



40503641001. -4

**Question Number : 65 Question Id : 40503611295 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 circle passing through the intersection of the circles,  $x^2 + y^2 - 6x = 0$  and  $x^2 + y^2 - 4y = 0$ , having its centre on the line,  $2x - 3y + 12 = 0$ , also passes through the point :

**Options :**

40503641002. (1, -3)

40503641003. (-3, 1)

40503641004. (-3, 6)

40503641005. (-1, 3)

**Question Number : 65 Question Id : 40503611295 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**

वृत्तों  $x^2 + y^2 - 6x = 0$  तथा  $x^2 + y^2 - 4y = 0$  के प्रतिच्छेदन बिंदुओं से हो कर जाने वाला वह वृत्त जिसका केंद्र, रेखा  $2x - 3y + 12 = 0$  पर स्थित है, निम्न में से जिस बिंदु से भी हो कर जाता है, वह है :

**Options :**

40503641002. (1, -3)

40503641003. (-3, 1)

40503641004. (-3, 6)

40503641005. (-1, 3)

**Question Number : 66 Question Id : 40503611296 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  $x=4$  be a directrix to an ellipse whose centre is at the origin and its eccentricity is

$\frac{1}{2}$ . If  $P(1, \beta)$ ,  $\beta > 0$  is a point on this ellipse,

then the equation of the normal to it at P is :

**Options :**

40503641006.  $4x - 3y = 2$

40503641007.  $4x - 2y = 1$

40503641008.  $8x - 2y = 5$

40503641009.  $7x - 4y = 1$

**Question Number : 66 Question Id : 40503611296 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 4 Wrong Marks : 1**

माना  $x = 4$  एक ऐसे दीर्घवृत्त की एक नियता है, जिसका

केंद्र मूल बिंदु पर है तथा जिसकी उत्केंद्रता  $\frac{1}{2}$  है। यदि

$P(1, \beta)$ ,  $\beta > 0$ , इस दीर्घवृत्त पर स्थित एक बिंदु है, तो इसके P पर खींचे गए अभिलंब का समीकरण है :

**Options :**

40503641006.  $4x - 3y = 2$

40503641007.  $4x - 2y = 1$

40503641008.  $8x - 2y = 5$

40503641009.  $7x - 4y = 1$

Question Number : 67 Question Id : 40503611297 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 distance of the point  $(1, -2, 3)$  from  
the plane  $x - y + z = 5$  measured parallel to

the line  $\frac{x}{2} = \frac{y}{3} = \frac{z}{-6}$  is :

Options :

40503641010.  $\frac{1}{7}$

40503641011. 1

40503641012. 7

40503641013.  $\frac{7}{5}$

Question Number : 67 Question Id : 40503611297 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

बिंदु  $(1, -2, 3)$  की समतल  $x - y + z = 5$  से रेखा

$\frac{x}{2} = \frac{y}{3} = \frac{z}{-6}$  के समांतर मापी गई दूरी है :

Options :

40503641010.  $\frac{1}{7}$

40503641011. 1

40503641012. 7

40503641013.  $\frac{7}{5}$

Question Number : 68 Question Id : 40503611298 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

In a game two players A and B take turns in throwing a pair of fair dice starting with player A and total of scores on the two dice, in each throw is noted. A wins the game if he throws a total of 6 before B throws a total of 7 and B wins the game if he throws a total of 7 before A throws a total of six. The game stops as soon as either of the players wins. The probability of A winning the game is :

Options :

40503641014.  $\frac{5}{6}$

40503641015.  $\frac{5}{31}$

40503641016.  $\frac{31}{61}$

40503641017.  $\frac{30}{61}$

Question Number : 68 Question Id : 40503611298 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक खेल में दो खिलाड़ी A तथा B बारी बारी से अनभिन्नत पासों के युग्म को फेंकते हैं, जबकि खिलाड़ी A खेल आरम्भ करता है, तथा प्रत्येक बार दोनों पासों पर आए अंकों का योग नोट किया जाता है। यदि B द्वारा फेंके गए पासों के अंकों का योग 7 आने से पहले A द्वारा फेंके गए पासों के अंकों का योग 6 आ जाता है, तो A जीतता है जबकि A द्वारा फेंके गए पासों के अंकों का योग 6 आने से पहले, B द्वारा फेंके गए पासों के अंकों का योग 7 आ जाता है, तो B जीतता है। किसी भी एक खिलाड़ी के जीतने पर खेल समाप्त हो जाता है। A के खेल को जीतने की प्रायिकता है :

**Options :**

40503641014.  $\frac{5}{6}$

40503641015.  $\frac{5}{31}$

40503641016.  $\frac{31}{61}$

40503641017.  $\frac{30}{61}$

**Question Number : 69 Question Id : 40503611299 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 angle of elevation of a cloud C from a point P, 200 m above a still lake is  $30^\circ$ . If the angle of depression of the image of C in the lake from the point P is  $60^\circ$ , then PC (in m) is equal to :

**Options :**

40503641018. 100

40503641019.  $200\sqrt{3}$

40503641020. 400

40503641021.  $400\sqrt{3}$

**Question Number : 69 Question Id : 40503611299 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 4 Wrong Marks : 1**

एक स्थिर जल वाली झील के तल से 200 मीटर की ऊँचाई पर स्थित एक बिंदु P से एक बादल C का उन्नयन कोण  $30^\circ$  है। यदि C के झील में प्रतिबिंब का P से अवनमन कोण  $60^\circ$  है, तो PC (मीटरों में) है :

**Options :**

40503641018. 100

40503641019.  $200\sqrt{3}$

40503641020. 400

40503641021.  $400\sqrt{3}$

**Question Number : 70 Question Id : 40503611300 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**

Contrapositive of the statement :

'If a function  $f$  is differentiable at  $a$ , then it is also continuous at  $a'$ , is :

**Options :**

40503641022. If a function  $f$  is continuous at  $a$ , then it is differentiable at  $a$ .

40503641023. If a function  $f$  is continuous at  $a$ , then it is not differentiable at  $a$ .



40503641024. If a function  $f$  is not continuous at  $a$ ,  
then it is not differentiable at  $a$ .

40503641025. If a function  $f$  is not continuous at  $a$ ,  
then it is differentiable at  $a$ .

**Question Number : 70 Question Id : 40503611300 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical**

**Correct Marks : 4 Wrong Marks : 1**

कथन,

‘यदि एक फलन  $f$ ,  $a$  पर अवकलनीय है, तो यह  $a$  पर  
संतत भी है’

का प्रतिधनात्मक कथन है :

**Options :**

40503641022. यदि एक फलन  $f$ ,  $a$  पर संतत है, तो यह  $a$  पर  
अवकलनीय है।

40503641023. यदि एक फलन  $f$ ,  $a$  पर संतत है, तो यह  $a$  पर  
अवकलनीय नहीं है।

40503641024. यदि एक फलन  $f$ ,  $a$  पर संतत नहीं है, तो यह  $a$   
पर अवकलनीय नहीं है।

40503641025. यदि एक फलन  $f$ ,  $a$  पर संतत नहीं है, तो यह  $a$   
पर अवकलनीय है।

**Sub-Section Number :**

2

**Sub-Section Id :**

405036790

**Question Shuffling Allowed :**

Yes

**Question Number : 71 Question Id : 40503611301 Question Type : SA Display Question Number : Yes  
Correct Marks : 4 Wrong Marks : 0**

If the variance of the following frequency distribution :

Class : 10-20 20-30 30-40

Frequency : 2 x 2

is 50, then  $x$  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 : 40503611301 Question Type : SA Display Question Number : Yes**

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

यदि निम्न बारंबारता बंटन

वर्ग : 10-20 20-30 30-40

बारंबारता : 2 x 2

का प्रसरण 50 है, तो  $x$  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 : 72 Question Id : 40503611302 Question Type : SA Display Question Number : Yes**

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

A test consists of 6 multiple choice questions, each having 4 alternative answers of which only one is correct. The number of ways, in which a candidate answers all six questions such that exactly four of the answers are correct, 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 : 40503611302 Question Type : SA Display Question Number : Yes**

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

एक परीक्षा में 6 बहुविकल्पी प्रश्न हैं तथा प्रत्येक प्रश्न के उत्तर के लिए 4 विकल्प हैं जिनमें से केवल एक सही है। एक परीक्षार्थी द्वारा सभी 6 प्रश्नों के उत्तर इस प्रकार देने, ताकि उसके ठीक 4 प्रश्नों के उत्तर सही हों, के तरीकों 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 : 73 Question Id : 40503611303 Question Type : SA Display Question Number : Yes**

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

Let  $\{x\}$  and  $[x]$  denote the fractional part of  $x$  and the greatest integer  $\leq x$  respectively of a real number  $x$ . If

$$\int_0^n \{x\} dx, \int_0^n [x] dx \quad \text{and} \quad 10(n^2 - n),$$

$(n \in \mathbb{N}, n > 1)$  are three consecutive terms of a G.P., then  $n$  is equal to \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.002

**Question Number : 73 Question Id : 40503611303 Question Type : SA Display Question Number : Yes**

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



माना  $\{x\}$  तथा  $[x]$ , क्रमशः एक वास्तविक संख्या  $x$  के भिन्नात्मक भाग तथा महत्तम पूर्णांक  $\leq x$ , को दर्शाते हैं। यदि  $\int_0^n \{x\} dx$ ,  $\int_0^n [x] dx$  तथा  $10(n^2 - n)$ , ( $n \in \mathbb{N}$ ,  $n > 1$ ) एक गुणोत्तर श्रेणी के तीन क्रमागत पद हैं, तो  $n$  का मान है \_\_\_\_\_।

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.002

**Question Number :** 74 **Question Id :** 40503611304 **Question Type :** SA Display **Question Number :** Yes  
**Correct Marks :** 4 **Wrong Marks :** 0

Let PQ be a diameter of the circle  $x^2 + y^2 = 9$ .  
If  $\alpha$  and  $\beta$  are the lengths of the perpendiculars from P and Q on the straight line,  $x + y = 2$  respectively, then the maximum value of  $\alpha\beta$  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 :** 40503611304 **Question Type :** SA Display **Question Number :** Yes  
**Correct Marks :** 4 **Wrong Marks :** 0

माना PQ वृत्त  $x^2 + y^2 = 9$  का एक व्यास है। यदि P तथा Q से रेखा  $x + y = 2$  पर खींचे गए लंबों की लंबाइयाँ क्रमशः  $\alpha$  तथा  $\beta$  हैं, तो  $\alpha\beta$  का अधिकतम 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 : 40503611305 Question Type : SA Display Question Number : Yes**

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

If  $\vec{a} = 2\hat{i} + \hat{j} + 2\hat{k}$ , then the value of

$$\left| \hat{i} \times (\vec{a} \times \hat{i}) \right|^2 + \left| \hat{j} \times (\vec{a} \times \hat{j}) \right|^2 +$$

$$\left| \hat{k} \times (\vec{a} \times \hat{k}) \right|^2 \text{ is equal to } \underline{\hspace{2cm}}.$$

**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 : 40503611305 Question Type : SA Display Question Number : Yes**

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

यदि  $\vec{a} = 2\hat{i} + \hat{j} + 2\hat{k}$  है, तो

$$\left| \hat{i} \times (\vec{a} \times \hat{i}) \right|^2 + \left| \hat{j} \times (\vec{a} \times \hat{j}) \right|^2 +$$

$$\left| \hat{k} \times (\vec{a} \times \hat{k}) \right|^2 \text{ का मान है } \underline{\hspace{2cm}}।$$

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.002