

# Banaras Hindu University

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<b>Actual Answer Key:</b>	Yes

## MA MSc Mathematics Computing

<b>Group Number :</b>	1
<b>Group Id :</b>	45489330
<b>Group Maximum Duration :</b>	0
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<b>Revisit allowed for edit? :</b>	No
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<b>Group Marks:</b>	360

## MA MSc Mathematics Computing

<b>Section Id :</b>	45489338
<b>Section Number :</b>	1
<b>Section type :</b>	Online
<b>Mandatory or Optional:</b>	Mandatory
<b>Number of Questions:</b>	120
<b>Number of Questions to be attempted:</b>	120
<b>Section Marks:</b>	360
<b>Display Number Panel:</b>	Yes
<b>Group All Questions:</b>	No

<b>Sub-Section Number:</b>	1
<b>Sub-Section Id:</b>	45489338
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 1 Question Id : 4548933673 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes**  
**Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes**

**Correct Marks : 3 Wrong Marks : 1**

Question Label : Multiple Choice Question

The equation of the plane passing through the point  $(-1, 3, 1)$  and perpendicular to the line  $2x + 3y + 4z = 5, 3x + 4y + 5z = 6$  is :

बिन्दु  $(-1, 3, 1)$  से होकर जाने वाले समतल, जो रेखा  $2x + 3y + 4z = 5, 3x + 4y + 5z = 6$  के लम्बवत् है, का समीकरण है :

Options :

1.  $x - 2y + 2z + 5 = 0$
2.  $x - 2y + z + 6 = 0$
3.  $4x + y + 2z - 1 = 0$
4.  $x + y + z - 3 = 0$

Question Number : 2 Question Id : 4548933674 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The equation of the plane passes through  $x$ -axis and perpendicular to the line

$$\frac{x-1}{\cos \theta} = \frac{y+2}{\sin \theta} = \frac{z-3}{0} \text{ is :}$$

$x$ -अक्ष से होकर जाने वाले उस समतल, जो रेखा  $\frac{x-1}{\cos \theta} = \frac{y+2}{\sin \theta} = \frac{z-3}{0}$  के लम्बवत् है, का समीकरण है :

Options :

1.  $y = 1$
2.  $z = 0$
3.  $y \sin \theta + z \cos \theta = 0$
4.  $y = 0$

Question Number : 3 Question Id : 4548933675 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The direction cosines of the line  $y - x = 0 = z$  are :

रेखा  $y - x = 0 = z$  की दिक्कोज्याएँ हैं :

Options :

1.  $(1, 0, 0)$

$$\left( \frac{1}{\sqrt{2}}, 0, \frac{1}{\sqrt{2}} \right)$$

2.

3.  $\left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}, 0\right)$

(1, 1, 0)

4.

Question Number : 4 Question Id : 4548933676 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If the sphere  $x^2 + y^2 + z^2 = a^2$  touches the plane  $lx + my + nz = p$ , then :

यदि गोला  $x^2 + y^2 + z^2 = a^2$  समतल  $lx + my + nz = p$ , को स्पर्श करता हो, तो :

Options :

1.  $l^2 + m^2 + n^2 = 1$

2.  $l^2 + m^2 + n^2 = p^2$

3.  $l^2 + m^2 + n^2 = p^2 / a^2$

4.  $(l^2 + m^2 + n^2)p^2 = a^2$

Question Number : 5 Question Id : 4548933677 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The locus of the point of intersection of three mutually perpendicular tangent planes to the surface  $2x^2 - 3y^2 + 6z^2 = 1$  is :

सतह  $2x^2 - 3y^2 + 6z^2 = 1$  के तीन परस्पर लम्बवत् स्पर्शी तलों के प्रतिच्छेद बिन्दु का बिन्दुपथ है :

Options :

1.  $x^2 + y^2 + z^2 = \frac{2}{3}$

2.  $x^2 + y^2 + z^2 = \frac{1}{3}$

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

3.

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

4.

Question Number : 6 Question Id : 4548933678 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If the plane  $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 0$  cuts the cone  $xy + yz + zx = 0$  in perpendicular lines,  
then :

यदि समतल  $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 0$ , शंकु  $xy + yz + zx = 0$  को परस्पर लम्बवत् रेखाओं में प्रतिच्छेदित करता हो, तो :

Options :

$$a + b + c = 1$$

1.

$$a + b + c = 0$$

2.

$$\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 0$$

3.

$$\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 1$$

4.

Question Number : 7 Question Id : 4548933679 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If a line makes angles  $\alpha, \beta, \gamma, \delta$  respectively with the four diagonals of a cube  
then the value of  $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma + \sin^2 \delta$  is :

यदि एक रेखा, एक घन के चार विकर्णों के साथ क्रमशः  $\alpha, \beta, \gamma, \delta$  कोण बनाता हो, तो  
 $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma + \sin^2 \delta$  का मान है :

Options :

$$8/3$$

1.

4/3

2.

2/3

3.

1

4.

Question Number : 8 Question Id : 4548933680 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The locus of the pole of a given straight line with respect to a system of confocal conic is :

एक सन्नाभिक शांकवों के लिए एक दिये गये सरल रेखा के ध्रुवों का बिन्दुपथ है :

Options :

a line

1. एक रेखा

a pair of lines

2. एक रेखा युग्म

a circle

3. एक वृत्त

an ellipse

4. एक दीर्घवृत्त

Question Number : 9 Question Id : 4548933681 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The shortest distance between  $z$ -axis and the line  $x+y+z+3=0=3x+y+2z+2$

is :

रेखा  $x+y+z+3=0=3x+y+2z+2$  और  $z$ -अक्ष के बीच की न्यूनतम दूरी है :

Options :

$2\sqrt{2}$

1.

$3\sqrt{2}$

2.

3.  $2\sqrt{3}$

4.  $3\sqrt{3}$

Question Number : 10 Question Id : 4548933682 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The equation of the right circular cylinder whose guiding curve is the circle

$$x^2 + y^2 + z^2 - 9 = 0 = x - y + z - 3 \text{ is :}$$

उस लम्ब वृत्तीय बेलन, जिसका मार्गदर्शी वक्र वृत्त  $x^2 + y^2 + z^2 - 9 = 0 = x - y + z - 3$  है, का समीकरण है :

Options :

1.  $x^2 + y^2 + z^2 + xy - yz - zx - 9 = 0$

2.  $x^2 + y^2 + z^2 + xy + yz - zx - 9 = 0$

3.  $x^2 + y^2 + z^2 - xy - yz + zx - 9 = 0$

4.  $x^2 + y^2 + z^2 + xy - yz + zx - 9 = 0$

Question Number : 11 Question Id : 4548933683 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Which of the following surface can be treated as a surface of revolution about z-axis :

निम्न में से किस सतह को z-अक्ष के सापेक्ष माना जा सकता है :

Options :

1.  $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$

2.  $\frac{x^2}{a^2} + \frac{y^2}{a^2} + \frac{z^2}{c^2} = 1$

3.  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

$$y^2 = 4ax$$

4.

Question Number : 12 Question Id : 4548933684 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Which of the following curve in  $\mathbb{R}^2$  is parametrized by its arc length ?

निम्न में से कौन-सा वक्र अपने चाप की लम्बाई से परामीतिकृत है ?

Options :

$$r(t) = (t, t^2)$$

1.

$$r(t) = \left( \frac{t}{\sqrt{2}}, \frac{t}{\sqrt{2}} \right)$$

2.

$$r(t) = (a \cos t, a \sin t), a \in \mathbb{R}^+$$

3.

$$r(t) = (a \cos t, b \sin t); a, b \in \mathbb{R}^+$$

4.

Question Number : 13 Question Id : 4548933685 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If  $g_{ij}$  are components of metric tensor and  $[k, ij]$  denotes Christoffel symbol of first kind then the value of  $[k, ij] + [i, jk]$  is :

यदि  $g_{ij}$  मीट्रिक टेन्सर के अवयव हो तथा  $[k, ij]$  क्रिस्टोफल का प्रथम प्रकार का चिह्न हो तो  $[k, ij] + [i, jk]$  का मान है :

Options :

$$\frac{\partial g_{ik}}{\partial x^j}$$

1.

$$\frac{\partial g_{jk}}{\partial x^i}$$

2.

3.  $\frac{\partial g_{ki}}{\partial x^j}$

4.  $\frac{\partial g_{ij}}{\partial x^k} + \frac{\partial g_{jk}}{\partial x^i}$

Question Number : 14 Question Id : 4548933686 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Which of the following surface is disconnected ?

निम्न में से कौन सा सतह जुड़ा हुआ नहीं है :

Options :

1.  $x^2 + y^2 + z^2 = 1$

2.  $z = x^2 + y^2$

3.  $x^2 + y^2 - z^2 = 1$

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

Question Number : 15 Question Id : 4548933687 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If the plane  $x + y + z = 5$  intersects the coordinate axes at points A, B, C respectively, then the area of the triangle ABC is :

यदि तल  $x + y + z = 5$  निर्देशाक्षों को क्रमशः A, B, C बिन्दुओं पर काटता हो तो त्रिभुज ABC का क्षेत्रफल है :

Options :

1.  $\frac{25}{2}$

2.  $25\sqrt{2}$



3.  $25 \frac{\sqrt{3}}{2}$

4.  $25\sqrt{3}$

Question Number : 16 Question Id : 4548933688 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Consider the equation  $Ax = b$ , where  $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 3 & 0 \end{bmatrix}$  and  $b = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ , which one of the following is a basic solution ?

$Ax = b$  समीकरण पर विचार कीजिए, जहाँ  $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 3 & 0 \end{bmatrix}$  तथा  $b = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ , निम्नलिखित में से कौन एक मौलिक हल है ?

Options :

1.  $\begin{bmatrix} 2 \\ -1 \\ 0 \end{bmatrix}$

2.  $\begin{bmatrix} 2 \\ 0 \\ -1 \end{bmatrix}$

3.  $\begin{bmatrix} 0 \\ 1/3 \\ 2/3 \end{bmatrix}$

4.  $\begin{bmatrix} 0 \\ 1/2 \\ 1/2 \end{bmatrix}$

Question Number : 17 Question Id : 4548933689 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If  $x = 2, y = 3$  and  $z = 1$  is a feasible solution of the following linear programming problem (LPP) :

यदि  $x = 2, y = 3$  और  $z = 1$  निम्नलिखित LPP का एक सम्भावित हल है :

$$\text{Max } x + 2y + 4z$$

Subject to

$$2x + y + 4z = 11$$

$$3x + y + 5z = 14$$

$$x, y, z \geq 0$$

then a basic feasible solution is :

तो एक मूल सम्भावित हल है :

Options :

1.  $x = \frac{1}{2}, y = 0$  and  $z = \frac{5}{2}$

2.  $x = 2, y = 0$  and  $z = \frac{5}{2}$

3.  $x = 2, y = 0$  and  $z = \frac{2}{5}$

4.  $x = \frac{1}{2}, y = 0$  and  $z = \frac{2}{5}$

Question Number : 18 Question Id : 4548933690 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The following LPP

निम्नलिखित LPP

$$\text{Maximize } 2x_1 + x_2 + 2x_3 + 9x_4$$

Subject to :

$$x_1 + 2x_4 = 2$$

$$x_2 - x_3 + x_4 = 3$$

$$x_1, x_2, x_3, x_4 \geq 0$$

has a :

के पास एक :

Options :

bounded solution

1. परिबद्ध हल

unbounded solution

2. अपरिबद्ध हल

degenerate solution

3. विकृत हल

non-degenerate solution

4. अविकृत हल

Question Number : 19 Question Id : 4548933691 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

For the following LPP

निम्नलिखित LPP

$$\text{Maximize } 3x_1 + 5x_2$$

subject to :

$$x_1 + x_2 \leq 4, 5x_1 + 3x_2 \geq 8, x_1, x_2 \geq 0$$

The reduced cost coefficients for optimal solution are :

के इष्टतम हल के लिए कम लागत गुणांक होंगे :

Options :

1. [2, 5]

2. [5, 2]

3. [0, 4]

4. [4, 0]

Question Number : 20 Question Id : 4548933692 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The dual of the following LPP :

निम्नलिखित LPP का द्वैत :

$$\text{Minimize } c^T x$$

$$\text{subject to } Ax \leq b$$

is :

है :

Options :

$$\begin{aligned} & \text{Maximize } \lambda^T b \\ & \text{subject to } \lambda^T A = c^T \\ & \lambda \leq 0 \end{aligned}$$

1.

$$\begin{aligned} & \text{Maximize } \lambda^T b \\ & \text{subject to } \lambda^T A \leq c^T \end{aligned}$$

2.

$$\begin{aligned} & \text{Maximize } \lambda^T b \\ & \text{subject to } \lambda^T A \geq c^T \\ & \lambda \geq 0 \end{aligned}$$

3.

$$\begin{aligned} & \text{Maximize } \lambda^T b \\ & \text{subject to } \lambda^T A \leq c^T \\ & \lambda \geq 0 \end{aligned}$$

4.

Question Number : 21 Question Id : 4548933693 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

For LPP

LPP के लिए :

$$\text{Minimize } (-2x_1 - x_2 - 7x_3 - 4x_4)$$

$$\text{subject to } x_1 + x_2 + x_3 + x_4 = 26$$

$$x_1, x_2, x_3, x_4 \geq 0$$

the optimal solution of the dual to above LPP is :

द्वैत का इष्टतम हल है :

Options :

$$\lambda = -2$$

1.

$$\lambda = -1$$

2.

$$\lambda = -7$$

3.

$$\lambda = -4$$

4.

Question Number : 22 Question Id : 4548933694 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The dual of the LPP is :

निम्नलिखित LPP का द्वैत है :

$$\begin{aligned} &\text{Minimize } x \\ &\text{subject to } x \leq 1 \end{aligned}$$

Options :

$$\begin{aligned} &\text{Maximize } \lambda \\ &\text{subject to } \lambda = 1 \\ &\lambda \leq 0 \end{aligned}$$

1.

$$\begin{aligned} &\text{Maximize } \lambda \\ &\text{subject to } \lambda = 1 \\ &\lambda \geq 0 \end{aligned}$$

2.

$$\begin{aligned} &\text{Maximize } (-\lambda) \\ &\text{subject to } \lambda = 1 \\ &\lambda \geq 0 \end{aligned}$$

3.

$$\begin{aligned} &\text{Minimize } \lambda \\ &\text{subject to } \lambda \leq 1 \end{aligned}$$

4.

Question Number : 23 Question Id : 4548933695 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

For the following LPP :

निम्नलिखित LPP के लिए :

$$\begin{aligned} & \text{Maximize } 3x + 4y \\ & \text{subject to } x - y \leq -1 \\ & \quad \quad \quad -x + y \leq 0 \\ & \quad \quad \quad x, y \geq 0 \end{aligned}$$

Which one of the following is true :

कौन-सा कथन सत्य है :

Options :

LPP and its dual both have solution

LPP और इसके द्वैत दोनों का हल है

1.

LPP has a solution, but the dual does not

LPP का हल है, लेकिन द्वैत का नहीं है

2.

LPP and its dual both have no solution

LPP और इसके द्वैत का कोई हल नहीं है

3.

The dual has a solution but the LPP does not

द्वैत का हल है लेकिन LPP का हल नहीं है

4.

Question Number : 24 Question Id : 4548933696 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Using the Vogel's approximations method, the minimum transportation cost for the following transportation problem is :

वोगेल के एप्राक्सिमेशनस विधि का प्रयोग करते हुए, निम्नलिखित परिवहन समस्या का न्यूनतम परिवहन मूल्य है :

		Destinations				
		6	1	9	3	
Sources	11	5	2	8	55	
	10	12	4	7	90	
	85	35	50	45		

Options :

1060 Units

1060 इकाई

1.

1100 Units

1100 इकाई

2.

1160 Units

1160 इकाई

3.

1016 Units

1016 इकाई

4.

Question Number : 25 Question Id : 4548933697 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The optimal assignment of the problem

इस समस्या का इष्टतम् काम

	a	b	c	d
1	18	26	17	11
2	13	28	14	26
3	38	19	18	15
4	19	26	24	10

is :

है :

Options :

1.  $1 \rightarrow c, 2 \rightarrow a, 3 \rightarrow b, 4 \rightarrow d$

2.  $1 \rightarrow d, 2 \rightarrow a, 3 \rightarrow d, 4 \rightarrow c$

3.  $1 \rightarrow d, 2 \rightarrow c, 3 \rightarrow d, 4 \rightarrow a$

4.  $1 \rightarrow a, 2 \rightarrow c, 3 \rightarrow d, 4 \rightarrow b$

Question Number : 26 Question Id : 4548933698 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The convex hull of the set given below

नीचे दिये गये समुच्चय की उत्तल पतवार

$$\{(x, y) : x, y \geq 0, x, y \leq 1\}$$

is :

है :

Options :

$$[0, 1] \times [0, 1]$$

1.

$$x\text{-axis} \times y\text{-axis}$$

2.

Entire positive quadrant

3.

Right half plane

4.

Question Number : 27 Question Id : 4548933699 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Which one of the following sets is a convex set :

निम्नलिखित समुच्चयों में से कौन-सा समुच्चय उत्तल है :

Options :

$$1. \{(x, y) : x^2 + y^2 = 4\}$$

$$2. \{(x, y) : -x + y \geq 3, x - y \geq 3, x, y \geq 0\}$$

$$3. \{(x, y) : |x| \leq 2, |y| \leq 1\}$$

$$4. \{(x, y) : x^2 + y - 3 \geq 0, x, y \geq 0\}$$

Question Number : 28 Question Id : 4548933700 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question



Consider the set of points  $(0, 0)$ ,  $(1, 0)$ ,  $(1, 2)$ ,  $(1, 1)$  and  $(4, 0)$ . In expressing the boundary point as a convex combination of the extreme points, the values of  $\lambda_1, \lambda_2$  and  $\lambda_3$  are, respectively :

बिन्दुओं  $(0, 0)$ ,  $(1, 0)$ ,  $(1, 2)$ ,  $(1, 1)$  और  $(4, 0)$  पर विचार करें। सीमा बिन्दु को चरम बिन्दुओं के उत्तल संयोजन में लिखने पर  $\lambda_1, \lambda_2$  और  $\lambda_3$  का मान होगा :

Options :

1.  $\lambda_1 = \frac{3}{4}, \lambda_2 = 0, \lambda_3 = \frac{1}{4}$

2.  $\lambda_1 = \frac{3}{8}, \lambda_2 = \frac{1}{2}, \lambda_3 = \frac{1}{8}$

3.  $\lambda_1 = \frac{3}{4}, \lambda_2 = \frac{1}{2}, \lambda_3 = \frac{1}{2}$

4.  $\lambda_1 = \frac{3}{8}, \lambda_2 = 0, \lambda_3 = \frac{1}{8}$

Question Number : 29 Question Id : 4548933701 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

One of the extreme points of the set  $X = \{(x, y) : x - y \geq 0, x \leq 5, x + 2y \leq 4\}$  is :

समुच्चय  $X = \{(x, y) : x - y \geq 0, x \leq 5, x + 2y \leq 4\}$  का एक चरम बिन्दु है :

Options :

1.  $(0, 0)$

2.  $(1, 2)$

3.  $(1, 1)$

4.  $(5, 3)$

Question Number : 30 Question Id : 4548933702 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Which one of the following sets has no extreme point ?  
निम्नलिखित समुच्चयों में से किसके पास एक भी चरम बिन्दु नहीं है ?

Options :

1.  $\{(x, y) : x \geq \alpha, \alpha \in \mathbb{R}\}$
2.  $\{(x, y) : x \geq 0, y \geq 0\}$
3.  $\{(x, y) : x \geq 0, 0 \leq y \leq z\}$
4.  $\{(x, y) : x^2 + y^2 \leq 1\}$

Question Number : 31 Question Id : 4548933703 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Which one of the following is a correct statement ?

निम्नलिखित में से कौन-सा कथन सही है ?

Options :

1. Basis of a zero vector space is  $\{0\}$   
एक शून्य सदिश समष्टि का आधार  $\{0\}$  है
2. Dimension of  $\mathbb{R}$  over  $\mathbb{Q}$  is not finite  
 $\mathbb{R}$  का  $\mathbb{Q}$  पर आयाम परिमित नहीं है
3. Dimension of  $\mathbb{C}$  over  $\mathbb{R}$  is 1  
 $\mathbb{C}$  का  $\mathbb{R}$  पर आयाम 1 है
4. The empty set  $\emptyset$  is not linearly independent  
रिक्त समुच्चय  $\emptyset$  रैखिकतः स्वतंत्र नहीं है

Question Number : 32 Question Id : 4548933704 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Let  $T : P_2[x] \rightarrow \mathbb{R}^2$  be defined by  $T(p(x)) = (p(0), p(1))$ . Let  $S_1 = \{1, x, x^2\}$  and  $S_2 = \{(1, 0), (0, 1)\}$  be two bases of  $P_2[x]$  and  $\mathbb{R}^2$ , respectively. The matrix of  $T$  with respect to bases of  $S_1$  to  $S_2$  is :

माना  $T : P_2[x] \rightarrow \mathbb{R}^2$  सूत्र  $T(p(x)) = (p(0), p(1))$  द्वारा परिभाषित है। माना  $S_1 = \{1, x, x^2\}$  और  $S_2 = \{(1, 0), (0, 1)\}$  क्रमशः  $P_2[x]$  और  $\mathbb{R}^2$  के दो आधार हैं।  $S_1$  से  $S_2$  आधार के सापेक्ष  $T$  का आव्यूह है :

Options :

$$\begin{bmatrix} 0 & 1 & 0 \\ 1 & 1 & 0 \end{bmatrix}$$

1.

$$\begin{bmatrix} 0 & 0 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

2.

$$\begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 1 \end{bmatrix}$$

3.

$$\begin{bmatrix} 1 & 1 \\ 0 & 1 \\ 0 & 1 \end{bmatrix}$$

4.

Question Number : 33 Question Id : 4548933705 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The rank of matrix  $A$ , where

आव्यूह  $A$  की कोटि, जहाँ

$$A = \begin{bmatrix} -1 & 1 & -2 & -1 \\ 1 & -1 & 2 & 1 \\ 4 & -4 & 4 & 2 \\ 3 & -3 & 4 & 2 \end{bmatrix}$$

is :

है :

Options :

4

1.

2. 3

3. 2

4. 1

Question Number : 34 Question Id : 4548933706 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The formula of  $\text{adj}(T)$  of a linear operator  $T$  on  $\mathbb{C}^2$  defined by  $T(\alpha, \beta) = (\alpha i + 2\beta, \alpha + \beta)$  is :

$\mathbb{C}^2$  पर एक रेखिक संकारक जोकि  $T(\alpha, \beta) = (\alpha i + 2\beta, \alpha + \beta)$  द्वारा परिभाषित है, के  $\text{adj}(T)$  का सूत्र है :

Options :

1.  $T^*(\alpha, \beta) = (-\alpha i + \beta, 2\alpha + \beta)$

2.  $T^*(\alpha, \beta) = (\alpha + \beta, \alpha i + 2\beta)$

3.  $T^*(\alpha, \beta) = (2\alpha + \beta, -\alpha i + \beta)$

4.  $T^*(\alpha, \beta) = (-\alpha i + \beta, \alpha i + 2\beta)$

Question Number : 35 Question Id : 4548933707 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Let  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  be a linear transformation defined by  $T(x, y) = (x, 0)$ . The characteristic values of  $T$  are :

माना एक रेखिक रूपान्तरण  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ ,  $T(x, y) = (x, 0)$  द्वारा परिभाषित है।  $T$  के अभिलाक्षणिक मान है :

Options :

1. 1, 2

2. 1, -1

3. 0, -1

4. 0, 1

Question Number : 36 Question Id : 4548933708 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If the characteristic values of a  $3 \times 3$  real matrix  $A$  are  $-1, 1$  and  $0$ , then :

यदि  $3 \times 3$  के वास्तविक आव्यूह  $A$  के अभिलाक्षणिक मान क्रमशः  $-1, 1$  और  $0$  हैं, तो :

Options :

1.  $A^3 = I_3$

2.  $A^3 = 0$

3.  $A^2 = A$

4.  $A^3 = A$

Question Number : 37 Question Id : 4548933709 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

For a unique solution of the following system of linear equations, the values of  $\lambda$  and  $\mu$  are :

निम्नलिखित रेखिक समीकरणों के एक अद्वितीय हल के लिए  $\lambda$  और  $\mu$  के मान हैं :

$$x + y + z = 6, \quad x + 2y + 3z = 10, \quad x + 2y + \lambda z = \mu$$

Options :

1.  $\lambda = 3, \mu = 10$

2.  $\lambda \neq 3, \mu = 10$

3.  $\lambda \neq 3, \mu \neq 10$

4.  $\lambda \neq 3, \mu$  is arbitrary ( $\mu$  के किसी भी मान के लिए)

Question Number : 38 Question Id : 4548933710 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Which one of the following is not a subspace of  $M_{n \times n}(\mathbb{R})$  ?

निम्नलिखित में से कौन  $M_{n \times n}(\mathbb{R})$  का उपसमष्टि नहीं है ?

Options :

1.  $W_1 = \{A \in M_{n \times n}(\mathbb{R}) \mid a_{11} = 0\}$
2.  $W_2 = \{A \in M_{n \times n}(\mathbb{R}) \mid \det(A) = 0\}$
3.  $W_3 = \{A \in M_{n \times n}(\mathbb{R}) \mid \text{trace}(A) = 0\}$
4.  $W_4 = \{A \in M_{n \times n}(\mathbb{R}) \mid A^t = A\}$

Question Number : 39 Question Id : 4548933711 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Let  $(\mathbb{Z}, \oplus)$  be a group. If the binary operation  $\oplus$  is defined by  $a \oplus b = a + b - 5$  for all  $a, b \in \mathbb{Z}$ , then the identity element of this group is :

माना  $(\mathbb{Z}, \oplus)$  एक समूह है। यदि  $\oplus$  एक द्विआधारी संक्रिया  $a \oplus b = a + b - 5$ , जहाँ सभी  $a, b \in \mathbb{Z}$  के द्वारा परिभाषित है, तो इस समूह का तत्समक अवयव है :

Options :

1. 0
2. -5
3. 1
4. 5

Question Number : 40 Question Id : 4548933712 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The total number of surjective group homomorphisms from the group  $\mathbb{Z}_{20}$  to  $\mathbb{Z}_8$  is :

समूह  $\mathbb{Z}_{20}$  से  $\mathbb{Z}_8$  पर कुल आच्छादी समूह समाकारिताओं की संख्या है :

Options :

1. 4

2. 8

3. 0

4. 2

Question Number : 41 Question Id : 4548933713 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The group  $S_3 \times S_3$  has an element of order :

समूह  $S_3 \times S_3$  में एक अवयव की कोटि है :

Options :

1. 6

2. 4

3. 9

4. 18

Question Number : 42 Question Id : 4548933714 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Let  $R = M_{2 \times 2}(\mathbb{Z})$  be a ring and  $S = \left\{ \begin{pmatrix} a & 0 \\ 0 & a \end{pmatrix} : a \in \mathbb{Z} \right\}$  be a subset of  $R$ . Find the correct statement.

माना  $R = M_{2 \times 2}(\mathbb{Z})$  एक वलय और  $S = \left\{ \begin{pmatrix} a & 0 \\ 0 & a \end{pmatrix} : a \in \mathbb{Z} \right\}$   $R$  का एक उप समुच्चय है। सही

वाक्य प्राप्त कीजिए :

Options :

1.  $S$  is a subring but not an ideal  
 $S$  एक उपवलय है लेकिन एक आइडियल नहीं है
2.  $S$  is an ideal  
 $S$  एक आइडियल है
3.  $S$  is neither a subring nor an ideal  
 $S$  न तो उपवलय है और न ही एक आइडियल है
4.  $S$  is an ideal but not a subring  
 $S$  एक आइडियल है लेकिन एक उपवलय नहीं है

Question Number : 43 Question Id : 4548933715 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
 Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
 No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Let  $f : \mathbb{Z}[\sqrt{2}] \rightarrow \mathbb{Z}[\sqrt{3}]$  be a map defined by  $f(a+b\sqrt{2}) = a+b\sqrt{3}$ . In the following determine a correct answer :

माना  $f : \mathbb{Z}[\sqrt{2}] \rightarrow \mathbb{Z}[\sqrt{3}]$  एक फलन  $f(a+b\sqrt{2}) = a+b\sqrt{3}$  के द्वारा परिभाषित है। निम्नलिखित में से सही उत्तर प्राप्त कीजिए :

Options :

1.  $f$  is a ring homomorphism  
 $f$  एक वलय समाकारिता है
2.  $f$  is a group homomorphism but not a ring homomorphism  
 $f$  एक समूह समाकारिता है लेकिन एक वलय समाकारिता नहीं है
3.  $f$  is a ring homomorphism but not a group homomorphism  
 $f$  एक वलय समाकारिता है लेकिन समूह समाकारिता नहीं है
4.  $f$  is neither a group homomorphism nor a ring homomorphism  
 $f$  न तो एक समूह समाकारिता है और न ही एक वलय समाकारिता है

Question Number : 44 Question Id : 4548933716 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
 Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
 No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question



The total number of ideals and maximal ideals of the ring  $\mathbb{Z}_8$  are :

वलय  $\mathbb{Z}_8$  के सभी आइडियलों और मैक्सिमल आइडियलों की संख्या है

Options :

1. 4, 1
2. 1, 4
3. 4, 0
4. 0, 4

Question Number : 45 Question Id : 4548933717 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The number of elements of order 5 in the group  $\mathbb{Z}_{15} \times \mathbb{Z}_5$  is :

$\mathbb{Z}_{15} \times \mathbb{Z}_5$  समूह में 5 कोटि के सभी अवयवों की संख्या है :

Options :

1. 16
2. 24
3. 8
4. 4

Question Number : 46 Question Id : 4548933718 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The Laplace transform of the function  $f(t) = tJ_0$ , where  $J_0(t)$  is Bessel's function, is :

फलन  $f(t) = tJ_0$  का लाप्लास ट्रान्सफार्म है, जहाँ  $J_0(t)$  बेसेल्स फलन है :

Options :

1.  $\frac{1}{(s^2 + 1)^{3/2}}$

2.  $\frac{s}{(s^2 + 1)^{3/2}}$

3.  $\frac{s}{(s^2 + 1)^{1/2}}$

4.  $\frac{1}{(s^2 + 1)^{1/2}}$

Question Number : 47 Question Id : 4548933719 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The Laplace transform of the Dirac delta function  $\delta(t - 3)$  is :

डिराक डेल्टा फलन  $\delta(t - 3)$  का लाप्लास ट्रान्सफार्म है :

Options :

1.  $e^{-s}$

2.  $e^{-3s}$

3.  $\frac{e^{-3s}}{3}$

4.  $\frac{e^{-3s}}{3s}$

Question Number : 48 Question Id : 4548933720 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The value of  $\int_0^{\infty} \frac{e^{-2t} - e^{-3t}}{t} dt$  is :

$\int_0^{\infty} \frac{e^{-2t} - e^{-3t}}{t} dt$  का मान है :

Options :

1.  $\log_e \left( \frac{3}{2} \right)$

2.  $\log_e \left( \frac{2}{3} \right)$

3.  $\log_e 2$

4.  $\log_e 3$

Question Number : 49 Question Id : 4548933721 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If  $u(t)$  is the unit step function then the inverse Laplace transform of the function  $\frac{e^{-5s}}{(s-2)^4}$  is :

यदि  $u(t)$  एक यूनिट स्टेप फलन है तो फलन  $\frac{e^{-5s}}{(s-2)^4}$  का प्रतिलोम लाप्लास ट्रांसफार्म है :

Options :

1.  $\frac{1}{6}(t-5)^3 e^{2(t-5)} u(t-5)$

2.  $\frac{1}{6}(t+5)^3 e^{2(t+5)} u(t+5)$

3.  $\frac{1}{6}t^3 e^{2(t-5)} u(t-5)$

4.  $\frac{1}{6}(t-5)^3 e^{2t} u(t)$

Question Number : 50 Question Id : 4548933722 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If  $u(t)$  is the unit step function and  $\delta(t)$  is the Dirac delta function then the solution of the initial value problem  $y'' + 16y = \delta(t-2)$ ,  $y(0) = 0$ ,  $y'(0) = 0$  is :

यदि  $u(t)$  यूनिट स्टेप फलन है तथा  $\delta(t)$  डिराक डेल्टा फलन है तो इनिशियल वैल्यू समस्या  $y'' + 16y = \delta(t-2)$ ,  $y(0) = 0$ ,  $y'(0) = 0$  का हल है :

Options :

1.  $\frac{1}{4}(\cos 4(t-2))u(t-2)$

2.  $\frac{1}{4}(\sin 4(t-2))u(t-2)$

3.  $\frac{1}{4}(\sin 4t)u(t)$

4.  $\frac{1}{4}(\sin 4t)u(t-2)$

Question Number : 51 Question Id : 4548933723 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The solution of the integral equation  $\int_0^t \frac{y(u)}{\sqrt{t-u}} du = 1+t$  is :

समाकल समीकरण  $\int_0^t \frac{y(u)}{\sqrt{t-u}} du = 1+t$  का हल है :

Options :

1.  $\frac{1}{3\pi}t^{-1/2}(3+6t)$

2.  $\frac{1}{3\pi}t^{1/2}(6+3t)$

$$\frac{1}{3\pi} t^{-3/2} (6 + 2t)$$

3.

$$\frac{1}{3\pi} t^{1/2} (3 + 6t)$$

4.

Question Number : 52 Question Id : 4548933724 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The Fourier Sine series of the function  $f(t) = t, 0 < t < 2$  in a half range is :

फलन  $f(t) = t, 0 < t < 2$  के हाफ रेंज में फोरियर ज्या श्रेणी है :

Options :

$$\sum_{n=1}^{\infty} \frac{4(-1)^{n-1}}{n\pi} \sin\left(\frac{n\pi t}{2}\right)$$

1.

$$\sum_{n=1}^{\infty} \frac{4(-1)^{n-1}}{n\pi} \cos\left(\frac{n\pi t}{2}\right)$$

2.

$$\sum_{n=1}^{\infty} \frac{4(-1)^{n-1}}{\pi} \sin\left(\frac{n\pi t}{2}\right)$$

3.

$$\sum_{n=1}^{\infty} \frac{4(-1)^{n-1}}{n^2\pi} \sin\left(\frac{n\pi t}{2}\right)$$

4.

Question Number : 53 Question Id : 4548933725 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Let  $f(t) = \begin{cases} -5 & , -\pi \leq t \leq 0 \\ 5 & , 0 < t \leq \pi \end{cases}$  be a periodic function of period  $2\pi$ . Then the value of the Fourier coefficient  $a_0$  is :

माना  $f(t) = \begin{cases} -5 & , -\pi \leq t \leq 0 \\ 5 & , 0 < t \leq \pi \end{cases}$  एक  $2\pi$  अन्तराल का आवर्त फलन है, तो फूरियर गुणांक  $a_0$  का मान है :

Options :

1. 1

2.  $2\pi$

3.  $5\pi$

4. 0

Question Number : 54 Question Id : 4548933726 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The smallest positive root of the equation  $x^3 - 5x + 1 = 0$  correct to 2 decimal place is :

समीकरण  $x^3 - 5x + 1 = 0$  का दशमलव के दो स्थान तक धनात्मक मूल है :

Options :

1. 0.30

2. 0.20

3. 0.29

4. 0.25

Question Number : 55 Question Id : 4548933727 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The condition for convergence of Iterative formula  $x_{k+1} = \phi(x_k)$  in interval  $[a, b]$  is :

इटेरेटिव सूत्र  $x_{k+1} = \phi(x_k)$  का अंतराल  $[a, b]$  में अभिसरण का शर्त है :

Options :

$$|\phi'(x)| > 1$$

1.

$$|\phi'(x)| < 1$$

2.

$$|\phi(x)| < 1$$

3.

$$|\phi(x)| > 1$$

4.

Question Number : 56 Question Id : 4548933728 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The iterative function for finding the root of the equation  $\cos(x) - xe^x = 0$  is :

समीकरण  $\cos(x) - xe^x = 0$  का मूल निकालने के लिए इटरेटिव फलन है :

Options :

$$\phi(x) = x + \frac{1}{2}(\cos(x) - xe^x)$$

1.

$$\phi(x) = x - \frac{1}{2}(\cos(x) - xe^x)$$

2.

$$\phi(x) = x + \frac{1}{2}(\cos(x) + xe^x)$$

3.

$$\phi(x) = \frac{1}{2}(\cos(x) - xe^x)$$

4.

Question Number : 57 Question Id : 4548933729 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Using Taylor's approximation about  $x_0 = 0$  for the function  $f(x) = e^{-x}$  ( $0 < x < 1$ ), the minimum number of terms in the approximation to find the result which has error less than  $10^{-10}$  is :

टेलर्स एप्राक्सिमेशन का उपयोग करते हुए  $x_0 = 0$  पर फलन  $f(x) = e^{-x}$  ( $0 < x < 1$ ) के एप्राक्सिमेशन में न्यूनतम पदों की संख्या, ताकि परिणाम निकालने में  $10^{-10}$  से कम की त्रुटि हो, है :

Options :

1.  $n \geq 12$

2.  $n \geq 14$

3.  $n \geq 10$

4.  $n \geq 7$

Question Number : 58 Question Id : 4548933730 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

What is the minimum step size for  $f(x) = \sin x$  in the interval  $[1, 3]$  so that linear interpolation will be correct to four decimal places :

फलन  $f(x) = \sin x$  के लिए अन्तराल  $[1, 3]$  में न्यूनतम पद का नाप क्या है। ताकि रैखिक अंतरवेषण दशमलव के 4 स्थानों तक शुद्ध हो :

Options :

1.  $h \leq 0.08$

2.  $h \leq 0.1$

3.  $h \leq 0.02$

4.  $h \leq 0.05$

Question Number : 59 Question Id : 4548933731 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question



Find the polynomial of degree 2 such that  $f(0) = 1, f(1) = 3$  and  $f(3) = 55$  is :

डिग्री 2 का बहुपद निकालिए, जबकि  $f(0) = 1, f(1) = 3$  और  $f(3) = 55$  है :

Options :

1.  $8x^2 - 6x + 1$
2.  $8x^2 + 6x + 1$
3.  $8x^2 + 6x - 1$
4.  $8x^2 - 6x - 1$

Question Number : 60 Question Id : 4548933732 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The  $n$ th divided difference of the function  $1/x$  based at the points  $x_0, x_1, \dots, x_n$

is :

फलन  $1/x$  का  $x_0, x_1, \dots, x_n$  बिन्दुओं के आधार पर  $n$ वाँ विभाजित अंतर है :

Options :

1.  $\frac{(-1)^n}{x_1 \dots x_n}$
2.  $\frac{(-1)^n}{x_0 x_1 \dots x_{n-1}}$
3.  $\frac{(-1)^n}{x_0 x_1 \dots x_n}$
4.  $\frac{1}{x_0 x_1 \dots x_n}$

Question Number : 61 Question Id : 4548933733 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The value of  $\Delta^n f(x_i)$  is :

$\Delta^n f(x_i)$  का मान है :

Options :

$$\sum_{k=0}^n (-1)^k \frac{n!}{k!(n-k)!} f_{i-k}$$

1.

$$\sum_{k=0}^n (-1)^k \frac{n!}{k!(n-k)!} f_{i+k}$$

2.

$$\sum_{k=0}^n (-1)^k \frac{n!}{k!(n-k)!} f_{i+n-k}$$

3.

$$\sum_{k=0}^n (-1)^k \frac{n!}{k!(n-k)!} f_{i+n+k}$$

4.

Question Number : 62 Question Id : 4548933734 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The value of  $\nabla - \Delta$  is :

$\nabla - \Delta$  का मान है :

Options :

$$-\Delta\nabla$$

1.

$$\Delta\nabla$$

2.

$$-\Delta/\nabla$$

3.

$$\Delta/\nabla$$

4.

Question Number : 63 Question Id : 4548933735 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The value of  $\nabla + \Delta$  is :

$\nabla + \Delta$  का मान है :

Options :

1.  $\Delta/\nabla + \nabla/\Delta$
2.  $\Delta/\nabla^2 - \nabla/\Delta^2$
3.  $\Delta/\nabla - \nabla/\Delta$
4.  $\Delta/\nabla^2 + \nabla/\Delta^2$

Question Number : 64 Question Id : 4548933736 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The sum of the series  $\Delta - \frac{\Delta^2}{2} + \frac{\Delta^3}{3} - \dots$  is :

श्रेणी  $\Delta - \frac{\Delta^2}{2} + \frac{\Delta^3}{3} - \dots$  का योग है :

Options :

1.  $hD$
2.  $\Delta/\nabla - \nabla/\Delta$
3.  $h\Delta/\nabla$
4.  $D\Delta/\nabla$

Question Number : 65 Question Id : 4548933737 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If the data points (4, 30) and (6, 132) satisfying the function  $y = f(x)$ , then the value of  $f(5)$ , using Lagrange polynomial of degree 1, is :

यदि डाटा बिन्दुओं (4, 30) और (6, 132) फलन  $y = f(x)$  को संतुष्ट करते हैं तो डिग्री 1 के लैग्रेंज बहुपद का उपयोग करते हुए  $f(5)$  का मान है :

Options :

1. 81

2. 80

3. 70

4. 75

Question Number : 66 Question Id : 4548933738 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

A cubic function  $y = f(x)$  satisfies the following data  $f(0) = 1, f(1) = 4, f(3) = 40$  and  $f(4) = 85$ , then  $f''(2)$  is :

यदि त्रिघातीय फलन  $y = f(x)$ , निम्नलिखित आँकड़ों  $f(0) = 1, f(1) = 4, f(3) = 40$  और  $f(4) = 85$ , को संतुष्ट करता है। तब  $f''(2)$  का मान है :

Options :

1. 12

2. 14

3. 16

4. 18

Question Number : 67 Question Id : 4548933739 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Solution of  $f(x) - \int_0^1 (x+t)f(t)dt = \frac{3}{2}x - \frac{5}{6}$  is :

$f(x) - \int_0^1 (x+t)f(t)dt = \frac{3}{2}x - \frac{5}{6}$  का हल है :

Options :

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

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

3.  $f(x) = x$

4.  $f(x) = -x + 1$

Question Number : 68 Question Id : 4548933740 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If  $\frac{dy}{dx} = \frac{y-x}{y+x}$ ,  $y(0) = 1$  then using Picard's method the value of  $y(0.1)$  correct to 2 decimal place, is :

यदि  $\frac{dy}{dx} = \frac{y-x}{y+x}$ ,  $y(0) = 1$  तो पिकार्डस विधि से  $y(0.1)$  का मान दशमलव के 2 स्थान तक है :

Options :

1. 0.98

2. 0.89

3. 0.71

4. 0.69

Question Number : 69 Question Id : 4548933741 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

An acceleration of a particle in  $t$  seconds moving in a straight line is  $(2t + 1)$  metre/sec<sup>2</sup>. If initial velocity is 4 metre/second, then velocity of particle after 2 seconds will be :

एक कण जो सीधी रेखा में घूम रहा है, उसका त्वरण  $t$  सेकण्ड में  $(2t + 1)$  मी०/सेकण्ड<sup>2</sup> है। यदि प्रारंभिक वेग 4 मी०/सेकण्ड है तो 2 सेकण्ड के बाद कण का वेग होगा :

Options :

1. 10 metre/sec.  
10 मीटर/सेकण्ड
2. 5 metre/sec.  
5 मीटर/सेकण्ड
3. 15 metre/sec.  
15 मीटर/सेकण्ड
4. 7.5 metre/sec.  
7.5 मीटर/सेकण्ड

Question Number : 70 Question Id : 4548933742 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

In the journey from station A to station B, a train moves with uniform acceleration in first one fourth of its journey and last one fourth part with uniform acceleration and in middle half part with constant velocity. The average velocity of train is :

स्टेशन A से स्टेशन B तक की यात्रा में, एक ट्रेन अपनी यात्रा के पहले एक चौथाई हिस्से में एकसमान त्वरण के साथ चलती है और आखिरी एक चौथाई हिस्सा एकसमान त्वरण के साथ और मध्य आधे भाग में अचर वेग के साथ चलती है। ट्रेन का औसत वेग है :

Options :

1.  $\frac{1}{3} \times$  maximum velocity  
 $\frac{1}{3} \times$  अधिकतम वेग
2.  $\frac{2}{3} \times$  maximum velocity  
 $\frac{2}{3} \times$  अधिकतम वेग

3.  $\frac{1}{2} \times \text{maximum velocity}$   
 $\frac{1}{2} \times \text{अधिकतम वेग}$

4.  $\frac{3}{4} \times \text{maximum velocity}$   
 $\frac{3}{4} \times \text{अधिकतम वेग}$

Question Number : 71 Question Id : 4548933743 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
 Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
 No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

A particle is thrown in vertical direction, the ratio of times by which particle will be at half of its maximum height is :

एक कण को ऊर्ध्वाधर दिशा में फेंक दिया जाता है, समय का अनुपात क्या होगा जब कण अधिकतम ऊँचाई के आधे हिस्से पर हो :

Options :

1.  $1 : (2 + 2\sqrt{2})$

2.  $1 : (2 + \sqrt{2})$

3.  $1 : (3 + 2\sqrt{2})$

4.  $1 : (4 + \sqrt{3})$

Question Number : 72 Question Id : 4548933744 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
 Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
 No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

A particle is thrown with the velocity  $v$  such that its range on horizontal plane is twice the maximum height obtained. Its range will be :

(where  $g$  is the acceleration due to gravity)

एक कण को  $v$  वेग से इस तरफ फेंका जाता है कि क्षैतिज तल पर इसका परास, अधिकतम प्राप्त की गई ऊँचाई से दोगुनी हो, इसका क्षैतिज परास होगा : (जहाँ  $g$  गुरुत्वीय त्वरण है)

Options :

1.  $\frac{2v^2}{3g}$

2.  $\frac{4v^2}{3g}$

3.  $\frac{4v^2}{5g}$

4.  $\frac{v^2}{7g}$

Question Number : 73 Question Id : 4548933745 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

A train of  $M$  kilograms is ascending in slope of 1 m in  $n$  sec. The velocity of train is  $v$  m/sec and its acceleration is  $f$  m/sec<sup>2</sup>. The horse power of engine is :

$M$  किलोग्राम की एक ट्रेन  $n$  सेकण्ड में 1 मी० ढलान में चढ़ रही है। ट्रेन का वेग  $v$  मी०/सेकण्ड और इसका त्वरण  $f$  मी०/सेकण्ड<sup>2</sup> है। इंजन की अश्वशक्ति है :

Options :

1.  $\frac{Mv(nf + g)}{ng}$

2.  $\frac{Mv(nf + g)}{100ng}$

3.  $\frac{Mv(nf + g)}{75ng}$

4.  $\frac{Mv(nf + g)}{2ng}$

Question Number : 74 Question Id : 4548933746 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question



The two balls of Billiards having same weight and velocities 6 cm/sec and -8cm/sec collide directly. If coefficient of restitution is 0.8, then their final velocities will be :

बिलियर्ड्स की समान भार वाली दो गेंदें जिनका वेग 6 सेमी०/सेकण्ड और -8 सेमी०/सेकण्ड है, सीधे टकराती है। यदि रेस्टिट्यूशन का गुणांक 0.8 है, तो इनके अंतिम वेग होंगे :

Options :

$$\frac{22}{5} \text{ and } \frac{11}{5} \text{ cm/sec}$$

1.  $\frac{22}{5}$  और  $\frac{11}{5}$  सेमी/सेकण्ड

$$-\frac{11}{5} \text{ and } \frac{23}{5} \text{ cm/sec}$$

2.  $-\frac{11}{5}$  और  $\frac{23}{5}$  सेमी/सेकण्ड

$$\frac{21}{5} \text{ and } \frac{23}{5} \text{ cm/sec}$$

3.  $\frac{21}{5}$  और  $\frac{23}{5}$  सेमी/सेकण्ड

$$-\frac{33}{5} \text{ and } \frac{23}{5} \text{ cm/sec}$$

4.  $-\frac{33}{5}$  और  $\frac{23}{5}$  सेमी/सेकण्ड

Question Number : 75 Question Id : 4548933747 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

A uniform rod of mass  $m$  and length  $2a$  can turn freely about a fixed end. The least angular velocity with which it must be started from the lowest position so that it may just make complete revolution is :

(where  $g$  in the acceleration due to gravity)

$m$  वजन और  $2a$  लम्बाई की एक समान छड़ जो एक स्थिर सिरे से घूम सकती है। सबसे कम कोणीय वेग, जिसके साथ इसे सबसे निचले स्थिति से शुरू किया जाए ताकि यह पूरी तरह से घूम सके है : (जहाँ  $g$  गुरुत्वीय त्वरण है)

Options :

$$\sqrt{\frac{3g}{a}}$$

1.

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

3.  $\sqrt{\frac{g}{3a}}$

4.  $\sqrt{\frac{a}{3g}}$

Question Number : 76 Question Id : 4548933748 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The moment of Inertia of a circular disc of radius  $a$  and mass  $M$ , about the diameter of the disc, is :

$a$  त्रिज्या और  $M$  द्रव्यमान वाले गोलाकार डिस्क का उसके व्यास के परितः जड़त्व आघूर्ण है :

Options :

1.  $\frac{1}{3}Ma^2$

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

3.  $\frac{1}{4}Ma^2$

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

Question Number : 77 Question Id : 4548933749 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

A homogeneous triangular lamina whose sides are 3, 4 and 5 cm is suspended by a rope from the mid point of longest side. That side will make an angle with the vertical equal to :

एक समान त्रिकोणीय लेमिना, जिसकी भुजाएँ 3, 4 और 5 सेमी० हैं, को सबसे लंबी भुजा के मध्य बिन्दु से रस्सी द्वारा लटकाया जाता है। उस भुजा का ऊर्ध्वाधर के साथ बनाया गया कोण है :

Options :

1.  $\cos^{-1}\left(\frac{7}{25}\right)$

2.  $\cos^{-1}\left(\frac{5}{17}\right)$

3.  $\sin^{-1}\left(\frac{3}{17}\right)$

4.  $\sin^{-1}\left(\frac{2}{19}\right)$

Question Number : 78 Question Id : 4548933750 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The coplanar forces of magnitude 1, 2,  $3\sqrt{3}$  and 4 Newtons are acting on a particle. The angle between first and second, second and third, third and fourth forces are  $60^\circ$ ,  $90^\circ$  and  $150^\circ$  respectively. The magnitude of its resultant will be :

1, 2,  $3\sqrt{3}$  और 4 न्यूटन के समतलीय बल एक कण पर कार्य कर रहे हैं। पहले और दूसरे, दूसरे और तीसरे, तीसरे और चौथे बलों के बीच का कोण क्रमशः  $60^\circ$ ,  $90^\circ$  और  $150^\circ$  है। परिणामी बल का परिमाण होगा :

Options :

1. 1 Newton  
1 न्यूटन

2.  $\sqrt{2}$  Newton  
 $\sqrt{2}$  न्यूटन

2 Newton

3. 2 न्यूटन

3 Newton

4. 3 न्यूटन

Question Number : 79 Question Id : 4548933751 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

A heavy uniform rod  $AB$ , of weight  $w$  is fixed with any hinge at  $A$  and on downward end at  $B$ , a horizontal force  $F$  is applied. If in the state of equilibrium the rod makes an angle  $60^\circ$  with vertical, then the magnitude of force  $F$  will be :

एक समान भारी राड  $AB$  जिसका वजन  $w$  है,  $A$  पर किसी काज से बधा हुआ है और नीचे की ओर  $B$  पर एक क्षैतिज बल  $F$  लगाया गया। यदि संतुलन की स्थिति में राड ऊर्ध्वाधर से  $60^\circ$  कोण बनाता है, तो बल  $F$  का परिमाण होगा :

Options :

$$\frac{w}{6}\sqrt{3}$$

1.

$$\frac{w}{4}\sqrt{3}$$

2.

$$\frac{w}{7}\sqrt{2}$$

3.

$$\frac{w}{4}\sqrt{5}$$

4.

Question Number : 80 Question Id : 4548933752 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

From a circular lamina whose radius is  $r$ , a small circular lamina is cut such that its diameter is a radius of the bigger lamina. The centre of the gravity of rest of the portion from the centre of the lamina will be :

एक गोलाकार लेमिना जिसकी त्रिज्या  $r$  है, एक छोटा गोलाकार लेमिना इस तरह से काटा जाता है कि उसका व्यास बड़े लेमिना के त्रिज्या के बराबर है। लेमिना के केन्द्र से शेष भाग के गुरुत्वाकर्षण का केन्द्र होगा :

Options :

$$\frac{1}{3}r$$

1.

$$\frac{1}{5}r$$

2.

$$\frac{1}{7}r$$

3.

$$\frac{1}{6}r$$

4.

Question Number : 81 Question Id : 4548933753 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If a particle moves in an ellipse of semi-major axis ' $a$ ' under a central force directed towards the focus of the ellipse, then the velocity  $v$  at any point of the path is given by :

यदि कोई कण अर्धप्रमुख अक्ष ' $a$ ' के दीर्घवृत्त में चलता है जो एक केन्द्रीय बल के तहत दीर्घवृत्त के फोकस की ओर निर्देशित करता है, तो पथ के किसी बिन्दु पर वेग  $v$  होगा :

Options :

$$v^2 = \mu \left( \frac{2}{r} - \frac{1}{a} \right)$$

1.

$$v^2 = \frac{2\mu}{r}$$

2.

$$v^2 = \mu \left( \frac{2}{r} + \frac{1}{a} \right)$$

3.

$$v^2 = \mu \left( \frac{2}{r^2} - \frac{1}{a} \right)$$

4.

Question Number : 82 Question Id : 4548933754 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

A particle describes the curve  $r^2 = a^2 \cos 2\theta$  under a force to the pole. If the central acceleration is  $P$ , then :

एक कण केन्द्रीय बल के तहत वक्र  $r^2 = a^2 \cos 2\theta$  का निरूपण करता है। यदि केन्द्रीय त्वरण  $P$  है, तो :

Options :

$$P \propto \frac{1}{r^7}$$

1.

$$P \propto \frac{1}{r^3}$$

2.

$$P \propto \frac{1}{r^2}$$

3.

$$P \propto \frac{1}{r^4}$$

4.

Question Number : 83 Question Id : 4548933755 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If  $(r, \theta)$  be the polar coordinates of the position of a particle moving along a plane curve at time  $t$ , then the transverse component of its velocity at time  $t$  is :

यदि  $(r, \theta)$  एक कण का समय  $t$  पर ध्रुवीय निर्देशांक हो जो एक तलीय वक्र पर घूम रहा है, तो  $t$  समय पर इसके वेग का अनुप्रस्थ घटक है :

Options :

$$\frac{d\theta}{dt}$$

1.

$$\frac{dr}{dt}$$

2.

$$r \frac{d\theta}{dt}$$

3.

$$\frac{1}{r} \frac{d}{dt} \left( r^2 \frac{d\theta}{dt} \right)$$

4.

Question Number : 84 Question Id : 4548933756 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Let  $y(t)$  be the solution of initial value problem  $\frac{d^2y}{dt^2} + \frac{dy}{dt} - 2y = 0, y(0) = b$

$\frac{dy}{dt}(0) = 2$ . For which values of  $b$ ,  $\lim_{t \rightarrow \infty} y(t) = 0$  :

माना  $y(t)$  इनिशियल वैल्यू प्रॉब्लम  $\frac{d^2y}{dt^2} + \frac{dy}{dt} - 2y = 0, y(0) = b, \frac{dy}{dt}(0) = 2$  का हल है।  $b$  के

किस मान के लिए  $\lim_{t \rightarrow \infty} y(t) = 0$  :

Options :

-1

1.

0

2.

1

3.

there is no such value of  $b$

$b$  का ऐसा कोई मान नहीं है

4.

Question Number : 85 Question Id : 4548933757 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Let  $y_1$  and  $y_2$  be two linearly independent solutions of the differential equation  $t \frac{d^2y}{dt^2} + \frac{dy}{dt} + ty = 0$ , then the Wronskian  $W(y_1, y_2)(t)$  is (where  $c$  is a constant) :

माना  $y_1$  और  $y_2$  अवकल समीकरण  $t \frac{d^2y}{dt^2} + \frac{dy}{dt} + ty = 0$  के दो रेखीय स्वतन्त्र हल हैं, तो रॉस्कियन  $W(y_1, y_2)(t)$  है (यहाँ  $c$  एक अचर है) :

Options :

1.  $ce^{-t}$

2.  $ce^t$

3.  $ct$

4.  $\frac{c}{t}$

Question Number : 86 Question Id : 4548933758 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The differential equation of the family of lines passing through the origin is :

मूल बिन्दु से होकर जाने वाली सरल रेखाओं के समूह का अवकल समीकरण है :

Options :

1.  $xdy - ydx = 0$

2.  $xdy + ydx = 0$

3.  $x dx + y dy = 0$



4.  $x^2 dx + y^2 dy = 0$

Question Number : 87 Question Id : 4548933759 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Consider the differential equation  $\frac{d^2y}{dt^2} + y = \operatorname{cosec} t$  by the method of variation of parameter, a solution is computed of the form  $y(t) = f_1(t)\cos t + f_2(t)\sin t$ , where  $f_1, f_2$  are some functions, then :

अवकल समीकरण  $\frac{d^2y}{dt^2} + y = \operatorname{cosec} t$  पर विचार कीजिए। वैरिएशन ऑफ पैरामीटर के विधि से एक हल  $y(t) = f_1(t)\cos t + f_2(t)\sin t$ , निकाला गया है, जहाँ  $f_1, f_2$  कोई फलन हैं, तो :

Options :

1.  $f_1(t) = -t$

2.  $f_2(t) = \tan t$

3.  $f_1(t) = e^t$

4.  $f_2(t) = t^3$

Question Number : 88 Question Id : 4548933760 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Let  $p(x)$  be a continuous function such that general solution of the differential equation  $x^2 \frac{d^2y}{dx^2} - 2x(1+x) \frac{dy}{dx} + p(x)y = 0$  is  $y(x) = c_1x + \frac{1}{2}c_2xe^{2x}$  where  $c_1, c_2$  are constants, then :

माना  $p(x)$  एक ऐसा सतत फलन है कि अवकल समीकरण  $x^2 \frac{d^2y}{dx^2} - 2x(1+x) \frac{dy}{dx} + p(x)y = 0$  का एक सामान्य हल  $y(x) = c_1x + \frac{1}{2}c_2xe^{2x}$  है जहाँ  $c_1, c_2$  अचर हैं, तो :

Options :

1.  $p(x) = x + 2$

2.  $p(x) = e^{2x}$

3.  $p(x) = 1 + x$

4.  $p(x) = 2(1 + x)$

Question Number : 89 Question Id : 4548933761 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Consider the partial differential equation  $\frac{\partial u}{\partial t} + \frac{\partial u}{\partial x} = x, x \in \mathbb{R}, t > 0$  with initial condition  $u(x, 0) = \phi(x), x \in \mathbb{R}$ . Then :

आंशिक अवकल समीकरण  $\frac{\partial u}{\partial t} + \frac{\partial u}{\partial x} = x, x \in \mathbb{R}, t > 0$  को प्रारम्भिक शर्त  $u(x, 0) = \phi(x), x \in \mathbb{R}$  के साथ विचार कीजिए, तो :

Options :

1.  $u(x, t) = \phi(x - t) + \left(x - \frac{t}{2}\right)t$

2.  $u(x, t) = \phi(x + t)$

3.  $u(x, t) = \phi(x - t) + x + \frac{t}{2}$

4.  $u(x, t) = \phi(x - t)$

Question Number : 90 Question Id : 4548933762 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Consider the wave equation  $\frac{\partial^2 u}{\partial t^2} = \frac{\partial^2 u}{\partial x^2}, x \in \mathbb{R}, t > 0$  with conditions  $u(x, 0) = 0$

and  $\frac{\partial u}{\partial t}(x, 0) = \cos(x), x \in \mathbb{R}$ . Then :

तरंग समीकरण  $\frac{\partial^2 u}{\partial t^2} = \frac{\partial^2 u}{\partial x^2}, x \in \mathbb{R}, t > 0$  को शर्तों  $u(x, 0) = 0$  और

$\frac{\partial u}{\partial t}(x, 0) = \cos(x), x \in \mathbb{R}$  के साथ विचार कीजिए, तो :

Options :

1.  $u(x, t) = \cos(x + t)$

2.  $u(x, t) = \sin(x - t) - \sin(x + t)$

3.  $u(x, t) = \cos(x) \sin(t)$

4.  $u(x, t) = \cos(t) \sin(x)$

Question Number : 91 Question Id : 4548933763 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The differential equation  $x^2 \frac{d^2 y}{dx^2} + x \frac{dy}{dx} + (x^2 - p^2)y = 0, p \geq 0$  is known as :

अवकल समीकरण  $x^2 \frac{d^2 y}{dx^2} + x \frac{dy}{dx} + (x^2 - p^2)y = 0, p \geq 0$  जाना जाता है :

Options :

Bessel Equation

बेसेल्स समीकरण

1.

Legendre Equation

लेजेन्द्रा समीकरण

2.

Euler Equation

ऑयलर समीकरण

3.

## Lagrange Equation

लैग्रान्ज समीकरण

4.

Question Number : 92 Question Id : 4548933764 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

A particular solution of  $\frac{d^3 y}{dx^3} + \frac{d^2 y}{dx^2} + \frac{dy}{dx} + y = x^5 - 2x^2 + x$  is :

अवकल समीकरण  $\frac{d^3 y}{dx^3} + \frac{d^2 y}{dx^2} + \frac{dy}{dx} + y = x^5 - 2x^2 + x$  का एक विशेष (particular) हल है :

Options :

1.  $x^5 + 5x^4 - 2x^2 - 121$

2.  $x^5 - 5x^4 - 2x^2 + 125x - 121$

3.  $x^5 + 5x^4 + 2x^2 - 125x + 121$

4.  $x^5 - 5x^4 + 125x - 121$

Question Number : 93 Question Id : 4548933765 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The initial value problem  $\frac{dy}{dt} = \sqrt{|y|}; y(0) = 0$  has :

इनिशियल वैल्यू समस्या  $\frac{dy}{dt} = \sqrt{|y|}; y(0) = 0$  रखता है :

Options :

no solution

कोई हल नहीं

1.

unique solution

अद्वितीय हल

2.

two solutions

दो हल

3.

infinitely many solution

अनन्त हल

4.

Question Number : 94 Question Id : 4548933766 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If  $u = \frac{x}{y+z} + \frac{y}{z+x} + \frac{z}{x+y}$  then the value of  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$  is :

यदि  $u = \frac{x}{y+z} + \frac{y}{z+x} + \frac{z}{x+y}$  तो  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$  का मान है :

Options :

0

1.

$\log_e u$

2.

$u \log_e u$

3.

$2u \log_e u$

4.

Question Number : 95 Question Id : 4548933767 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

By using Lagrange's Mean Value theorem the value of  $|\cos b - \cos a|$  is :

लैग्रांज के माध्य मान प्रमेय का प्रयोग करते हुए  $|\cos b - \cos a|$  का मान है :

Options :

$\geq |b - a|$

1.

$\leq |b - a|$

2.

$> |b - a|$

3.

4.  $\geq |b^2 - a^2|$

Question Number : 96 Question Id : 4548933768 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The value of  $\int_0^{1+i} (x^2 + iy) dz$  along the curve  $y = x^2$  is :

$\int_0^{1+i} (x^2 + iy) dz$  का मान  $y = x^2$  वक्र के अनुसार है :

Options :

1.  $\frac{5i+1}{6}$

1.

2.  $\frac{5i-1}{6}$

2.

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

3.

4.  $5i+1$

4.

Question Number : 97 Question Id : 4548933769 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The values of  $P_n(1)$  and  $P_n(-1)$ , where  $P_n(x)$  is Legendre polynomial of degree  $n$  are :

$P_n(1)$  और  $P_n(-1)$  के मान हैं, जहाँ  $P_n(x)$  कोटि  $n$  का लीजेन्ड्रे बहुपद है :

Options :

1.  $-1, 1$

1.

2.  $1, -1$

2.

3.  $1, (-1)^n$

4.  $(-1)^n, 1$

Question Number : 98 Question Id : 4548933770 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The differential equation of a simple harmonic motion, given by  $x = A \cos (wt + \phi)$ , where  $A$  and  $\phi$  are constants, is :

$x = A \cos (wt + \phi)$  द्वारा दिए गए एक सरल आवर्त गति, जहाँ  $A$  और  $\phi$  स्थिरांक हैं, का अवकल समीकरण है :

Options :

1.  $\frac{d^2x}{dt^2} - w^2x = 0$

2.  $\frac{d^2x}{dt^2} + w^2x = 0$

3.  $\frac{d^2w}{dt^2} - wx = 0$

4.  $\frac{d^2x}{dt^2} + wx = 0$

Question Number : 99 Question Id : 4548933771 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The values of Bessel's functions  $J_{-\frac{1}{2}}(x)$  and  $J_{\frac{1}{2}}(x)$  are :

बेसेल फलनों  $J_{-\frac{1}{2}}(x)$  और  $J_{\frac{1}{2}}(x)$  के मान हैं :

Options :

1.  $\sqrt{\frac{2}{\pi x}} \cos x, \sqrt{\frac{2}{\pi x}} \sin x$

2.  $\sqrt{\frac{2}{\pi x}} \sin x, \sqrt{\frac{2}{\pi x}} \cos x$

3.  $\sqrt{\frac{\pi x}{2}} \cos x, \sqrt{\frac{\pi x}{2}} \sin x$

4.  $\sqrt{\frac{\pi x}{2}} \sin x, \sqrt{\frac{\pi x}{2}} \cos x$

Question Number : 100 Question Id : 4548933772 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The partial differential equation for the equation  $2z = \frac{x^2}{a^2} + \frac{y^2}{b^2}$  (where  $a$  and  $b$  are parameters) is :

समीकरण  $2z = \frac{x^2}{a^2} + \frac{y^2}{b^2}$  के लिए आंशिक अवकल समीकरण है (जहाँ  $a$  और  $b$  पैरामीटर हैं) :

Options :

1.  $z = qx + py$

2.  $2z = qx + py$

3.  $2z = px + qy$

4.  $z = qy + px$

Question Number : 101 Question Id : 4548933773 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The orthogonal trajectories of the family of curve  $y = ax^2$  is ( $a$  and  $c$  being constants) :

वक्रों के परिवार  $y = ax^2$  का लम्बवत् ट्रैजेक्टरीज है ( $a$  और  $c$  स्थिरांक हैं) :

Options :

1.  $\frac{x^2}{2} + \frac{y^2}{3} = c$



2.  $\frac{x^2}{1} + \frac{y^2}{2} = c$

3.  $\frac{x^2}{3} + \frac{y^2}{2} = c$

4.  $\frac{x^2}{2} + \frac{y^2}{1} = c$

Question Number : 102 Question Id : 4548933774 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The evolute of the parabola  $y^2 = 4ax$  is :

परवलय  $y^2 = 4ax$  का इवोल्यूट है :

Options :

1.  $27ay^2 = 4(x - 2a)^3$

1.

2.  $4ay^2 = 27(x - 2a)^3$

2.

3.  $27ay = 4(x - 2a)^2$

3.

4.  $4ay = 27(x - 2a)^2$

4.

Question Number : 103 Question Id : 4548933775 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Which of the following is convergent ?

निम्न में से कौन-सा अभिसारी है ?

Options :

1.  $\sum_{n=2}^{\infty} \frac{1}{n \log_e n}$

1.

2. 
$$\sum_{n=3}^{\infty} \frac{1}{n \log_e n (\log_e \log_e n)}$$

3. 
$$\sum_{n=3}^{\infty} \frac{1}{n \log_e n (\log_e \log_e n)^2}$$

4. 
$$\sum_{n=3}^{\infty} \frac{1}{n (\log_e n)^{1/2}}$$

Question Number : 104 Question Id : 4548933776 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
 Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
 No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The integral  $\int_1^{\infty} \frac{\sin x}{x^p} dx$  converges iff :

समाकलन  $\int_1^{\infty} \frac{\sin x}{x^p} dx$  अभिसारी है यदि और केवल यदि :

Options :

1.  $p > 0$

2.  $p > 1$

3.  $p < 0$

4.  $p < 1$

Question Number : 105 Question Id : 4548933777 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
 Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
 No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If  $f(x, y) = \log_e(\cos^2(e^{x^2})) + \sin(x + y)$  then  $\frac{\partial}{\partial y} \frac{\partial}{\partial x} f(x, y)$  is :

यदि  $f(x, y) = \log_e(\cos^2(e^{x^2})) + \sin(x + y)$  हो तो  $\frac{\partial}{\partial y} \frac{\partial}{\partial x} f(x, y)$  होगा :

Options :

1.  $\frac{\cos(e^{x^2}) - 1}{1 + \sin^2(e^{x^2})} - \cos(x + y)$

2.  $\cos(x + y)$

3. 0

4.  $-\sin(x + y)$

Question Number : 106 Question Id : 4548933778 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Consider the space  $S = \{(x, y) \mid x, y \in \mathbb{Q}\} \subseteq \mathbb{R}^2$ , where  $\mathbb{Q}$  is the set of rational numbers. Then :

यदि परिमेय संख्याओं के समुच्चय को  $\mathbb{Q}$  से निरूपित किया जाए व  $S = \{(x, y) \mid x, y \in \mathbb{Q}\} \subseteq \mathbb{R}^2$  हो तो :

Options :

1.  $S$  is connected in  $\mathbb{R}^2$

$\mathbb{R}^2$  में  $S$  सुबंधित है

2.  $S^c$  is connected in  $\mathbb{R}^2$

$\mathbb{R}^2$  में  $S^c$  सुबंधित है

3.  $S$  is closed in  $\mathbb{R}^2$

$\mathbb{R}^2$  में  $S$  संवृत है

$S^c$  is closed in  $\mathbb{R}^2$

4.  $\mathbb{R}^2$  में  $S^c$  संवृत है

Question Number : 107 Question Id : 4548933779 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The value of the intergral  $\int_0^1 \log_e \sqrt{x} dx$  is :

समाकलन  $\int_0^1 \log_e \sqrt{x} dx$  का मान है :

Options :

1.  $\frac{1}{3} \log_e 4\pi$

2.  $\frac{1}{2} \log_e 3\pi$

3.  $\frac{1}{2} \log_e 2\pi$

4.  $\frac{1}{2} \log_e 4\pi$

Question Number : 108 Question Id : 4548933780 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Let  $f: \mathbb{R} \rightarrow \mathbb{R}$  be a continuous map. Choose the correct statement :

माना कि  $f: \mathbb{R} \rightarrow \mathbb{R}$  एक सतत मानचित्र है। सही कथन चुनें :

Options :

$f([0, 1])$  is bounded

$f([0, 1])$  परिबद्ध है

1.

$f$  is bounded

$f$  परिबद्ध है

2.

The image of  $f$  is an open subsets of  $\mathbb{R}$

$f$  का प्रतिबिम्ब  $\mathbb{R}$  का एक विवृत उपसमुच्चय है

3.

$f^{-1}([0,1])$  is an open subset of  $\mathbb{R}$

$f^{-1}([0,1])$ ,  $\mathbb{R}$  का एक विवृत उपसमुच्चय है

4.

Question Number : 109 Question Id : 4548933781 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The value of  $\oint_C \frac{e^z}{z^2+9} dz$  where  $C: |z|=2$  and  $z=x+iy$ , is :

$\oint_C \frac{e^z}{z^2+9} dz$  जहाँ  $C: |z|=2$  है एवं  $z=x+iy$ , का मान है :

Options :

1.  $2\pi i$

1.

2.  $4\pi i$

2.

3.  $6\pi i$

3.

4.  $0$

4.

Question Number : 110 Question Id : 4548933782 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The value of  $\oint_C \frac{dz}{z^2+4}$  where  $C : |z+2i| = 1$  and  $z = x + iy$ , is :

$\oint_C \frac{dz}{z^2+4}$  जहाँ  $C : |z+2i| = 1$  है एवं  $z = x + iy$ , का मान है :

Options :

1.  $i\pi/2$

2.  $\pi/2$

3.  $-\pi/2$

4.  $-i\pi/2$

Question Number : 111 Question Id : 4548933783 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Which of the following statement is *not* correct ?

निम्नलिखित कथन में से कौन-सा सही *नहीं* है ?

Options :

$f(z) = z^3$  is analytic for any point  $z$

$f(z) = z^3$  किसी भी  $z$  के लिए वैश्लेषिक फलन है

1.

$f(z) = \sin \bar{z}$  is analytic for any point  $z$

$f(z) = \sin \bar{z}$  किसी भी  $z$  के लिए वैश्लेषिक फलन है

2.

$f(z) = \bar{z}$  is not analytic at any point  $z$

$f(z) = \bar{z}$  किसी भी  $z$  के लिए वैश्लेषिक फलन नहीं है

3.

$f(z) = e^{\bar{z}}$  is not analytic at any point  $z$

$f(z) = e^{\bar{z}}$  किसी भी  $z$  के लिए वैश्लेषिक फलन नहीं है

4.

Question Number : 112 Question Id : 4548933784 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The value of the  $\lim_{n \rightarrow \infty} \frac{1}{n} (1 + 2^{1/2} + 3^{1/3} + \dots + n^{1/n})$  is :

$\lim_{n \rightarrow \infty} \frac{1}{n} (1 + 2^{1/2} + 3^{1/3} + \dots + n^{1/n})$  का मान है :

Options :

1

1.

2

2.

0

3.

$\infty$

4.

Question Number : 113 Question Id : 4548933785 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load :  
No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Which one of the following statement is *not* true ?

निम्नलिखित में से कौन-सा एक कथन सत्य *नहीं* है ?

Options :

The series  $\sum_{n=1}^{\infty} \frac{n^{n^2}}{(n+1)n^2}$  is convergent

श्रेणी  $\sum_{n=1}^{\infty} \frac{n^{n^2}}{(n+1)n^2}$  अभिसारी है

1.

The series  $\sum_{n=1}^{\infty} \left(1 + \frac{1}{\sqrt{n}}\right)^{-n^3/2}$  is divergent

श्रेणी  $\sum_{n=1}^{\infty} \left(1 + \frac{1}{\sqrt{n}}\right)^{-n^3/2}$  अपसारी है

2.

The series  $\sum_{n=1}^{\infty} \frac{1}{n^2}$  is convergent

श्रेणी  $\sum_{n=1}^{\infty} \frac{1}{n^2}$  अभिसारी है

3.

The series  $\sum_{n=1}^{\infty} 3^{-n-(-1)^n}$  is convergent

श्रेणी  $\sum_{n=1}^{\infty} 3^{-n-(-1)^n}$  अभिसारी है

4.

Question Number : 114 Question Id : 4548933786 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Let  $(X, d)$  be a metric space and  $A \subseteq X$ , then which of the following is *not* correct ?

माना  $(X, d)$  एक मेट्रिक स्पेस है तथा  $A \subseteq X$ , तो निम्नलिखित में से कौन-सा सही **नहीं** है ?

Options :

1.  $A^\circ \subseteq A$

1.

2.  $A^\circ$  is open ( $A^\circ$  विवृत है)

2.

3.  $A \subseteq B \Rightarrow A^\circ \subseteq B^\circ$

3.

4.  $A^\circ \cap B^\circ = (A \cup B)^\circ$

4.



Question Number : 115 Question Id : 4548933787 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

The value of triple integral  $\iiint \sqrt{1 - \frac{x^2}{a^2} - \frac{y^2}{b^2} - \frac{z^2}{c^2}} dx dy dz$  over the ellipsoid

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1 \text{ is :}$$

दीर्घवृत्तज  $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$  के ऊपर त्रिसमाकलन  $\iiint \sqrt{1 - \frac{x^2}{a^2} - \frac{y^2}{b^2} - \frac{z^2}{c^2}} dx dy dz$  का

मान है :

Options :

1.  $\pi^2 \frac{abc}{4}$

2.  $\frac{\pi ab}{4}$

3.  $\pi^2 abc$

4.  $\pi^2 abc^2$

Question Number : 116 Question Id : 4548933788 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If  $f(x) = \sin x$ ,  $g(x) = \cos x$  and  $h(x) = \tan x$ , then there exists at least one  $c \in (\pi/6, \pi/4)$  such that :

यदि  $f(x) = \sin x$ ,  $g(x) = \cos x$  तथा  $h(x) = \tan x$ ,  $(\pi/6, \pi/4)$  में परिभाषित है तो कम से कम एक  $c \in (\pi/6, \pi/4)$  का अस्तित्व इस प्रकार होगा कि :

Options :

1.  $\begin{vmatrix} f'(c) & f(\pi/6) & f(\pi/4) \\ g'(c) & g(\pi/6) & g(\pi/4) \\ h'(c) & h(\pi/6) & h(\pi/4) \end{vmatrix} = 0$

$$2. \begin{vmatrix} f'(c) & f(\pi/4) & f(\pi/6) \\ g(\pi/4) & g'(c) & g(\pi/6) \\ f(\pi/6) & g(\pi/4) & h'(c) \end{vmatrix} = 0$$

$$3. \begin{vmatrix} f(\pi/4) & g(\pi/6) & f'(c) \\ h(\pi/4) & g'(c) & h(\pi/6) \\ h'(c) & f(\pi/6) & g(\pi/4) \end{vmatrix} = 0$$

$$4. \begin{vmatrix} h(\pi/6) & g(\pi/4) & h'(c) \\ g'(c) & g(\pi/6) & f'(c) \\ h(\pi/4) & h'(c) & g(\pi/4) \end{vmatrix} = 0$$

Question Number : 117 Question Id : 4548933789 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

By changing the order of integration, the integral  $\int_0^1 \int_{\sqrt{y}}^{2-y} f(x,y) dy dx$  can be

expressed as :

समाकल  $\int_0^1 \int_{\sqrt{y}}^{2-y} f(x,y) dy dx$  में समाकलन के क्रम को बदलने के बाद इसे व्यक्त किया जा

सकता है :

Options :

$$1. \int_0^2 \int_0^{x^2} f(x,y) dx dy + \int_0^2 \int_0^{2-x} f(x,y) dx dy$$

$$2. \int_0^1 \int_0^{x^2} f(x,y) dx dy + \int_0^2 \int_0^{2-x} f(x,y) dx dy$$

$$3. \int_0^1 \int_0^{x^2} f(x,y) dx dy + \int_1^2 \int_0^{2-x} f(x,y) dx dy$$

$$\int_0^2 \int_0^{x^2} f(x, y) dx dy + \int_0^1 \int_0^{2-x} f(x, y) dx dy$$

4.

Question Number : 118 Question Id : 4548933790 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

If  $f(x) = \begin{cases} 1 & , x \in [0,1] \cap \mathbb{Q} \\ -1 & , x \in [0,1] \cap (\mathbb{R} - \mathbb{Q}) \end{cases}$  then :

यदि  $f(x) = \begin{cases} 1 & , x \in [0,1] \cap \mathbb{Q} \\ -1 & , x \in [0,1] \cap (\mathbb{R} - \mathbb{Q}) \end{cases}$  तो :

Options :

$f$  is  $R$ -integrable on  $[0, 1]$  and  $\int_0^1 f(x) dx = 1$

$f$ ,  $[0, 1]$  पर  $R$ -समाकलनीय है तथा  $\int_0^1 f(x) dx = 1$

1.

$f$  is  $R$ -integrable on  $[0, 1]$  and  $\int_0^1 f(x) dx = -1$

$f$ ,  $[0, 1]$  पर  $R$ -समाकलनीय है तथा  $\int_0^1 f(x) dx = -1$

2.

$f$  is  $R$ -integrable on  $[0, 1]$  and  $\int_0^1 f(x) dx = 0$

$f$ ,  $[0, 1]$  पर  $R$ -समाकलनीय है तथा  $\int_0^1 f(x) dx = 0$

3.

$f$  is not  $R$ -integrable on  $[0, 1]$

$f$ ,  $[0, 1]$  पर  $R$ -समाकलनीय नहीं है

4.

Question Number : 119 Question Id : 4548933791 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Value of integral  $\int_0^1 \int_0^{1-x} e^{y/(x+y)} dx dy$  is :

समाकलन  $\int_0^1 \int_0^{1-x} e^{y/(x+y)} dx dy$  का मान है :

Options :

1.  $(e + 1)$

2.  $(e - 1)$

3.  $\frac{1}{2} (e - 1)$

4.  $\frac{1}{2} (e + 1)$

Question Number : 120 Question Id : 4548933792 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Allowed Progression : Yes Number of Replay : 999 Play On Load : No Control Enable : Yes

Correct Marks : 3 Wrong Marks : 1

Question Label : Multiple Choice Question

Let  $\chi_A(x)$  denote the function which is 1 if  $x \in A$  ( $A \subseteq \mathbb{R}$ ) and 0 otherwise. If

$$f(x) = \sum_{n=1}^4 \frac{1}{n^6} \chi_{[0, n/4]}(x), \quad x \in [0, 1], \text{ then } f(x) :$$

माना कि  $\chi_A(x)$  उस फलन को निर्दिष्ट करता है जो यदि  $x \in A$  ( $A \subseteq \mathbb{R}$ ) है तो 1, तथा

अन्यथा 0 है। यदि  $f(x) = \sum_{n=1}^4 \frac{1}{n^6} \chi_{[0, n/4]}(x), \quad x \in [0, 1],$  तो  $f(x) :$

Options :

1. is not Riemann integrable on  $[0, 1]$   
 $[0, 1]$  पर रीमान समाकलनीय नहीं है

2. is monotone function on  $[0, 1]$   
 $[0, 1]$  पर एकदिष्ट फलन

is not monotone function on  $[0, 1]$

3.  $[0, 1]$  पर एकदिष्ट फलन नहीं है

is a continuous function on  $[0, 1]$

4.  $[0, 1]$  पर सतत फलन है