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Group 1

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Maths

Section Id :	8273479
Section Number :	1
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Section Marks:	100

Sub-Section Number:	1
Sub-Section Id:	8273479
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 827347801 Question Type : MCQ

Which one of the following is a null set?

$A = \{ x : x \text{ is prime} \}$

$B = \{ x : x + 8 = 8 \}$

$C = \{ x : x^2 + 1 = 0, x \text{ is a real number} \}$

$D = \{ x : x^2 = 4, x \text{ is an integer} \}$

Options :

C

D

A

B

Question Number : 2 Question Id : 827347802 Question Type : MCQ

If universal set E = { 1, 2, 3, ….., 9}, B = {6, 7, 8}, AUC = { 1, 2, 3, 4, 5, 6}, then the elements of (A U B U C) are

Options :

{1, 2, 3, 4, 5, 6, 7, 8}

{9}

{ 1, 2, 3, ….., 9}

{ 1, 2, 3, 4, 5, 6}

Question Number : 3 Question Id : 827347803 Question Type : MCQ

Let A be a set having 'p' elements and B be the set having 'q' elements, the number of relations from A to B is

Options :

2^p

2^q

2^{pq}

2^{pq-q}

Question Number : 4 Question Id : 827347804 Question Type : MCQ

Let $f(x)=x^2$ and $g(x)=2x-1$ then the value of $f \circ g$ is

Options :

$2x^2+1$

$4x^2+4x+1$

$4x^2-4x-1$

$4x^2-4x+1$

Question Number : 5 Question Id : 827347805 Question Type : MCQ

If $f(x)=\frac{1}{1-x}$, $g(x)=f[f(x)]$, $h(x)=f[g(x)]$ then what is the value of $f(x).g(x).h(x)$

Options :

-1

0

1

2

Question Number : 6 Question Id : 827347806 Question Type : MCQ

If G is a cyclic group of order 24 and $a^{2002}=a^n$ where $a \in G,\ 0<n<24$. Then the value of n is

Options :

4

6

8
10

Question Number : 7 Question Id : 827347807 Question Type : MCQ

The number of group homomorphisms from the symmetric group S_3 to the additive group Z / 6Z is

Options :

1
2
3
0

Question Number : 8 Question Id : 827347808 Question Type : MCQ

How many normal subgroups does a non-abelian group G of order 21 have other than the identity subgroup {e} and G?

Options :

0
1
3
7

Question Number : 9 Question Id : 827347809 Question Type : MCQ

What is the largest order of an element in the group of permutation of 5 objects?

Options :

5
6
15
120

Question Number : 10 Question Id : 827347810 Question Type : MCQ

Let $A=\begin{bmatrix}2&0&0\\0&2&0\\0&0&2\end{bmatrix}$ and $B=\begin{bmatrix}1&2&3\\0&1&3\\0&0&2\end{bmatrix}$ then the determinant AB has the value

Options :

4
8
16
32

Question Number : 11 Question Id : 827347811 Question Type : MCQ

The inverse of the matrix $\begin{bmatrix}-0.5&0&0\\0&4&0\\0&0&1\end{bmatrix}$ is

Options :

$\begin{bmatrix} 0.5 & 0 & 0 \\ 0 & -4 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$\begin{bmatrix} -0.5 & 0 & 0 \\ 0 & -4 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$\begin{bmatrix} -2 & 0 & 0 \\ 0 & 0.25 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$\begin{bmatrix} 2 & 0 & 0 \\ 0 & -0.25 & 0 \\ 0 & 0 & -1 \end{bmatrix}$

Question Number : 12 Question Id : 827347812 Question Type : MCQ

If $\begin{vmatrix} a & a^2 & a^2-1 \\ b & b^2 & b^2-1 \\ c & c^2 & c^2-1 \end{vmatrix} = 0$ in which a, b and c are different then

Options :

abc=1

abc + 1= 0

abc=0

ab + bc + ca =0

Question Number : 13 Question Id : 827347813 Question Type : MCQ

Let $A = \begin{bmatrix} 3 & 2 & 2 \\ 1 & 3 & 1 \\ 5 & 3 & 4 \end{bmatrix}$ and $AB = \begin{bmatrix} 3 & 4 & 2 \\ 1 & 6 & 1 \\ 5 & 6 & 4 \end{bmatrix}$ then the value of matrix B is

Options :

$\begin{bmatrix} 1 & 0 & 0 \\ 2 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$

$\begin{bmatrix} 0 & 1 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 1 & 0 \end{bmatrix}$

$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

Question Number : 14 Question Id : 827347814 Question Type : MCQ

If $A=\begin{bmatrix}3 & -4\\ 1 & -1\end{bmatrix}$ then A^n is equal to

Options :

$\begin{bmatrix}1+2n & -4n\\ n & 1-2n\end{bmatrix}$

$\begin{bmatrix}1-2n & -4n\\ n & 1-2n\end{bmatrix}$

$\begin{bmatrix}1+2n & 4n\\ -n & 1-2n\end{bmatrix}$

$\begin{bmatrix}1+2n & 4n\\ n & 1-2n\end{bmatrix}$

Question Number : 15 Question Id : 827347815 Question Type : MCQ

If $A=\begin{bmatrix}1 & 3 & 2\\ 2 & 0 & -1\\ 1 & 2 & 3\end{bmatrix}$ then the value of $A^3-4A^2-3A+11I=$

Options :

A + I

0

A – I

A+2I

Question Number : 16 Question Id : 827347816 Question Type : MCQ

If $3\begin{bmatrix}x & y\\ z & w\end{bmatrix}=\begin{bmatrix}x & 5\\ -1 & 2w\end{bmatrix}+\begin{bmatrix}6 & x+y\\ z+w & 5\end{bmatrix}$ then the value of x, y, z and w are

Options :

x = 3, y = 4, z = 2, w = 5

x = -3, y = 4, z = 2, w = 5

x = 3, y = -4, z = 2, w = 5

x = 3, y = 4, z = -2, w = 5

Question Number : 17 Question Id : 827347817 Question Type : MCQ

Let $A=\begin{bmatrix}1 & 0 & 0\\ \alpha & 1 & 0\\ \beta & \gamma & 1\end{bmatrix}$ and $B=\begin{bmatrix}1 & 0 & 0\\ 2 & 1 & 0\\ 3 & 4 & 1\end{bmatrix}$ then

Options :

A is row equivalent to B only when $\alpha=2,\beta=3,\gamma=4$

A is row equivalent to B only when $\alpha\neq 0,\beta\neq 0,\gamma=0$

A is not row equivalent to B

A is row equivalent to B for all values of α,β,γ

Question Number : 18 Question Id : 827347818 Question Type : MCQ

The inverse of $\begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$ is $\begin{bmatrix} 3 & 2 & 6 \\ 1 & 1 & k \\ 2 & 2 & 5 \end{bmatrix}$ then the value of k is

Options :

5

2

3

1

Question Number : 19 Question Id : 827347819 Question Type : MCQ

The value of λ and μ for which the following system of equations

x+y+z=6; x+2y+3z=10; x+2y+ λ z= μ has a unique solution is

Options :

$\lambda = 3,\ \mu = 2$

$\lambda \neq 3,\ \mu$ may have any value

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

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

Question Number : 20 Question Id : 827347820 Question Type : MCQ

If the system of equations x = cy + bz; y = az + cx; z = bx + ay has a non-trivial solutions, then a, b and c are connected by the relation

Options :

$a^2 + b^2 + c^2 - 3abc = 0$

$a^2 + b^2 + c^2 - ab - bc - ca = 0$

$a^2 + b^2 + c^2 - 2abc = 1$

$a^2 + b^2 + c^2 + 2abc = 1$

Question Number : 21 Question Id : 827347821 Question Type : MCQ

The product of the eigen values of $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 3 & -1 \\ 0 & -1 & 3 \end{bmatrix}$ is equal to

Options :

-4

4

-8

8

Question Number : 22 Question Id : 827347822 Question Type : MCQ

Consider the following row vectors : $a_1 = (1,1,0,1,0,0)$, $a_2 = (1,1,0,0,1,0)$, $a_3 = (1,1,0,0,0,1)$, $a_4 = (1,0,1,1,0,0)$, $a_5 = (1,0,1,0,1,0)$, $a_6 = (1,0,1,0,0,1)$. The dimension of the vector space spanned by these row vectors is

Options :

6

5

4

3

Question Number : 23 Question Id : 827347823 Question Type : MCQ

Let A be a 5×4 matrix with real entries such that $A\bar{x} = \bar{0}$ if and only if $\bar{x} = \bar{0}$, where $\bar{x}$ is a 4×1 vector and $\bar{0}$ is a null vector. Then, the rank of A is

Options :

4

5

2

1

Question Number : 24 Question Id : 827347824 Question Type : MCQ

Consider the linear transformation $T : \Re^4 \to \Re^4$ given by $T(x, y, z, u) = (x, y, 0, 0) \forall (x, y, z, u) \in \Re^4$. Then, which one of the following is correct?

Options :

Rank of T > Nullity of T

Rank of T < Nullity of T

Rank of T = Nullity of T=3

Rank of T=Nullity of T=2

Question Number : 25 Question Id : 827347825 Question Type : MCQ

M is a 2-square matrix of rank 1, then M is

Options :

diagonalizable and non singular

diagonalizable and nilpotent

neither diagonalizable nor nilpotent

either diagonalizable or nilpotent

Question Number : 26 Question Id : 827347826 Question Type : MCQ

U and V are subspace of R^4 such that

U = span [(1,2,3,4), (5,7,2,1), (3,1,4,-3)]

V=span [(2,1,2,3), (3,0,1,2), (1,1,5,3)].

Then the dimension of U∩V is

Options :

1

2

3

4

Question Number : 27 Question Id : 827347827 Question Type : MCQ

A linear transformation T rotates each vector in R^2 clockwise through 90^0. The matrix T relative to standard ordered basis $\left(\begin{bmatrix}1\\0\end{bmatrix},\begin{bmatrix}0\\1\end{bmatrix}\right)$ is

Options :

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

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

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

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

Question Number : 28 Question Id : 827347828 Question Type : MCQ

If $f(x)=\frac{\sin\left(e^{x-2}-1\right)}{\log(x-1)}$, then $\lim_{x\to 2} f(x)$ is given by

Options :

-2

-1

0

1

Question Number : 29 Question Id : 827347829 Question Type : MCQ

The least value of a such that the function x^3+ax+1 is increasing on (1,2) is

Options :

a = 2

a = - 2

a = 0

a = - 1

Question Number : 30 Question Id : 827347830 Question Type : MCQ

The condition for which the curves $ax^2 + by^2 = 1$ and $cx^2 + dy^2 = 1$ to intersect orthogonally is

Options :

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

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

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

$\frac{1}{a}-\frac{1}{c}=\frac{1}{b}-\frac{1}{d}$

Question Number : 31 Question Id : 827347831 Question Type : MCQ

The function $M(x) = x^4 - 4x^2$ has

Options :

two relative minima and one relative maximum

two relative minima and no relative maxima

one relative minimum and one relative maximum

one relative maximum and one relative minimum

Question Number : 32 Question Id : 827347832 Question Type : MCQ

If $z = \sin^{-1}\frac{x+y}{\sqrt{x}-\sqrt{y}}$, then the value of $x\frac{\partial z}{\partial x}-y\frac{\partial z}{\partial y}$ is

Options :

z/2

2z

tan(z)/2

sin(z)/2

Question Number : 33 Question Id : 827347833 Question Type : MCQ

The value of integral $\int_{-1}^{1}\int_{0}^{z}\int_{x-z}^{x+z}(x+y+z)dx\,dy\,dz$ is equal to

Options :

1

0

-1

2

Question Number : 34 Question Id : 827347834 Question Type : MCQ

The value of integral $\int_{0}^{1}\int_{x^2}^{2-x} xy\,dx\,dy$ is equal to

Options :

$\frac{3}{4}$

$\frac{3}{8}$

$\frac{3}{5}$

$\frac{3}{7}$

Question Number : 35 Question Id : 827347835 Question Type : MCQ

The value of the integral $\int_0^{\infty} \frac{x a^x dx}{1+x^5}$ is equal to

Options :

$\frac{1}{6}B(\frac{1}{2},\frac{1}{3})$

$\frac{1}{6}B(\frac{1}{2},\frac{2}{3})$

$\frac{1}{6}B(\frac{1}{3},\frac{2}{3})$

$\frac{1}{6}B(\frac{1}{2},\frac{1}{2})$

Question Number : 36 Question Id : 827347836 Question Type : MCQ

The asymptotes of the curve $y=\frac{x^2}{x^2-1}$ are

Options :

$x=\pm 1, y=1$

$x=\pm 1, y=-1$

$x=1, y=\pm 1$

$x=-1, y=\pm 1$

Question Number : 37 Question Id : 827347837 Question Type : MCQ

The value of $\frac{\partial(u,v)}{\partial(x,y)} \times \frac{\partial(x,y)}{\partial(u,v)}$ is equal to

Options :

-1

0

1

2

Question Number : 38 Question Id : 827347838 Question Type : MCQ

Let $f(x)=\begin{cases} \frac{x-4}{|x-4|}-a, & x<4 \\ a-b, & x=4 \\ \frac{x-4}{|x-4|}-b, & x>4 \end{cases}$ then f(x) is continuous at x = 4 when

Options :

a = 0, b = 0

a = 1, b = 1

a = - 1, b = 1

a = 1, b = - 1

Question Number : 39 Question Id : 827347839 Question Type : MCQ

Let $f''(x)$ be continuous at x = 0 and $f'(0)=4$. Then $\lim_{x\to 0}\frac{2f(x)-3f(2x)+f(4x)}{x^2}$ is equal to

Options :

2

13

11

12

Question Number : 40 Question Id : 827347840 Question Type : MCQ

If $\sqrt{1-x^2}+\sqrt{1-y^2}=a(x-y)$ then $\frac{dy}{dx}$ is equal to

Options :

$\sqrt{(1-x^2)(1-y^2)}$

$\sqrt{\frac{(1-y^2)}{(1-x^2)}}$

$\sqrt{\frac{(1-x^2)}{(1-y^2)}}$

$\sqrt{(1-x^2)(1+y^2)}$

Question Number : 41 Question Id : 827347841 Question Type : MCQ

The series $1-\frac{1}{\sqrt{2}}+\frac{1}{\sqrt{3}}-\frac{1}{\sqrt{4}}+\ldots$ is

Options :

Oscillatory

Conditionally convergent

Divergent

Absolutely convergent

Question Number : 42 Question Id : 827347842 Question Type : MCQ

If $\sum u_n$ is aconvergent series of positive terms, then $\underset{n\to\infty}{Lt}\, u_n$ is

Options :

1

-1

0

±1

Question Number : 43 Question Id : 827347843 Question Type : MCQ

The sequence $\left\{\frac{1}{2}, \frac{2}{3}, \ldots\ldots \frac{n}{n-1}\right\}$ is

Options :

monotonically increasing

increasing and bounded

non-increasing and bounded

non-increasing, but not bounded

Question Number : 44 Question Id : 827347844 Question Type : MCQ

Let R be the set of real numbers. The function $d: R \times R \to R$ defined by

$d(x, y) = \left|x^2 - y^2\right| \forall x, y \in R$ then

Options :

d is not a metric on R

d is a metric on R

d is not a pseudo-metric on R

d is a metric on R2

Question Number : 45 Question Id : 827347845 Question Type : MCQ

Every closed subset of a compact metric space is

Options :

Infinite subcovers

Not a metric space

Not compact

Compact

Question Number : 46 Question Id : 827347846 Question Type : MCQ

A bounded function f is integerable in [a,b] if

Options :

the set of its points of discontinuity is finite

the set of its points of discontinuity is infinite

the set of its points of continuity is finite

the set of its points of continuity is infinite

Question Number : 47 Question Id : 827347847 Question Type : MCQ

The relation $|3 - z| + |3 - z| = 5$ represents

Options :

A circle

A parabola

An ellipse

A hyperbola

Question Number : 48 Question Id : 827347848 Question Type : MCQ

The modulus of $(\sqrt{i})^{\sqrt{i}}$ is

Options :

$e^{\frac{\pi}{4}\sqrt{2}}$

$e^{-\frac{\pi}{4}\sqrt{2}}$

$e^{-\frac{\pi}{3}\sqrt{2}}$

$e^{\frac{\pi}{3}\sqrt{2}}$

Question Number : 49 Question Id : 827347849 Question Type : MCQ

If z_1 and z_2 are non-zero complex numbers such that $|z_1 - z_2| = |z_1| - |z_2|$, then $Argz_1 - Argz_2$ is equal to

Options :

$-\pi$

$-\pi/2$

0

$\pi/2$

Question Number : 50 Question Id : 827347850 Question Type : MCQ

If $iz^3 - z^2 - z - i = 0$ then the value of $|z|$ is

Options :

1

-1

Less than 1

Greater than 1

Question Number : 51 Question Id : 827347851 Question Type : MCQ

The analytic function which maps the angular region $0 \le \theta \le \frac{\pi}{4}$ onto the upper half plane is

Options :

z^2

4z

z^4

Z

Question Number : 52 Question Id : 827347852 Question Type : MCQ

The value of $\int_C \frac{4z^2 + z - 5}{z - 4} dz \; where C : 9x^2 + 4y^2 = 36$ is equal to

Options :

-1

1

2

0

Question Number : 53 Question Id : 827347853 Question Type : MCQ

Image of $|z-1|=1$ under the mapping w = 1/z is

Options :

2v+1=0

2v-1=0

2u+1=0

2u-1=0

Question Number : 54 Question Id : 827347854 Question Type : MCQ

If f(z) is analytic in a simply connected domain D and c is any simple closed path then the value of $\int_c f(z)dz$ is given by

Options :

1

2

0

3

Question Number : 55 Question Id : 827347855 Question Type : MCQ

The order of the pole of the function $f(z)=\frac{z^4-2z-1}{z^3-5z+2}$, at $z=\infty$ is

Options :

2

1

0

4

Question Number : 56 Question Id : 827347856 Question Type : MCQ

The solution of the differential equation $(y-x)^2\frac{dy}{dx}=a^2$ is given by

Options :

$y+x=a\tan\left(\frac{y-c}{a}\right)$

$y-x=\tan\left(\frac{y-c}{a}\right)$

$y-x=a\tan(y-c)$

$a(y-x)=\tan\left(y-\frac{c}{a}\right)$

Question Number : 57 Question Id : 827347857 Question Type : MCQ

The solution of the differential equation $\frac{d^2y}{dx^2}-3\frac{dy}{dx}+2y=e^{3x}$ is

Options :

$y=ae^{-x}+be^{-2x}+\frac{1}{2}e^{3x}$

$y=ae^{x}+be^{2x}+\frac{1}{2}e^{3x}$

$y=ae^{x}+be^{-2x}+\frac{1}{2}e^{3x}$

$y=ae^{-x}+be^{2x}+\frac{1}{2}e^{3x}$

Question Number : 58 Question Id : 827347858 Question Type : MCQ

The differential equation of a family of circles having the radius r and the Centre on the x-axis is given by

Options :

$y^2\left(1+(\frac{dy}{dx})^2\right)=r^2$

$x^2\left(1+(\frac{dy}{dx})^2\right)=r^2$

$r^2\left(1+(\frac{dy}{dx})^2\right)=x^2$

$(x^2+y^2)\left(1+(\frac{dy}{dx})^2\right)=r^2$

Question Number : 59 Question Id : 827347859 Question Type : MCQ

The solution of differential equation $\frac{dy}{dx}+\frac{y}{x}=x^2$ under condition y(1)=1 is given by

Options :

$4xy=x^3+3$

$4xy=x^4+3$

$4xy=y^4+3$

$4xy=y^3+3$

Question Number : 60 Question Id : 827347860 Question Type : MCQ

The particular integral of the differential equation $\frac{d^2y}{dx^2}+a^2y=\sin ax$ is

Options :

$\frac{x}{2a}\cos ax$

$-\frac{ax}{2}\cos ax$

$\frac{ax}{2}\cos ax$

$-\frac{x}{2a}\cos ax$

Question Number : 61 Question Id : 827347861 Question Type : MCQ

The solution of p + q = z is

Options :

F(xy, y logz) =0

F(x+y, y + logz) = 0

F(x –y, y – logz) = 0

F(xy, xlogz) = 0

Question Number : 62 Question Id : 827347862 Question Type : MCQ

The solution of $\frac{\partial^3 z}{\partial x^3} = 0$ is

Options :

$z = (1 + x + x^2) f(y)$

$z = (1 + y + y^2) f(x)$

$z = f_1(x) + y f_2(x) + y^2 f_3(x)$

$z = f_1(y) + x f_2(y) + x^2 f_3(y)$

Question Number : 63 Question Id : 827347863 Question Type : MCQ

Particular integral of $\left(2D^2 - 3DD' + D'^2\right)z = e^{x+2y}$ is

Options :

$\frac{1}{2}e^{x+2y}$

$\frac{-x}{2}e^{x+2y}$

xe^{x+2y}

x^2e^{x+2y}

Question Number : 64 Question Id : 827347864 Question Type : MCQ

The differential equation $(x + x^8 + ay^2)dx + (y^8 - y + bxy)dy = 0$ is exact if

Options :

b = 2a

b = a

b < 2a

b =3, a = 1.

Question Number : 65 Question Id : 827347865 Question Type : MCQ

The condition that the line $lx+my+n=0$ is normal to the circle $x^2+y^2+2gx+2fy+c=0$ is

Options :

$1g-mf=n$

$1g-mf+n=0$

$1g+mf=n$

$1g+mf+n=0$

Question Number : 66 Question Id : 827347866 Question Type : MCQ

The pole of the line $lx+my+n=0$ with respect to the parabola $y^2 = 4ax$ is

Options :

$(\frac{n}{l},\frac{2am}{l})$

$(\frac{n}{l},\frac{-2am}{l})$

$(-\frac{n}{l},\frac{2am}{l})$

$(-\frac{n}{l},\frac{-2am}{l})$

Question Number : 67 Question Id : 827347867 Question Type : MCQ

The eccentricity of an ellipse $\frac{x^2}{169}+\frac{y^2}{25}=1$ is

Options :

$\frac{12}{13}$

$\frac{5}{13}$

$-\frac{12}{13}$

$-\frac{5}{13}$

Question Number : 68 Question Id : 827347868 Question Type : MCQ

The lines $y = mx$ and $y = nx$ are conjugate to hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ if

Options :

$mn=-\frac{b^2}{a^2}$

$m-n=\frac{b^2}{a^2}$

$m+n=\frac{b^2}{a^2}$

$mn = \frac{b^2}{a^2}$

Question Number : 69 Question Id : 827347869 Question Type : MCQ

The direction cosines of the line joining the points (4, 3, -5) and (-2, 1, -8) is

Options :

$\left(\frac{6}{7}, \frac{2}{7}, \frac{3}{7}\right)$

$\left(\frac{6}{7}, \frac{-2}{7}, \frac{3}{7}\right)$

$\left(\frac{6}{7}, \frac{2}{7}, \frac{-3}{7}\right)$

$\left(\frac{6}{7}, \frac{-2}{7}, \frac{-3}{7}\right)$

Question Number : 70 Question Id : 827347870 Question Type : MCQ

If A, B, C, D are the points (3, 4, 5), (4, 6, 3), (-1, 2, 4), (1, 0, 5) then the projection of CD on AB is

Options :

$\frac{3}{4}$

$\frac{4}{3}$

$-\frac{3}{4}$

$-\frac{4}{3}$

Question Number : 71 Question Id : 827347871 Question Type : MCQ

The points at which the tangent to the curve $y = x^3+5$ is perpendicular to the line
$x + 3y = 2$ are

Options :

(1,6),(-1,4)

(1,6),(1,4)

(6,1),(4,-1)

(6,1),(-1.4)

Question Number : 72 Question Id : 827347872 Question Type : MCQ

The equation of the plane passing through the straight line $\frac{x-1}{2} = \frac{y-1}{-1} = \frac{z-3}{4}$ and perpendicular to the plane $x + 2y + z = 12$ is

Options :

$9x + 2y - 5z + 4 = 6$

$9x + 2y + 5z - 4 = 0$

$9x - 2y - 5z - 4 = 0$

$9x - 2y - 5z + 4 = 0$

Question Number : 73 Question Id : 827347873 Question Type : MCQ

The lines $x-2y-6=0, 3x+y-4=0$ $\lambda x+4y+\lambda^2=0$ are concurrent if

Options :

$\lambda=-4$

$\lambda=4$

$\lambda=-2$

$\lambda=-3$

Question Number : 74 Question Id : 827347874 Question Type : MCQ

The value of the integral $\int x^2 J_1(x)dx$ is

Options :

$x^2 J_1(x)+c$

$x^2 J_{-1}(x)+c$

$x^2 J_2(x)+c$

$x^2 J_{-2}(x)+c$

Question Number : 75 Question Id : 827347875 Question Type : MCQ

The value of $\int_{-1}^{1} P_3(x)P_4(x)dx$ is equal to

Options :

1

0

$\frac{2}{9}$

$\frac{2}{7}$

Question Number : 76 Question Id : 827347876 Question Type : MCQ

Laplace transform of $e^{3t}\sin^2 t$, is

Options :

$\frac{1}{2}\left[\frac{1}{s-3}-\frac{(s-3)}{(s-3)^2+4}\right]$

$\frac{1}{2}\left[\frac{1}{s+3}-\frac{(s+3)}{(s+3)^2+4}\right]$

$\frac{1}{2}\left[\frac{1}{s-3}+\frac{(s-3)}{(s-3)^2+4}\right]$

$$\frac{1}{2}\left[\frac{1}{s+3}+\frac{(s+3)}{(s+3)^2+4}\right]$$

Question Number : 77 Question Id : 827347877 Question Type : MCQ

$L^{-1}\left(\frac{s^2-3s+4}{s^3}\right)$ is

Options :

$1-3t-2t^2$

$1-3t+2t^2$

$1+3t-2t^2$

$1+3t+2t^2$

Question Number : 78 Question Id : 827347878 Question Type : MCQ

If $f(x)=|\cos x|, (-\pi,\pi)$ then the value of b_n is

Options :

$-\pi$

0

π

2π

Question Number : 79 Question Id : 827347879 Question Type : MCQ

The value of $P_2(x)$ is given as

Options :

$\frac{1}{2}(3x^2+1)$

$\frac{1}{2}(-3x^2+1)$

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

$-\frac{1}{2}(3x^2+1)$

Question Number : 80 Question Id : 827347880 Question Type : MCQ

If J_0, J_1 are Bessel's function then $J_1'(x)$ is given by

Options :

$-J_0$

$J_0(x)+\frac{1}{x}J_1(x)$

J_0

$J_0(x)-\frac{1}{x}J_1(x)$

Question Number : 81 Question Id : 827347881 Question Type : MCQ

The Fourier Cosine transform of e^{-x^2} is

Options :

$\frac{\sqrt{\pi}}{2}e^{-x^2/4}$

$-\frac{\sqrt{\pi}}{2}e^{x^2/4}$

$\frac{\sqrt{\pi}}{2}e^{x^2/4}$

$-\frac{\sqrt{\pi}}{2}e^{-x^2/4}$

Question Number : 82 Question Id : 827347882 Question Type : MCQ

When f(x) is an odd function in Fourier Series then the value of a_n is

Options :

0

1

-1

Even

Question Number : 83 Question Id : 827347883 Question Type : MCQ

The constraints that cannot be expressed as equation form

Options :

non- holonomic constraints

holonomic constraints

rheonomous constraints

scleronomous constraints

Question Number : 84 Question Id : 827347884 Question Type : MCQ

Euler's theorem states that

Options :

the general displacement of a rigid body with one point fixed is a rotation about some axis

the general displacement of a rigid body is translation with a rotation

Lagrange's bracket is canonical invariant

Poisson's bracket is invariant under canonical transformation

Question Number : 85 Question Id : 827347885 Question Type : MCQ

Principal of virtual work states

Options :

the work done is zero in the case of an arbitrary displacement of a system from a position of equilibrium

the work done is non-zero in the case of an arbitrary displacement of a system from a position of equilibrium

the work done is infinite in the case of an arbitrary displacement of a system from a position of equilibrium

It calculates the distance

Question Number : 86 Question Id : 827347886 Question Type : MCQ

The work done by the string of a simple pendulum during one complete oscillation is equal to

Options :

total energy of the pendulum

KE of the pendulum

PE of the pendulum

Zero

Question Number : 87 Question Id : 827347887 Question Type : MCQ

A simple pendulum has some time period T. What will be the percentage change in its time period if its amplitudes is decreased by 5 % ?

Options :

6%

3%

1.5%

0%

Question Number : 88 Question Id : 827347888 Question Type : MCQ

A particle executes SHM with a frequency f. The frequency with which it's KE oscillates is

Options :

f/2

F

2f

4f

Question Number : 89 Question Id : 827347889 Question Type : MCQ

An object with a mass M is suspended from an elastic spring with a spring constant k. The object oscillates with maximum amplitude A. If the amplitude of oscillations is doubled, how it will change the period of oscillations?

Options :

The period remains the same

The period is increased by factor two

The period is increased by factor four

The period is decreased by factor two

Question Number : 90 Question Id : 827347890 Question Type : MCQ

What is the distance traveled by an electron in first 4 seconds from its initial position, if velocity time relation is given as v = 3t?

Options :

20m

24 m

16m

18m

Question Number : 91 Question Id : 827347891 Question Type : MCQ

What is the initial velocity of an object which travels a distance of $10t^2 + 15t + 5$ along a straight line in time t?

Options :

+ 15

-15

+ 10

-10

Question Number : 92 Question Id : 827347892 Question Type : MCQ

If f(0)=1, f(1)=14, f(2)=15, f(4)=5, f(5)=6, f(6)=19, then the value of f(3) using Lagrange's formula is

Options :

10

11

12

13

Question Number : 93 Question Id : 827347893 Question Type : MCQ

If h is the interval of differencing then $(\Delta - \nabla)x^2$ equals to

Options :

2h

$2h^2$

$2h^3$

h

Question Number : 94 Question Id : 827347894 Question Type : MCQ

If y_x is a polynomial for which fifth difference is constant and $y_1+y_7=-7845$, $y_2+y_6=686$, $y_3+y_5=1088$ then the value of y_4 is

Options :

570

571

572

Question Number : 95 Question Id : 827347895 Question Type : MCQ

If y(1)=-3, y(3)=9, y(4)=30, y(6) = 132, then the Lagrange's interpolation polynomial that takes the same values of y at the given points is given as

Options :

x^3+3x^2+5x-6

x^3-3x^2-5x-6

$x^3 - 3x^2 + 5x - 6$

x^3-3x^2+5x+6

Question Number : 96 Question Id : 827347896 Question Type : MCQ

If $y_0=1$, $y = 16/17$, $y_2=4/5$, $y_3=16/25$, $y_4=1/2$ and $h = ¼$, then using Trapezoidal rule, the value of integral $\int_0^4 ydx =$

Options :

0.783

0.75

0.65

0.683

Question Number : 97 Question Id : 827347897 Question Type : MCQ

The dual problem of the LPP:

Max. $Z= 4x_1+9x_2+2x_3$, subject to

$2x_1+3x_2+2x_3\leq 7$, $3x_1-2x_2+4x_3=5$; $x_1, x_2, x_3 \geq 0$ is

Options :

Min $W=7y_1+5y_2$ subject to $2y_1+3y_2\leq 4$, $3y_1-2y_2\leq 9$, $2y_1+4y_2\leq 2$, $y_1\geq 0$, y_2 unrestricted in sign

Min $W=7y_1-5y_2$ subject to $2y_1+3y_2\leq 4$, $3y_1-2y_2\leq 9$, $2y_1+4y_2\leq 2$, $y_1\geq 0$, y_2 unrestricted in sign

Min $W=7y_1+5y_2$ subject to $2y_1+3y_2\geq 4$, $3y_1-2y_2\leq 9$, $2y_1+4y_2\leq 2$, $y_1\geq 0$, y_2 unrestricted in sign

Min $W=7y_1+5y_2$ subject to $2y_1+3y_2\leq 4$, $3y_1-2y_2\geq 9$, $2y_1+4y_2\leq 2$, $y1\geq 0$, y_2 unrestricted in sign

Question Number : 98 Question Id : 827347898 Question Type : MCQ

For a balanced transportation problem with 3 rows and 3 columns, the number of basic variables will be

Options :

6
5
7
4

Question Number : 99 Question Id : 827347899 Question Type : MCQ

The optimal basis of primal consists of variables x and y. The cost of these are 3 and 0 and the corresponding columns are $(3,2)^T$ and $(0, -1)^T$. Then, the optimal solution of dual is

Options :

(3, 0)

(1, 0)

(1, 2)

(0, 0)

Question Number : 100 Question Id : 827347900 Question Type : MCQ

Four jobs are to be done on four machines. The optimal assignment is given as job 1 to machine 2, job2 to machine 4, job 3 to machine 1, job 4 to machine 3. The cost of producing ith job on the jth machine is given as J_1M_1=13, J_1M_2=11, J_1M_3=13, J_1M_4=15; J_2M_1=17, J_2M_2=12, J_2M_3=12, J_2M_4=13; J_3M_1=14, J_3M_2=15, J_3M+3=10, J_3M_4=14; J_4M_1=16, J_4M_2=13, J_4M_3=11, J_4M_4=17. The minimized total cost is

Options :

Rs. 46

Rs. 47

Rs. 48

Rs. 49