Mathematics

Number of Questions: 50
Display Number Panel: Yes
Group All Questions: No

Question Number: 1  Question Id: 8946582605  Question Type: MCQ  Option Shuffling: Yes  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

Let \( M = (a_{ij}) \) be a \( 10 \times 10 \) matrix such that \( a_{ij} = \begin{cases} 1, & \text{if } i + j = 11 \\ 0, & \text{otherwise} \end{cases} \). Then, the determinant of \( M \) is \( \boxed{\text{______}} \).

Options:
1. 0
2. 1
3. -1
4. 11

Question Number: 2  Question Id: 8946582606  Question Type: MCQ  Option Shuffling: Yes  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

Let \( A \) and \( B \) be two square matrices of order \( n \). If \( AB = A \), \( BA = B \) then \( A^2 + B^2 = \boxed{\text{______}} \).

Options:
1. \( AB \)

2. \( A - B \)

3. 0

4. \( A + B \)

Consider the system of linear equations \( x + y + z = 3, x - y - z = 4, x - 5y + \alpha z = 6 \). Then, the value of \( \alpha \) for which this system has an infinite number of solutions is ______.

Options:

1. -5

2. 5

3. 3

4. 1

If \( A(\alpha, \beta) = \begin{pmatrix} \cos \alpha & \sin \alpha & 0 \\ -\sin \alpha & \cos \alpha & 0 \\ 0 & 0 & e^\beta \end{pmatrix} \), then the inverse of the matrix \( A(\alpha, \beta) \) is ________.

Options:

1. \( A(\alpha, \beta) \)

2. \( A(\alpha, -\beta) \)
3. \( A(\alpha, -\beta) \)

4. \( A(\alpha, \beta) \)

The rational fraction \( \frac{x^2 + 1}{(x^2 + 4)(x - 2)} \) is equal to ________

Options:

1. \( \frac{3x + 6}{8(x^2 + 4)} + \frac{5}{4(x - 2)} \)

2. \( \frac{3x + 6}{4(x^2 + 4)} + \frac{5}{8(x - 2)} \)

3. \( \frac{3x + 6}{8(x^2 + 4)} + \frac{5}{8(x - 2)} \)

4. \( \frac{5}{(x^2 + 4)} + \frac{3x + 6}{(x - 2)} \)

If \( \log_2 3 = a, \log_3 5 = b, \log_7 2 = c \), then \( \log_{140} 63 = \) ________

Options:

1. \( \frac{1 - 2ac}{2c + abc + 1} \)

2. \( \frac{1 - 2ac}{2c - abc - 1} \)
\[
\frac{1+2ac}{2c-abc-1}
\]

\[
\frac{1+2ac}{2c+abc+1}
\]

Question Number : 7  Question Id : 8946582611  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  
Single Line Question Option : No  Option Orientation : Vertical

\[\cos \frac{2\pi}{7} + \cos \frac{4\pi}{7} + \cos \frac{6\pi}{7} = \ldots.\]

Options:

1.

\[\frac{1}{2}\]

2.

\[-\frac{1}{2}\]

3.

0

4.

Question Number : 8  Question Id : 8946582612  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  
Single Line Question Option : No  Option Orientation : Vertical

If the angles \(A, B\) and \(C\) of a triangle are in an arithmetic progression and if \(a, b\) and \(c\) denote the lengths of the sides opposite to \(A, B\) and \(C\) respectively, then the value of the expression \(\frac{a}{c} \sin 2C + \frac{c}{a} \sin 2A\) is _.

Options:

1.

\(\sqrt{3}\)

2.

\(\frac{\sqrt{3}}{2}\)
If \( \sin x + \sin y = \frac{1}{4} \) and \( \cos x + \cos y = \frac{1}{3} \), then \( \cot(x + y) = \) \underline{}.

Options:
1. \( \frac{7}{24} \)
2. \( \frac{24}{7} \)
3. \( \frac{3}{4} \)
4. \( 1 \)

If \( \sin(x + 28^\circ) = \cos(3x^\circ - 78^\circ) \) and \( 0^\circ < x^\circ < 90^\circ \), then, which of the following is the value of \( x^\circ \)?

Options:
1. \( 50^\circ \)
2. \( 30^\circ \)
3. \( 16^\circ \)
4. \( 8^\circ \)
Question Number : 11  Question Id : 8946582615  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( x = \tan \left( \csc^{-1} \frac{65}{63} \right) \) and \( y = \sec^2 \left( \cot^{-1} \frac{1}{2} \right) + \cos^2 \left( \tan^{-1} \frac{1}{3} \right) \), then \( (x, y) = \) _______.

Options :

1. \( \left( \frac{63}{16}, 1.5 \right) \)

2. \( \left( \frac{16}{63}, 1.5 \right) \)

3. \( \left( \frac{63}{16}, 5 \right) \)

4. \( \left( \frac{16}{63}, 5 \right) \)

Question Number : 12  Question Id : 8946582616  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The equation \( \tan^{-1} \left( \frac{x+1}{x-1} \right) + \tan^{-1} \left( \frac{x-1}{x} \right) = \tan^{-1} (-7) \) has _________.

Options :

1. unique solution \( x = 2 \)

2. two solutions \( x = 1, 2 \)

3. no solution

4. infinite number of solutions

Question Number : 13  Question Id : 8946582617  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
In a triangle \( ABC \), let \( a, b \) and \( c \) denote the lengths of the sides opposite to \( A, B \) and \( C \) respectively. If \( \frac{1}{a+c} + \frac{1}{b+c} = \frac{3}{a+b+c} \), then the angle \( C \) is ____.

Options:
1. \( 30^\circ \)
2. \( 90^\circ \)
3. \( 60^\circ \)
4. \( 45^\circ \)

If \( \sin bx = 3 \) then \( x = \) __________.

Options:
1. \( \log(3 + \sqrt{10}) \)
2. \( \log(3 - \sqrt{10}) \)
3. \( \log(6 + \sqrt{10}) \)
4. 1

Which of the following is NOT true for the complex numbers \( z_1 \) and \( z_2 \)?

Options:
\[ \frac{z_1}{z_2} = \frac{z_1 \overline{z_2}}{|z_2|^2} \]
1. 
2. \[ |z_1 + z_2| \leq |z_1| + |z_2| \]

3. \[ |z_1 + z_2| \leq |z_1| - |z_2| \]

4. \[ |z_1 + z_2|^2 + |z_1 - z_2|^2 = 2|z_1|^2 + 2|z_2|^2 \]

Question Number : 16  Question Id : 8946582620  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If a complex number \( z = \frac{\sqrt{3}}{2} + \frac{i}{2} \), then \( z^4 \) is __________.

Options :
1. \( 2\sqrt{2} + 2i \)
2. \( -1 + i\frac{\sqrt{3}}{2} \)
3. \( \frac{\sqrt{3}}{2} - i\frac{1}{2} \)
4. \( \frac{\sqrt{3}}{8} - i\frac{1}{8} \)

Question Number : 17  Question Id : 8946582621  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The equation of the straight line which makes intercepts \( r \) and \( s \) on the coordinate axes such that \( r + s = 5 \) and \( rs = 6 \) is \( ax + by + c = 0 \), then \( a + b + c = \) ———.

Options :
1. 11
2. 5
3. \(-7\)

4. \(-1\)

If a straight line \(ax + by + \sqrt{5} = 0\) touches the circle \(x^2 + y^2 = 5\), then which of the following is TRUE?

Options:
1. \(5(a^2 + b^2) = 1\)
2. \(a^2 + b^2 = \sqrt{5}\)
3. \(a^2 + b^2 = 1\)
4. \(\sqrt{a^2 + b^2} = 5\)

If a chord of length 12 cm is at a distance of \(4\sqrt{10}\) cm from the centre of the circle, then the radius of the circle is ______.

Options:
1. \(14\) cm
2. \(\sqrt{304}\) cm
3. \(4\) cm
4. \(\sqrt{124}\) cm
The 2019th derivative of the function \((x - 1)e^{-x}\) is ________.

Options:
1. \(\frac{x - 2019}{e^x}\)
2. \(\frac{2019 - x}{e^x}\)
3. \(\frac{x - 2020}{e^x}\)
4. \(\frac{2020 - x}{e^x}\)

If \(z = f(x + ct) + \varphi(x - ct)\), then \(\frac{\partial^2 z}{\partial t^2} = \) ________.

Options:
1. \(c^2 \frac{\partial^3 z}{\partial x^2}\)
2. \(-c^2 \frac{\partial^2 z}{\partial x^2}\)
3. \(\frac{1}{c^2} \frac{\partial^2 z}{\partial x^2}\)
4. \(-\frac{1}{c^2} \frac{\partial^2 z}{\partial x^2}\)
If \( x = r \cos \theta \), \( y = r \sin \theta \) and \( U = \frac{f(\theta)}{r} \) then \( x \frac{\partial U}{\partial x} + y \frac{\partial U}{\partial y} = \) ________.

Options:

1. 0
2. \( U \)
3. \(-U\)
4. \( 2U \)

Let \( f(x + y) = f(x)f(y) \), \( \forall x, y \) and \( f'(0) = 5 \), \( f(2019) = 15 \). Then the value of \( f'(2019) \) is ________.

Options:

1. 3
2. 75
3. \( \frac{1}{3} \)
4. \( \frac{1}{75} \)

The set of values of \( x \) for which the function \( f(x) = 2x^3 - 9x^2 + 12x + 4 \) is increasing is ________.

Options:

1. \( 1 < x < 2 \)
1. \( \forall x \in \mathbb{R} \)

2. \( \mathbb{R} - [1, 2] \)

3. \( x \geq 2 \)

Question Number : 25  Question Id : 8946582629  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[
\lim_{x \to \infty} \left( \log \left( 1 + \frac{x}{2} \right) - \log \left( \frac{x}{2} \right) \right) = \text{_____}.
\]

Options :
1. \( e^2 \)
2. \( \infty \)
3. 1
4. 2

Question Number : 26  Question Id : 8946582630  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( f(x, y, z) = x^3 + x^2 + y^3 + xyz, \ x = e^t, \ y = \cos t, \ z = t^3 \) then \( \frac{df}{dt} \) at \( t = 0 \) is \text{_______}.

Options :
1. 2
2. 4
3. \( e \)
4. 3

Question Number : 27  Question Id : 8946582631  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Which of the following is the value of \[ 5050 \times \frac{\int_0^1 (1-(1-x)^{50})^{100} x^{49} \, dx}{\int_0^1 (1-x^{50})^{101} x^{49} \, dx} \]?

Options:
1. 5100
2. 1
3. 5050
4. \[ \frac{1}{2} \]

\[ \int_0^1 \max \left\{ x, \frac{1}{2} - x \right\} \, dx = \ldots. \]

Options:
1. 0
2. \[ \frac{1}{2} \]
3. \[ \frac{9}{16} \]
4. \[ \frac{9}{8} \]

\[ \lim_{n \to \infty} \frac{1}{n^6} \sum_{k=1}^n k^5 = \ldots. \]

Options:
\[ \int_{-1}^{1} \frac{x^{15}(1-x^2)^{12}}{(1+x^2)^8} \, dx = \quad \text{________.} \]

Options:

1. 0

2. \( \frac{22}{7} - \pi \)

3. \( \frac{2}{105} \)

4. \( \frac{71}{15} - \frac{3\pi}{4} \)

The area of the region bounded by the curves \( y = 2 - x^2 \) and \( y = -x \) is \( \underline{______} \).

Options:

1. 1

2. \( \frac{8}{19} \)
3. \[
\frac{35}{4}
\]

4. \[
\frac{27}{6}
\]

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**Question 32**

The volume of the solid obtained by revolving the region bounded by the curves 
\[ y = x^3, \quad y = 8 \quad \text{and} \quad x = 0 \] 
about the y-axis is \[
\text{______}
\]

**Options**:

1. \[
\frac{96}{5}
\]

2. \[
\frac{96\pi}{5}
\]

3. \[
\frac{32\pi}{5}
\]

4. \[
\frac{32}{5}
\]

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**Question 33**

The value of \[
\int_0^\pi \theta \sin^3 \theta \cos^4 \theta \, d\theta
\] is \[
\text{______}
\]

**Options**:

1. \[
\frac{\pi^2}{32}
\]

2. \[
\frac{\pi}{32}
\]

3. \[
\frac{\pi^3}{16}
\]
The average value of the function \( f(x) = 4 - x^2 \) over the interval \([-1, 3]\) is ______.

Options:
1. \( \frac{20}{3} \)
2. \( \frac{5}{3} \)
3. \( 5 \)
4. \( 1 \)

The differential equation \( x \frac{dy}{dx} = y + x^2, \ x > 0 \) satisfying \( y(0) = 0 \) has __________.

Options:
1. infinitely many solutions
2. no solution
3. a unique solution
4. exactly two solutions

The differential equation \( (a \ y^3 + y \cos x) \, dx + (x^2 \ y^2 + b \sin x) \, dy = 0 \) is an exact differential equation for __________.

Options:
1. \( a = 1, \ b = \frac{3}{2} \)

2. \( a = \frac{3}{2}, \ b = 1 \)

3. \( a = \frac{2}{3}, \ b = 1 \)

4. \( a = 1, \ b = \frac{2}{3} \)

Question Number : 37  Question Id : 8946582641  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( \sin x \) is a solution of the differential equation \( \frac{d^4 y}{dx^4} + 2 \frac{d^3 y}{dx^3} + 6 \frac{d^2 y}{dx^2} + 2 \frac{dy}{dx} + 5 y = 0 \),
then the general solution is ________________.

Options :

1. \( y = c_1 \sin x + c_2 \cos x + e^{-x}(c_3 \sin 2x + c_4 \cos 2x) \)

2. \( y = c_1 \sin x + c_2 \cos x + c_3 \sin 2x + c_4 \cos 2x \)

3. \( y = c_1 \sin x + c_2 \cos x + c_3 e^{-3x} + c_4 e^{-2x} \)

4. \( y = c_1 \sin x + c_2 \cos x + c_3 e^{3x} + c_4 e^{2x} \)

Question Number : 38  Question Id : 8946582642  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( D = \frac{d}{dx} \), then \( \frac{1}{D^2 - 4D + 13}(6e^{3x} \sin 3x) \) is ___________.

Options :

1. \( -xe^{3x} \cos 3x \)
2. $xe^{2x} \cos 3x$
3. $-xe^{2x} \sin 3x$
4. $xe^{2x} \sin 3x$

The general solution of \( \left( \frac{e^{-2\sqrt{x}}}{\sqrt{x}} - \frac{y}{\sqrt{x}} \right) \frac{dx}{dy} = 1 \) is ________.

Options:
1. \( y = e^{2\sqrt{x}} (2\sqrt{x} + c) \)
2. \( y = 2\sqrt{x} e^{2\sqrt{x}} + c \)
3. \( y = 2\sqrt{x} e^{-2\sqrt{x}} + c \)
4. \( y = e^{-2\sqrt{x}} (2\sqrt{x} + c) \)

Let \( y \) be the solution of the differential equation \( \frac{dy}{dx} + y = x, \ x \in \mathbb{R} \) and \( y(-1) = 0 \).

Then, \( y(1) \) is equal to ________.

Options:
1. \( \frac{2}{e} - \frac{2}{e^2} \)
2. \( 2e^{-2} \)
3. \[2 - \frac{2}{e}\]

4. \[2 - 2e\]

Question Number : 41  Question Id : 8946582645  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If the substitution \(x = X + h, \; y = Y + k\) transforms the differential equation \((y - x + 1)\frac{dy}{dx} - (y + x + 2)dx = 0\) into a homogeneous equation, then the value of \((h, k)\) is \[\underline{\text{__________}}\].

Options :
1. \(\left(\frac{1}{2}, \frac{3}{2}\right)\)
2. \(\left(\frac{-1}{2}, \frac{-3}{2}\right)\)
3. \(\left(\frac{3}{2}, \frac{1}{2}\right)\)
4. \(\left(\frac{-3}{2}, \frac{-1}{2}\right)\)

Question Number : 42  Question Id : 8946582646  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The general solution of \[\frac{dy}{dx} - y = y^2(\sin x + \cos x)\] is \[\underline{\text{__________}}\].

Options :
1. \[y = \frac{1}{ce^x - \sin x}\]
2. \[y = ce^{-x} - e^x \sin x\]
3. 
\[ y = ce^{-x} - \sin x \]

4. 
\[ y = \frac{1}{ce^{-x} - \sin x} \]

Question Number : 43  Question Id : 8946582647  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The Laplace transform of the function 
\[ f(t) = \begin{cases} 
\sin t, & \text{for } 0 \leq t \leq \pi \\
0, & \text{for } t > \pi 
\end{cases} \]

is ________________.

Options :
1. \[ \frac{1}{(1+s^2)} \text{ for all } s > 0 \]

2. \[ \frac{1}{(1+s^2)} \text{ for all } s < \pi \]

3. \[ \frac{(1+e^{-\pi s})}{(1+s^2)} \text{ for all } s > 0 \]

4. \[ \frac{e^{-\pi s}}{(1+s^2)} \text{ for all } s > 0 \]

Question Number : 44  Question Id : 8946582648  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The inverse Laplace transform of 
\[ \frac{5}{s} - \frac{3e^{-3s}}{s} - \frac{2e^{-7s}}{s} \]

is ________________.

Options :
1. 
\[ f(x) = \begin{cases} 
5, & 0 < x < 3 \\
0, & 3 < x < 7 \\
2, & x > 7 
\end{cases} \]
2. \[ f(x) = \begin{cases} 
5, & 0 < x < 7 \\
2, & x > 7 
\end{cases} \]

3. \[ f(x) = \begin{cases} 
5, & 0 < x < 3 \\
2, & 3 < x < 7 \\
0, & x > 7 
\end{cases} \]

4. \[ f(x) = \begin{cases} 
5, & 0 < x < 7 \\
0, & x > 7 
\end{cases} \]

Question Number : 45 Question Id : 8946582649 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The Laplace transform of a function \( f(x) \) is \( F(s) = \frac{1}{s^3 + 2s^2 + 2s} \) Then, \( \lim_{x \to 0} f(x) = \) 

Options :

1. 0
2. 3
3. \( \infty \)
4. \( \frac{1}{2} \)

Question Number : 46 Question Id : 8946582650 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The Laplace transform of the solution of the differential equation \( \frac{dy}{dx} - 2y = e^{5x} \) with the initial condition \( y(0) = 3 \) is ________.

Options :
\[ \frac{1}{3(s-2)} + \frac{1}{3(s-5)} \]

\[ \frac{8}{3(s-2)} + \frac{1}{s-5} \]

\[ \frac{8}{3(s-2)} + \frac{1}{3(s-5)} \]

\[ \frac{8}{s-2} + \frac{1}{3(s-5)} \]

Question Number : 47 Question Id : 8946582651 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If \( L(y(x)) = Y(s) \) and \( y(x) = x^3 + \int_0^x \sin(x-t)y(t)dt \) then \( \frac{1}{6} Y(s) = \) ________.

Options :

1. \( \left( \frac{1}{s^4} + \frac{1}{s^6} \right) \)

2. \( \left( \frac{1}{s^3} + \frac{1}{s^5} \right) \)

3. \( \left( \frac{1}{s^3} + \frac{1}{s^7} \right) \)

4. \( \left( \frac{1}{s} + \frac{1}{s^3} \right) \)

Question Number : 48 Question Id : 8946582652 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For \( x > 0 \), \( \int_0^\infty \frac{\sin xt}{t} dt \) is ________.

Options :
1. \( \frac{\pi}{2x} \)

2. \( \frac{1}{x} \)

3. \( \frac{\pi}{2} \)

Question Number: 49  Question Id: 8946582653  Question Type: MCQ  Option Shuffling: Yes  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

If \( f(x) = \frac{1}{2}a_0 + \sum_{n=1}^{\infty} (a_n \cos nx + b_n \sin nx) \) is the Fourier series of the function

\[
f(x) = \begin{cases} 
0, & -\pi < x < 0 \\
\pi, & 0 \leq x \leq \pi
\end{cases}
\]

then, which of the following is TRUE?

Options:

1. \( a_n = 0, \) for all \( n \geq 0 \)

2. \( a_0 = \frac{\pi}{2} \) and \( a_n = 0, \) for all \( n \geq 1 \)

3. \( b_n \neq 0, \) for all \( n \geq 1 \)

4. \( a_0 = \pi \) and \( a_n = 0, \) for all \( n \geq 1 \)

Question Number: 50  Question Id: 8946582654  Question Type: MCQ  Option Shuffling: Yes  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

A function \( f(x) \) is such that \( f(x + 2\pi) = f(x) \) and \( f(x) = x, -\pi \leq x \leq \pi. \) The Fourier series of \( f(x) \) is ____________.

Options:
\[ 2\left(\sin x - \frac{1}{2}\sin 2x + \frac{1}{3}\sin 3x - \ldots\right) \]

\[ 2\left(\sin x + \frac{1}{2}\sin 2x + \frac{1}{3}\sin 3x + \ldots\right) \]

\[ 2\left(\cos x - \frac{1}{2}\cos 2x + \frac{1}{3}\cos 3x - \ldots\right) \]

\[ 2\left(\cos x + \frac{1}{2}\cos 2x + \frac{1}{3}\cos 3x + \ldots\right) \]

The dimensional formula for gravitational constant is \( \underline{\text{1. } L^3T^{-2}M^{-1}} \)

The dimensions of the quantities in one of the following pairs are same. Identify the pairs.
1. torque and work
2. angular momentum and work
3. energy and Young’s modules
4. light year and wavelength

Which of the following is not correct?

Options:
1. \( j \times i = -k \)
2. \( k \times j = -i \)
3. \( i \times k = -j \)
4. \( k \times i = -j \)

If \( 0.5 \, i + 0.8 \, j + c \, k \) is a unit vector then \( c \) is______.

Options:
1. \( \sqrt{0.89} \)
2. 0.2
3. 0.3
4. \( \sqrt{0.11} \)
Which of the following is correct?

Options:

1. $A.B \neq B.A$

2. $A.(B+C) = A.B + C.A$

3. $A.B = A.B - A.C$

4. $A.B = -B.A$

The acceleration due to gravity on the surface of the earth is given by______.

Options:

1. $G$

2. $GM/R^2$

3. $GM/R$

4. $GM$

The value of $g$ is maximum at______.

Options:

1. equator

2. Pole

3. higher altitudes
at the centre of the earth

4.

Question Number : 58  Question Id : 8946582662  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
When the speed of rotation of earth increases your weight_______

Options :

1. increases

2. decreases

3. remains constant

4. becomes zero

Question Number : 59  Question Id : 8946582663  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
The value of G is zero at _______

Options :

1. nowhere

2. the centre of the earth

3. surface of the earth

4. pole

Question Number : 60  Question Id : 8946582664  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
If the linear momentum is increased by 50%, the kinetic energy will be increased by_______

Options :

1. 50%
2. 100%

3. 125%

4. 25%

A metallic block slides down a smooth inclined plane when released from the top, while the other falls freely from the same point, then ______.

Options:
1. both will reach the ground with the same velocity
2. both will reach the ground together
3. both will reach the ground travelling with same acceleration
4. the block sliding down the plane will strike earlier

A long spring is stretched by 2 cm and its potential energy is u. If the spring is stretched by 10 cm, then the potential energy stored in it will be ______.

Options:
1. u/24
2. u/5
3. 5u
4. 25u
Two masses of 1 gm and 4 gm are moving with equal kinetic energies. The ratio of the magnitudes of their linear momentum is _______.

Options:
1. 4:1
2. $\sqrt{2}:1$
3. 1:2
4. 1:16

A body is dropped from rest at height 0.5 m. What will be its velocity when it just strikes the ground?

Options:
1. 7 m/s
2. 9.8 m/s
3. 4.9 m/s
4. $\sqrt{9.8}$ m/s

A particle moves such that its acceleration $a$ is given by $a = -bx$ where $x$ is the displacement from equilibrium and $b$ is a constant. The period of Oscillation is _______.

Options:
1. $2\pi b$
2. \(2\pi\sqrt{b}\)

3. \(2\pi/b\)

4. \(2\sqrt{\pi}/b\)

Question Number : 66  Question Id : 8946582670  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A particle is vibrating in simple harmonic motion with amplitude of 4 cm. At what displacement from the equilibrium position is its energy half potential and half kinetic?

Options:
1. 1 cm
2. \(\sqrt{2}\) cm
3. 2 cm
4. \(2\sqrt{2}\) cm

Question Number : 67  Question Id : 8946582671  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

When a star approaches the earth, the waves are shifted towards ________

Options:
1. green colour
2. yellow colour
3. blue end
4. red end

Question Number : 68  Question Id : 8946582672  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
If a tuning fork of frequency 90 is sounded and moved towards an observer with a velocity equal to one tenth the velocity of sound, then the note heard by the observer will have frequency______.

Options:
1. 100
2. 90
3. 80
4. 900

What is the most important factor which helps to recognise a person by his/her voice alone______

Options:
1. quality
2. pitch
3. intensity
4. quality, pitch and intensity

The quality of tone______

Options:
1. decreases with loudness
2. varies inversely as amplitude
3. varies directly as pitch

4. depends on the overtones present

Question Number : 71  Question Id : 8946582675  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The conduction of heat from hot body to cold body is an example of___________.

Options :
1. reversible process

2. irreversible process

3. isothermal process

4. isobaric process

Question Number : 72  Question Id : 8946582676  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

From the isothermal drawn from Andrews experiment, it can be inferred that_______

Options :
1. CO₂ is a perfect gas

2. there is continuity of state

3. there is discontinuity of state

4. gases like CO₂ and H₂ cannot be liquefied

Question Number : 73  Question Id : 8946582677  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A diesel cycle works at_______

Options :
constant volume

constant pressure

constant temperature

both constant volume and constant temperature

The transition temperature of most low temperature superconducting elements is in the range of _______.

Options:
1. zero to 10 k
2. 10 k to 20 k
3. 20 k to 50 k
4. 50 k alone

Propagation of light through fiber core is due to _______.

Options:
1. diffraction
2. interference
3. total internal reflection
4. reflection
Question Number : 76  Question Id : 8946582680  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which of the following energy orders is correct?

Options :
1. \(6s < 4f < 5d < 6p\)
2. \(4f < 5d < 6s < 6p\)
3. \(4f < 6s < 6p < 5d\)
4. \(6s < 6p < 5d < 4f\)

Question Number : 77  Question Id : 8946582681  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

An element A of atomic number 11 combines with an element B of atomic number 17. The compound formed is ____________.

Options :
1. Covalent AB
2. Ionic AB
3. Covalent AB₂
4. Ionic AB₂

Question Number : 78  Question Id : 8946582682  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The oxidation number of ‘S’ in \(S_8\), \(S_2F_2\), \(H_2S\) respectively are ____________.

Options :
1. 0, +1 and -2
The elements A, B, C and D have the following electronic configurations:

A: \(1s^2, 2s^2, 2p^1\)

B: \(1s^2, 2s^2, 2p^6, 3s^2, 3p^1\)

C: \(1s^2, 2s^2, 2p^6, 3s^2, 3p^3\)

D: \(1s^2, 2s^2, 2p^6, 3s^2, 3p^5\)

The elements that belong to same group are ________.

Options:
1. A and C
2. C and D
3. A and D
4. A and B

4.9 gm of \(H_2SO_4\) is present in 2 lit of its solution. The molarity of the solution is ________.

Options:
1. 0.1 M
2. 0.025 M
3. 0.25 M
4. 0.01 M

Question Number : 81  Question Id : 8946582685  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
The molecular weight of $\text{H}_3\text{PO}_4$ is 98. The equivalent weight is _________ gram / equivalents.

Options :
1. 98
2. 49
3. 32.66
4. 24.5

Question Number : 82  Question Id : 8946582686  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Which of the following is the Bronsted acid?

Options :
1. $\text{Cl}^-$
2. $\text{NH}_2^-$
3. $\text{CH}_3\text{COO}^-$
4. $\text{NH}_4^+$
The pH of 1 M KOH is _____.

Options:
1. 12
2. 11
3. 14
4. 13

The froth flotation process is used for the ________.

Options:
1. Oxide ores
2. Sulphide ores
3. Chloride ores
4. Oxide ores and Chloride ores

The composition of brass is ________.

Options:
1. Cu and Zn
2. Cu and Ni
3. Cu and Mn
4. 

Which of the following statements is correct?

Options:

1. Cathode is positive terminal in an electrolytic cell

2. Cathode is negative terminal in a galvanic cell

3. Reduction occurs at cathode in either of cells

4. Oxidation occurs at cathode in either of cells

In the electrolysis of CuCl₂ solution using copper electrode, if 2.5 gm of Cu is deposited at cathode, then at anode ________________.

Options:

1. 890 mL of Cl₂ at STP is liberated

2. 445 mL of O₂ at STP is liberated

3. 2.5 gm of copper is deposited

4. a decrease of 2.5 gm of mass takes place

The unit of resistivity is ________.

Options:

1. Ω
2. \( \Omega m \)

3. \( \Omega/\text{m} \)

4. \( \Omega \text{ m}^2 \)

Question Number : 89  Question Id : 8946582693  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Which of the following metals provide cathodic protection to iron?
Options :
1. Cu and Ni
2. Al and Zn
3. Al and Cu
4. Co and Ni

Question Number : 90  Question Id : 8946582694  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
The chemical composition of rust is __________.
Options :
1. \( \text{Fe}_3\text{O}_4 \)
2. \( \text{Fe}_3\text{O}_3 \)
3. \( \text{Fe}_2\text{O}_3 \cdot n\text{H}_2\text{O} \)
4. \( \text{Fe}_3\text{O}_3 \cdot x\text{H}_2\text{O} \)

Question Number : 91  Question Id : 8946582695  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
1 ppm of hardness of water is equal to ________________.
Options :
1. 1 part of CaCO₃ hardness in 10⁶ parts of water
2. 1 part of CaCO₃ hardness in 10⁸ parts of water
3. 1 part of CaCO₃ hardness in 10⁷ parts of water
4. 1 part of CaCO₃ hardness in 10⁵ parts of water

The temporary hardness of water is due to the presence of ____________.

Options:
1. MgCl₂ and CaCl₂
2. Ca(NO₃)₂ and Mg(NO₃)₂
3. CaSO₄ and MgSO₄
4. Ca(HCO₃)₂ and Mg(HCO₃)₂

The basic buffer solution is a mixture of ____________.

Options:
1. NH₃ + NH₄Cl
2. HCl + NH₄Cl
3. NaCl + NH₄Cl
4. KOH + NH₄Cl

The temporary hardness of water is due to the presence of ____________.
Which of the following polymers has amide linkage?

Options:
1. Terylene
2. Bakelite
3. Nylon
4. PVC

The monomer of natural rubber is ____________.

Options:
1. Butadiene
2. Chloroprene
3. 2-methyl 1,2 butadiene
4. 2-methyl 1,3 butadiene

Which of the following is a thermo setting?

Options:
1. Bakelite
2. Polyethylene
3. Nylon-6
4. Natural rubber
Question Number : 97  Question Id : 8946582701  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The composition of water gas is ____________________.

Options:

1. CO and H₂ are combustible gases and CO₂ and N₂ are non-combustible gases

2. CO + CO₂ are combustible gases and H₂O and N₂ non-combustible gases

3. CO + N₂ are combustible gases and H₂O and H₂ are non-combustible gases

4. N₂+H₂ are combustible gases and CO + H₂O are non-combustible gases

Question Number : 98  Question Id : 8946582702  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Earth is protected from UV radiation by ____________________.

Options:

1. Nitrogen layer

2. Ozone layer

3. Carbon dioxide layer

4. Oxygen layer

Question Number : 99  Question Id : 8946582703  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which of following statements is not correct?

Options:

1. CO is the main air pollutant

2. All pollutants are not wastes

3. Water is polluted by dissolved Oxygen
Lichens are pollution indicators

4. Minamata disease is caused due to the presence of ___________.
   Options:
   1. Cd
   2. Pb
   3. As
   4. Hg

Electronics and Communication Engineering

Number of Questions: 100
Display Number Panel: Yes
Group All Questions: No

The capacitance of a reverse-biased PN-junction ___________.
Options:
1. makes the PN junction more effective at high frequencies
2. increases as the reverse bias is decreased
3. depends mainly on the reverse saturation current
4. increases as the reverse bias is increased

Question Number : 101 Question Id : 8946582705 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Question Number : 102 Question Id : 8946582706 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
The signal handling capacity of an amplifier is high if________

Options:
1. the operating point is selected near the cut-off region
2. the operating point is selected in the middle of the active region
3. the operating point is selected near the saturation region
4. the operating point is on either end of the load line

The output voltage waveform in CE amplifier is __________ with input voltage waveform.

Options:
1. in phase
2. out of phase by 180°
3. out of phase by 90°
4. out of phase by 270°

A radio-frequency signal contains three frequencies as 870 kHz, 875 kHz and 880 kHz. These signals need to be amplified. The amplifier used should be ________.

Options:
1. audio-frequency amplifier
2. wide-band amplifier
3. tuned voltage amplifier
4. push-pull amplifier

The voltage gain of an amplifier is 100. On applying negative feedback with \( \beta = 0.03 \), its gain will reduce to ________.

Options:
1. 3
2. 33.33
3. 99.97
4. 25

The relationship between sweep error \((e_s)\), displacement error \((e_d)\) and transmission error \((e_t)\) in sweep circuit is ____________.

Options:
1. \( e_s = 2e_t = 8e_d \)
2. \( e_s = e_t = e_d \)
3. \( 2e_s = 2e_t = 4e_d \)
4. \( 2e_s = 2e_t = e_d \)

The figure of merit for the diode clipper is ________.

Options:
1. \( \frac{R_s}{R_f} \)

2. \( \frac{R_s}{R_f} \)

3. \( R_s + R_f \)

4. \( R_s - R_f \)

The UJT is ___________.

Options:

1. current controlled negative resistance device

2. voltage controlled negative resistance device

3. current controlled current source

4. voltage controlled current source

The unit for mobility of the electron is ______

Options:

1. Square meter per volt-second

2. Volt per meter-ohm

3. Ohm-meter per volt

4. Volt per ohm-meter
The main component responsible for the fall of gain of an RC-coupled amplifier in low-frequency range is _____________.

Options:
1. stray shunt capacitance
2. the active device itself
3. coupling capacitor
4. load resistor

The network consisting of linear resistors and ideal voltage sources, if the value of resistors are doubled, then voltage across each resistor ______.

Options:
1. increases four times
2. remains unchanged
3. doubled
4. halved

Determine the current, if a 20 coulomb charge passes from a point in 0.25 seconds ______.

Options:
1. 10 A
2. 20 A
3. 2 A
4. 80 A

Question Number : 113  Question Id : 8946582717  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A network is said to be reciprocal, if it satisfies the condition ______

Options :
1. \(Z_{11} = Z_{22}\)
2. \(Z_{12} = Z_{21}\)
3. \(Z_{11} = Z_{12} = 0\)
4. \(Y_{11} = Y_{22}\)

Question Number : 114  Question Id : 8946582718  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Q factor of a coil in series resonance is ______.

Options :
1. \(\frac{1}{w_0RL}\)
2. \(\frac{w_0R}{L}\)
3. \(w_0RL\)
4. \(\frac{w_0L}{R}\)

Question Number : 115  Question Id : 8946582719  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If both roots of second order differential equation for a series RLC circuit are real and equal, then the oscillations are ______.

Options :
1. un damped
2. under damped
3. over damped

4. critically damped

The imaginary part of the complex frequency is called as a/an ________.

Options :
1. angular frequency
2. sampling frequency
3. neper frequency
4. radian frequency

The number of branches incident at the node of a graph is called as the __________.

Options :
1. degree of the node
2. order of the node
3. status of the node
4. number of the node

If the resistors of star connected system are R1, R2, R3, then the resistance between 2 and 3 in delta connected system will be ________.

Options :
1. \((R1R2 + R2R3 + R3R1)/R3\)
2. \((R1R2 + R2R3 + R3R1)/R2\)

3. \((R1R2 + R2R3 + R3R1)/R1\)

4. \((R1R2 + R2R3 + R3R1)/(R3 + R2)\)

The matrix formed by link branches of a tie set matrix is _________.

Options:
1. Row matrix
2. Column matrix
3. Diagonal matrix
4. Identity matrix

What is the range of phase variation for reflection coefficient in the transmission lines?

Options:
1. 0° to 90°
2. 90° to 150°
3. 0° to 180°
4. 90° to 360°

Resistances can be measured with the help of _________.

Options:
1. voltmeters
2. wattmeters
3. ammeters
4. ohmmeters and resistance bridges

Digital voltmeters can be used to measure ________

Options:
1. voltage only
2. voltage, current and resistance
3. voltage and current
4. voltage and resistance

The SYNC control in CRO is used to__________

Options:
1. change the brightness of the beam
2. change the contrast of the beam CRO
3. lock the input signal being viewed
4. adjust the range of frequency

Question Number : 122  Question Id : 8946582726  Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No  Option Orientation : Vertical

Question Number : 123  Question Id : 8946582727  Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No  Option Orientation : Vertical

Question Number : 124  Question Id : 8946582728  Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No  Option Orientation : Vertical
Which of the following units is used to express sensitivity of an analog voltmeter?

Options:
1. ohms
2. voltage
3. no unit
4. ohms per volt

Basic building blocks of digital multimeter are _________

Options:
1. Oscillator and amplifier
2. Diode and Op-Amp
3. Rectifier and Schmitt trigger
4. ADC, attenuator and counter

What is the effect of heat on the resistances in a Wheatstone bridge?

Options:
1. no effect
2. increases the voltage drop across the circuit
3. decreases the current flowing through the circuit
4. causes a permanent change in the resistance values
Which of the following measurement instruments does not have eddy current damping?

Options:
1. repulsion type instrument
2. true RMS volt meter
3. moving iron instrument
4. moving coil instrument

The error of an instrument is normally given as a percentage of _________.

Options:
1. full-scale value
2. measured value
3. mean value
4. RMS value

Which of the following is not an LC oscillator?

Options:
1. Hartley Oscillator
2. Colpitts oscillator
3. Crystal oscillator
4. Clapp oscillator

A practical Q meter consists of __________

Options:
1. Wien bridge oscillator
2. AF oscillator
3. RF oscillator
4. Crystal oscillator

Which of the following is not a basic data type in C language?

Options:
1. float
2. int
3. real
4. char

The program written by the programmer in high level language is called ________

Options:
1. object Program
2. source Program
3. assembled Program

4. compiled Program

Which of these values is not valid as an AUTO_INCREMENT value?

Options:
1. 0
2. 1
3. 2
4. 3

Which function definition will run correctly?

Options:
1. `int sum(int a, int b)`
   `return (a+b)`

2. `int sum(int a, int b)`
   `return (a+b);`

3. `int sum(a, b)`
   `return (a + b);`
4. \text{int (real a, real b) }
   \text{return (a + b);}

**Question Number : 135**  Question Id : 8946582739  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The value obtained in the function is given back to main by using \_\_\_\_\_\_\_ key word.

Options:
1. \text{return}
2. \text{static}
3. \text{new}
4. \text{volatile}

**Question Number : 136**  Question Id : 8946582740  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which of the following concepts make extensive use of arrays?

Options:
1. \text{binary trees}
2. \text{scheduling of processes}
3. \text{caching}
4. \text{spatial locality}

**Question Number : 137**  Question Id : 8946582741  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

In C, if you pass an array as an argument to a function, what does actually get passed?

Options:
1. \text{value of elements in array}
2. first element of the array
3. base address of the array
4. address of the last element of array

If the cathode of an SCR is made positive with respect to the anode and gate current is not applied, then ____________.

Options:
1. all the junctions are reverse biased
2. all the junctions are forward biased
3. only the middle junction is forward biased
4. only the middle junction is reverse biased

In a power transistor, _____ is the controlled parameter.

Options:
1. \( V_{BE} \)
2. \( V_{CE} \)
3. \( I_B \)
4. \( I_C \)
The power rating of a BJT is determined by which of the following?

Options:
1. collector base area
2. base width
3. heat sink
4. emitter base junction area

In single phase induction motor the net torque experienced by the rotor at starting is ___.

Options:
1. high
2. low
3. average
4. zero

What are the names of the windings used in the split phase starting?

Options:
1. main winding and running winding
2. auxiliary windings
3. main winding and starting winding
4. starting and auxiliary windings
In a transformer, which of the following windings has got more cross-sectional area?

Options:
1. copper winding
2. steel winding
3. aluminium winding
4. iron winding

The capability of convention relay systems for complex operations is ________ that of the PLCs.

Options:
1. poorer than
2. better than
3. as good as
4. unpredictable as

In the following statements which is not an advantage of an open loop system?

Options:
1. simplicity in construction and design
2. easy maintenance
3. rare problems of stability
4. recalibration from time to time

Find the efficiency $\eta$ of ordinary AM for 50 percent modulation?

Options:
1. 33.3%
2. 12.5%
3. 22.2%
4. 66.6%

Which of the following antennas is used for TV transmission?

Options:
1. Helical antenna
2. Yagi-uda antenna
3. Turnstile antenna
4. Loop antenna

The product of rise time and 3-dB bandwidth of the low-pass RC filter is_______

Options:
1. 0.35
Find the instantaneous frequency in hertz for the given signal $10 \cos \left(200\pi t + \frac{\pi}{3}\right)$?

Options:
1. 200 Hz
2. $200\pi$ Hz
3. 2000 Hz
4. 100 Hz

Consider an angle-modulated signal

$$S(t) = 10 \cos[\left(10^8\right)\pi t + 5 \sin 2\pi (10^3) t]$$

Find the maximum frequency deviation?

Options:
1. 10 kHz
2. 5 kHz
3. 50 MHz
4. 1 kHz
A carrier is frequency-modulated with a sinusoidal signal of 2 kHz, resulting in a maximum frequency deviation of 5 kHz. Find the bandwidth of the modulated signal?

Options:
1. 14 kHz
2. 10 kHz
3. 3 kHz
4. 7 kHz

Find the Nyquist sampling rate for the given signal 5 \cos(1000\pi t) \cos(4000\pi t)?

Options:
1. 2 kHz
2. 500 Hz
3. 2.5 kHz
4. 5 kHz

Two analog signals m_1(t) and m_2(t) are to be transmitted over a common channel by means of time-division multiplexing. The highest frequency of m_1(t) is 4 kHz and that of m_2(t) is 4.5 kHz. What is the minimum value of the permissible sampling rate?

Options:
1. 4000 samples/s
2. 4500 samples/s
3. 8000 samples/s
4. 9000 samples/s

The function of the quartz delay line in an MTI radar is to_______

Options:
1. delay a sweep so that the next sweep can be subtracted from it
2. match the phase of the coho and the output oscillator
3. match the phase of the coho and the stalo
4. help in subtracting a complete scan from the previous scan

The IF bandwidth of a radar receiver is inversely proportional to the_______

Options:
1. pulse interval
2. square root of the peak transmitted power
3. pulse width
4. pulse repetition frequency

To separate channels in an FDM receiver, it is necessary to use_______

Options:
1. differentiation
2. AND gate
3. integration
4. band pass filters

Question Number : 157  Question Id : 8946582761  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A super heterodyne receiver with an IF of 450 kHz is tuned to a signal at 1000 kHz. The image frequency is _______.

Options :
1. 1000 kHz
2. 450 kHz
3. 1900 kHz
4. 1550 kHz

Question Number : 158  Question Id : 8946582762  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If an 8-level encoding scheme is used in a 10 kHz bandwidth system, then the channel capacity is ____________ bits/s.

Options :
1. 60,000
2. 30,000
3. 80,000
4. 20,000
The most popular satellite frequency range is 4 to 6 GHz and is called the ________ band.

Options:
1. Ku
2. X
3. C
4. S

A circular orbit around the equator with a 24-h period is called as a/an ________.

Options:
1. elliptical orbit
2. geostationary orbit
3. polar orbit
4. transfer orbit

The acronym VCO means__________

Options:
1. variable crystal oscillator
2. variable capacitor oscillator
3. voltage constant oscillator
voltage controlled oscillator

4.

Given the single-tone FM signal: \( S(t) = 20 \cos[(2\pi \times 10^6 t) + 2 \sin(2\pi \times 10^4 t)] \).

What is the bandwidth using Carson’s rule?

Options:

1. 20 kHz
2. 60 kHz
3. 40 kHz
4. 10 kHz

Given the angle-modulated signal: 10 \( \cos[\omega_c t + 2 \sin(2000\pi \tau)] \). Find the average transmitted power?

Options:

1. 100 W
2. 20 W
3. 50 W
4. 10 W

The horizontal radiation pattern of a dipole is a ________

Options:
1. clover leaf
2. narrow beam
3. figure eight
4. circle

Question Number : 165  Question Id : 8946582769  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

During an eclipse, the satellite is powered by _______

Options :
1. batteries
2. solar panels
3. jet engine
4. motors

Question Number : 166  Question Id : 8946582770  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \((292)_{10} = (204)_{b}\), then the possible base \(b\) is _______

Options :
1. 8
2. 12
3. 14
4. 16

Question Number : 167  Question Id : 8946582771  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
De Morgan’s theorem states that

Options:
1. \( \overline{A + B} = \overline{A} \cdot \overline{B} \) and \( \overline{AB} = \overline{A} + \overline{B} \)
2. \( \overline{A + B} = \overline{A} + \overline{B} \) and \( \overline{AB} = \overline{A} \cdot \overline{B} \)
3. \( \overline{A + B} = A + B \) and \( \overline{AB} = AB \)
4. \( \overline{A + B} = \overline{AB} \) and \( \overline{AB} = \overline{A} \cdot \overline{B} \)

How many full-adders are required to construct an N-bit parallel adder?

Options:
1. \( \frac{N}{2} \)
2. \( N-1 \)
3. \( N \)
4. \( N+1 \)

The number of 2-to-4 line decoders required to construct a 3-to-8 line decoder is______.

Options:
1. 1
2. 2
3. 3
4.

**Question Number : 170**  **Question Id : 8946582774**  **Question Type : MCQ**  **Option Shuffling : Yes**  **Display Question Number : Yes**  **Single Line Question Option : No**  **Option Orientation : Vertical**

What is the minimum number of NAND gates required to realize an XOR gate?

Options:
1. 3
2. 4
3. 5
4. 6

**Question Number : 171**  **Question Id : 8946582775**  **Question Type : MCQ**  **Option Shuffling : Yes**  **Display Question Number : Yes**  **Single Line Question Option : No**  **Option Orientation : Vertical**

The race around condition occurs in a J-K flip-flop when _______.

Options:
1. both inputs are 0
2. the inputs are complementary
3. both inputs are 1
4. both inputs are high impedance

**Question Number : 172**  **Question Id : 8946582776**  **Question Type : MCQ**  **Option Shuffling : Yes**  **Display Question Number : Yes**  **Single Line Question Option : No**  **Option Orientation : Vertical**

The minimum number of flip-flops required for a Mod-12 ripple counter is _______.

Options:
1. 3
The logic family which consumes least power is _______.

Options:
1. TTL
2. ECL
3. CMOS
4. IIL

The non-volatile memory is _______.

Options:
1. RAM
2. DRAM
3. Cache memory
4. ROM

The ADC used in digital voltmeters and multimeters is _______.

Options:
counter – type

2. flash type

3. successive-approximation type

4. dual-slope type

The addressing capacity of an 8085 microprocessor is_______.

Options:
1. 64 KB

2. 32 KB

3. 64 MB

4. 64 Bytes

The Priority order of 8085 interrupts are_______.

Options:
1. RST 5.5, RST 6.5, RST 7.5

2. RST 7.5, RST6.5, RST5.5

3. RST6.5, RST 7.5, RST 5.5

4. RST 7.5, RST 5.5, RST6.5
If LXI H, 8054H

LXI B.1276H

DAD B

HLT

What is the result of execution of above piece of code?

Options:
1. HL = 92BA
2. BC = 92CA
3. HL = 9330
4. BC = 9330

The BSR mode control word of 8255 is used _______.

Options:
1. to set port C bits
2. to reset port C bits
3. to set and reset port C bits
4. to set or reset port A bit

RS-232 standard is related to_______.

Options:
serial communication

parallel communication

interrupts

memory

The 8051 microcontroller Architecture is ________. 

Options:
1. Von Neumann
2. Princeton
3. Harvard
4. Super scalar

One machine cycle of 8051 takes ________.

Options:
1. 12 clock cycles
2. 6 clock cycles
3. 4 clock cycles
4. 20 clock cycles
How many modes of operations are there for ports in 8255 PPI?

Options:
1.
2.
3.
4.

Question Number : 184  Question Id : 8946582788  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which of the following is used to program and control the operation of IC 8259?

Options:
1. WR
2. IMR
3. INT
4. RXD

Question Number : 185  Question Id : 8946582789  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

PIC 16F877 on chip program memory size is_______.

Options:
1. 8Kx14 flash type
2. 8Kx14 EPROM type
3. 8Kx8 Flash type
4. 8Kx8 EPROM
In the 625-B monochrome TV system, the number of scanning lines per field is______.  

Options:  
1. 625  
2. 312.5  
3. 311.5  
4. 300

In 525 American monochrome TV system, the duration of front porch is______.  

Options:  
1. 1.27\mu s  
2. 4.7\mu s  
3. 5.7\mu s  
4. 2.0\mu s

In NTSC color TV system, the I and Q signals differ in phase by______.  

Options:  
1. 0^\circ  
2. 90^\circ  
3. 180^\circ
4. 270°

In PAL color TV system, on modulation, the color difference signals are allowed with a bandwidth of _______.

Options:
1. 0.5 MHz
2. 1 MHz
3. 1.3 MHz
4. 1.6 MHz

In SECAM color TV system, which modulation is used to encode chrominance signal?

Options:
1. amplitude
2. angle
3. frequency
4. pulse

In asynchronous serial communication, the physical layer provides_______.

Options:
1. start and stop signalling
2. congestion control

3. error control

4. connection control

Question Number : 192  Question Id : 8946582796  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Wireless transmission can be done via______.

Options :
1. radio waves

2. coaxial cables

3. twister pair

4. optical fibre

Question Number : 193  Question Id : 8946582797  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Bluetooth is the wireless technology for______.

Options :
1. local area network

2. personal area network

3. metropolitan area network

4. wide area network

Question Number : 194  Question Id : 8946582798  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which of the following allows the client to update his/her DNS entry as his/her IP address changes?
1. dynamic DNS

2. mail transfer agent

3. authoritative name server

4. SMTP

Question Number : 195  Question Id : 8946582799  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which multiple access technique is used by IEEE 802.11 standard for wireless LAN?

Options :

1. CDMA

2. CSMA/CA

3. ALOHA

4. GSM

Question Number : 196  Question Id : 8946582800  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A proxy server keeps copies of responses to______

Options :

1. current requests

2. recent requests

3. pending requests

4. received requests
How many OSI layers are covered in the X.25 standard?

Options:
1. three
2. four
3. Two
4. seven

Bank's ATM facility is an example of______.

Options:
1. LAN
2. WAN
3. Mixed networking
4. Multipurpose networking

Frames from one LAN can be transmitted to another LAN via the device______.

Options:
1. router
2. bridge
3. repeater
When a router cannot route a datagram, datagram is discarded and sends a message to source i.e., ________________.

Options:
1. destination unreachable
2. destination unverified
3. destination unavailable
4. destination no-entry