Question Number : 1  Question Id : 8946583809  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 \[ \_\_\_\_. \]

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

Question Number : 2  Question Id : 8946583810  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 \( A^2 + B^2 = \_\_\_\_. \)

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

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

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

Question Number : 7  Question Id : 8946583815  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. 1
2. \[ \frac{1}{2} \]
3. \[ \frac{-1}{2} \]
4. 0

Question Number : 8  Question Id : 8946583816  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 \( \ldots \).

Options:
1. \( \sqrt{3} \)
2. \[ \frac{\sqrt{3}}{2} \]
3. \( \frac{1}{2} \)

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

Question Number : 9  Question Id : 8946583817  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

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

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

Question Number : 10  Question Id : 8946583818  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( \sin(x^\circ + 28^\circ) = \cos(3x^\circ - 78^\circ) \) 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. \( 8^\circ \)
If \( x = \tan\left(\csc^{-1}\frac{65}{63}\right) \) and \( y = \sec^2\left(\cot^{-1}\frac{1}{2}\right) + \cos\sec^2\left(\tan^{-1}\frac{1}{3}\right) \), then \((x, y) = \underline{\text{_______}}\).

Options:
1. \(\left(\frac{63}{16}, 15\right)\)
2. \(\left(\frac{16}{63}, 15\right)\)
3. \(\left(\frac{63}{16}, 5\right)\)
4. \(\left(\frac{16}{63}, 5\right)\)

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

Options:
1. unique solution \(x = 2\)
2. two solutions \(x = 1, 2\)
3. no solution
4. infinite number of solutions
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 \( \text{______} \).

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

If $\sin \theta = 3$ then $x = \text{__________}$.

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 : 8946583824  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If a complex number $z = \frac{\sqrt{3}}{2} + i \frac{1}{2}$, then $z^4$ is __________.

Options:

1. $2\sqrt{2} + 2i$

2. $\frac{-1}{2} + i \frac{\sqrt{3}}{2}$

3. $\frac{\sqrt{3}}{2} - i \frac{1}{2}$

4. $\frac{\sqrt{3}}{8} - i \frac{1}{8}$

---

Question Number : 17  Question Id : 8946583825  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. \(-1\)

**Question Number : 18  Question Id : 8946583826  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

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. \(\sqrt{a^2 + b^2} = 5\)

**Question Number : 19  Question Id : 8946583827  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

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:

\[
\frac{x - 2019}{e^x}
\]

1.

\[
\frac{2019 - x}{e^x}
\]

2.

\[
\frac{x - 2020}{e^x}
\]

3.

\[
\frac{2020 - x}{e^x}
\]

4.

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

Options:

\[
\frac{c^2 \partial^2 z}{\partial x^2}
\]

1.

\[
-\frac{c^2 \partial^2 z}{\partial x^2}
\]

2.

\[
\frac{1}{c^2} \frac{\partial^2 z}{\partial x^2}
\]

3.

\[
-\frac{1}{c^2} \frac{\partial^2 z}{\partial x^2}
\]

4.
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. \( 1 < x < 2 \)
all $x \in \mathbb{R}$

$\mathbb{R} - [1, 2]$

$x \geq 2$

Question Number : 25  Question Id : 8946583833  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

$$\lim_{x \to \infty} \left( \log \left( 1 + \frac{x}{2} \right) - \log \left( \frac{x}{2} \right) \right) = \ldots$$

Options :

1. $e^2$

2. $\infty$

3. 1

4. 2

Question Number : 26  Question Id : 8946583834  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

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

Options :

1. 2

2. 4

3. $e$

4. 3

Question Number : 27  Question Id : 8946583835  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. \( \frac{1}{2} \)

Question Number : 29 Question Id : 8946583837 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

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

Options:
1. \frac{1}{6}

2. \frac{1}{5}

3. 1

4. 6

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

Options :

1. 0

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

3. \frac{2}{105}

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

---

Question Number : 31  Question Id : 8946583839  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

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

Options :

1. 1

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

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

Question Number : 32  Question Id : 8946583840  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The volume of the solid obtained by revolving the region bounded by the curves \( y = x^3, \ y = 8 \) and \( x = 0 \) about the \( y \)-axis is ________

Options :

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

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

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

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

Question Number : 33  Question Id : 8946583841  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The value of \[
\int_{\theta=0}^{\pi} \theta \sin^2 \theta \cos^4 \theta \, d\theta
\]

is ________

Options :

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

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

3. \[
\frac{\pi^3}{16}
\]
4. \( \frac{\pi}{16} \)

Question Number : 34  Question Id : 8946583842  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The average value of the function \( f(x) = 4 - x^2 \) over the interval \([-1, 3]\) is _____.

Options :

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

Question Number : 35  Question Id : 8946583843  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

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

Options :

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

Question Number : 36  Question Id : 8946583844  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The differential equation \( (a xy^3 + y \cos x) \, dx + (x^2 y^3 + b \sin x) \, dy = 0 \) 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 : 8946583845  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 \( \frac{d^4 y}{dx^4} + 2 \frac{d^3 y}{dx^3} + 6 \frac{d^2 y}{dx^2} + 2 \frac{dy}{dx} + 5y = 0 \),

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

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

**Question Number : 38  Question Id : 8946583846  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

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

Options :

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

3. \( -xe^x \sin 3x \)

4. \( xe^x \sin 3x \)

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. \[ \frac{2}{e} \]

4. \[ 2 - 2e \]

**Question Number : 41  Question Id : 8946583849  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 \[ \underline{__________}. \]

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 : 8946583850  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 \[ \underline{__________}. \]

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

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

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 \underline{\phantom{123456789}}.

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 : 8946583852  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 \underline{\phantom{123456789}}.

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 : 8946583853  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 : 8946583854  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 :
1. \[\frac{1}{3(s-2)} + \frac{1}{3(s-5)}\]

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

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

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

**Question Number : 47  Question Id : 8946583855  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. \( \left( \frac{1}{s^2} + \frac{1}{s^7} \right) \)

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

**Question Number : 48  Question Id : 8946583856  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. \[ \frac{\pi}{2} \]

4. \[ \frac{\pi}{x} \]

---

Question Number : 49  Question Id : 8946583857  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

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

then, which of the following is TRUE?

Options :

1. \[ a_n = 0, \text{ for all } n \geq 0 \]

2. \[ a_0 = \frac{\pi}{2} \text{ and } a_n = 0, \text{ for all } n \geq 1 \]

3. \[ b_n \neq 0, \text{ for all } n \geq 1 \]

4. \[ a_0 = \pi \text{ and } a_n = 0, \text{ for all } n \geq 1 \]

---

Question Number : 50  Question Id : 8946583858  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 :
1. \(2(\sin x - \frac{1}{2}\sin 2x + \frac{1}{3}\sin 3x - \ldots)\)

2. \(2(\sin x + \frac{1}{2}\sin 2x + \frac{1}{3}\sin 3x + \ldots)\)

3. \(2(\cos x - \frac{1}{2}\cos 2x + \frac{1}{3}\cos 3x - \ldots)\)

4. \(2(\cos x + \frac{1}{2}\cos 2x + \frac{1}{3}\cos 3x + \ldots)\)

The dimensional formula for gravitational constant is_______.

Options:
1. \(L^3T^{-2}M^{-1}\)
2. \(L^3T^2M^{-1}\)
3. \(L^2T^3M^{-2}\)
4. \(L^3T^1M^{-3}\)
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. \[ \sqrt{0.11} \]

Question Number : 53  Question Id : 8946583861  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Question Number : 54  Question Id : 8946583862  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Question Number : 55  Question Id : 8946583863  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Which of the following is correct?

Options:
1. \( A \neq B \cdot A \)
2. \( A(B + C) = A \cdot B + C \cdot A \)
3. \( A \cdot B = A \cdot B - A \cdot C \)
4. \( A \cdot B = -B \cdot A \)

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

Options:
1. \( G \)
2. \( \frac{GM}{R^2} \)
3. \( \frac{GM}{R} \)
4. \( GM \)

The value of \( g \) is maximum at______.

Options:
1. equator
2. pole
3. higher altitudes
4.

at the centre of the earth

Question Number : 58  Question Id : 8946583866  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
   remains constant
3. becomes zero

Question Number : 59  Question Id : 8946583867  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 : 8946583868  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%

Question Number : 61  Question Id : 8946583869  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

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

Question Number : 62  Question Id : 8946583870  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

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 : 8946583874  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 : 8946583875  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 : 8946583876  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 : 8946583879  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 : 8946583880  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 : 8946583881  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A diesel cycle works at______

Options:
1. constant volume
2. constant pressure
3. constant temperature
4. 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
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. $6s < 6p < 5d < 4f$

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 AB$_2$
4. Ionic AB$_2$

The oxidation number of ‘S’ in S$_8$, S$_2$F$_2$, H$_2$S respectively are ____________.

Options:
1. 0, +1 and -2
2. +2, +1 and -2
3. 0, +1 and +2
-2, +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\(_2\)SO\(_4\) is present in 2 lit of its solution. The molarity of the solution is ________.

Options:
1. 0.1 M
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

Which of the following is the Bronsted acid?

Options:
1. $\text{Cl}^-$
2. $\text{NH}_2^-$
3. $\text{CH}_3\text{COO}^-$
4. $\text{NH}_4^+$
Question Number : 83  Question Id : 8946583891  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The pH of 1 M KOH is _____.

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

Question Number : 84  Question Id : 8946583892  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Froth floatation process is used for the ________.

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

Question Number : 85  Question Id : 8946583893  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The composition of brass is ________.

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

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. $\Omega / m$
4. $\Omega m^2$

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

The chemical composition of rust is ___________.
Options:
1. Fe$_3$O$_4$
2. Fe$_3$O$_3$
3. Fe$_2$O$_3$, nH$_2$O
4. Fe$_3$O$_3$, xH$_2$O

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
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
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

Earth is protected from UV radiation by ____________________.

Options:
1. Nitrogen layer
2. Ozone layer
3. Carbon dioxide layer
4. Oxygen layer

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

Computer Science and Engineering

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

Question Number : 101  Question Id : 8946583909  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Match the following:

<table>
<thead>
<tr>
<th>List I</th>
<th>List II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 8251A</td>
<td>(i) Programmable Peripheral Interface</td>
</tr>
<tr>
<td>(b) 8255A</td>
<td>(ii) Programmable Interface Controller</td>
</tr>
<tr>
<td>(c) 8259A</td>
<td>(iii) Programmable Communication Interface</td>
</tr>
</tbody>
</table>

Options:
1. a-i, b-iii, c-ii
2. a-iii, b-ii, c-i
Choose the correct pair of instructions designed to aid the sign-extension process.

Options:
1. CBW and CWD
2. INC and DEC
3. NEG and POS
4. CMP and XGHS

When \( J = K = 1 \), then JK flip-flop functions like a/an ________.

Options:
1. D flip-flop
2. S-R flip-flop
3. NAND gate
4. T flip-flop

Two numbers with digits X and Y and radix 3 and 4 have following relationship:
\( (XY)_3 = (YX)_4 \), then what are the values of X and Y?

Options:
1. \( X = 3 \) and \( Y = 2 \)
2. \( X = 5 \) and \( Y = 4 \)

3. \( X = 1 \) and \( Y = 2 \)

4. \( X = 3 \) and \( Y = 1 \)

Which of the following are employed in digital computers for generating binary control decisions?

Options:
1. combinational circuits
2. sequential circuits
3. binary counters
4. segment registers

Which of the following is the maximum number of prime implicants possible for an \( n \)-variable Boolean function?

Options:
1. \( 2^{n-1} \)
2. \( 2^n \)
3. \( 2^{n+1} \)
4. \( 2^n \)
A simplified form of the Boolean function \( F(A, B, C) = \Sigma(0, 2, 4, 5, 6) \) is _______.

Options:
1. \( F = BC + AC' \)
2. \( F = C' + AB' \)
3. \( F = BC + AC \)
4. \( F = A' + BC \)

Which digital logic family is suitable for circuits that need high component density?

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

According to Flynn’s classification, MISD stands for ____________.

Options:
1. Multiple Input Sequential Data
2. Multiple Instruction stream Single data stream
3. Multiple Input Single Data output
4. Multiple Input Single Data stream
Question Number : 110  Question Id : 8946583918  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A three-input decoder has ________________ outputs.

Options:
1. 4
2. 8
3. 12
4. 6

Question Number : 111  Question Id : 8946583919  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

What is the maximum possible range of sequence for Mod-16 binary up-counter?

Options:
1. 0 to 256
2. 0 to 255
3. 0 to 15
4. 0 to 16

Question Number : 112  Question Id : 8946583920  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which is an implementation technique where the phases of a computer instruction cycle overlap in execution?

Options:
1. context switching
2. vector processing
3. **array processing**

4. **Pipelining**

**Question Number : 113  Question Id : 8946583921  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes**  
**Single Line Question Option : No  Option Orientation : Vertical**

The Intel 8086 processor has __________ bit address space.

Options :
1. 8  
2. 16  
3. 20  
4. 32

**Question Number : 114  Question Id : 8946583922  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes**  
**Single Line Question Option : No  Option Orientation : Vertical**

The Intel 8086 processor has _______ segment registers to point to segments of memory.

Options :
1. 8  
2. 4  
3. 6  
4. 2

**Question Number : 115  Question Id : 8946583923  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes**  
**Single Line Question Option : No  Option Orientation : Vertical**

Which of the following is correct during mode-2 operation of 8255?

Options :
1. port A can be configured as 8-bit I/O port
2. port A can be configured as bidirectional port

3. port B can be configured as bidirectional port

4. port C can be configured as bidirectional port

What are the address lines of the interrupts RST 7 and 8?

Options:
1. 0036 H and 0038H

2. 0030H and 0030H

3. 0032 H and 0034H

4. 0030 H and 0038H

In 80486 processor a _________ way set-associative cache is used for instructions and data.

Options:
1. 2

2. 3

3. 4

4. 5

For 80386 processor, _____ allows the application programmer to organize the main memory in logical modules.

Options:
1. protection

2. input/output

3. bus

4. segmentation

Question Number : 119  Question Id : 8946583927  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

When the word read from memory is an operand, the computer is in ________ cycle.

Options:
1. fetch

2. execute

3. Indirect

4. Empty

Question Number : 120  Question Id : 8946583928  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

What is the content of the simplest type of dynamic RAM cell?

Options:
1. one transistor and one flip-flop

2. only one register and one transistor

3. only one transistor and one capacitor

4. one capacitor and one inductor
What is the purpose of having combinational gates in registers?

Options:

1. to perform data-processing tasks

2. to encode the data

3. to decode the data

4. to encrypt the data

In the ______ mode, the content of the program counter is added to the address part of the instruction to obtain the effective address.

Options:

1. absolute address

2. indexed address

3. auto decrement

4. relative-address

Memory mapped I/O allows the use of _____________ type instructions to access I/O data.

Options:

1. I/O

2. Memory

3. Key board
4.

Question Number : 124  Question Id : 8946583932  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

In ________ controlled I/O, the processor repeatedly polls I/O device.

Options :

1. I/O

2. DMA

3. Program

4. Interrupt

---

Question Number : 125  Question Id : 8946583933  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

In direct memory access the interface transfers data into and out of the memory unit through the ________ bus.

Options :

1. CPU

2. Input

3. Output

4. Memory

---

Question Number : 126  Question Id : 8946583934  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The terms DTE and DCE are connected with which interface device?

Options :

1. 8255
2. 8251
3. 8257
4. 8259

What is the decimal equivalent of the octal number 736.4?

Options:
1. 487.5
2. 463.5
3. 478.5
4. 352.5

-------------- memory systems permit user to construct his/her programs as though he/she had a memory space equal to the totality of the auxiliary memory.

Options:
1. Cache
2. Register
3. I/O
4. Virtual
A ___________ is a collection of one or more variables, possibly of different types grouped together under single name.

Options:

1. structure
2. class
3. object
4. Pointer

Question Number : 130  Question Id : 8946583938  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes
Single Line Question Option : No  Option Orientation : Vertical

The number of values returned by a function is _____.

Options:

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

Question Number : 131  Question Id : 8946583939  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes
Single Line Question Option : No  Option Orientation : Vertical
What is the output of the following program?

```
#include <stdio.h>

int jumble(int x, int y) {
    x = 2*x + y;
    return x;
}

int main()
{
    int x = 2, y = 5;
    x = jumble(y, x); y = jumble(y, x);
    printf("%d\n", y);
    return 0;
}
```

Options :

1. 5
2. 2
3. 22
4. 26

Consider the following program:

```
#include <stdio.h>

int main()
{
    int i = 0;
    int j = sizeof(i++);
    printf("%d %d", i, j);
    return 0;
}
```

What is the output of the program?

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

Which of the following is **not** used as a keyword for storage classes?

Options:
1. `auto`
2. `static`
3. `dynamic`
4. `extern`

Which of the following registers is a 6-byte queue in 8086?

Options:
1. `base pointer`
2. `instruction register`
3. `programme counter`
4. `stack segment register`
Consider the following program:

```c
#include<stdio.h>

int main()
{
    int a=25, b;
    b = a<<1>>2<<2>>3;
    printf("%d", b);
    return 0;
}

What is the output of the program?

Options:

1. 25
2. 6
3. 24
4. 7

The result of evaluating the postfix expression 5 4 + 6 * 8 - 6 + 7 * is _______.

Options:

1. 280
2. 364
3. 481
4. 502
Question Number : 137  Question Id : 8946583945  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

What is the time complexity of the following algorithm when \( n = 2^k \), for some \( k \geq 0 \)?

Algorithm Display(n)
for (i=1; i \leq n; i=i+4)
   for (j=1; j \leq n; j=j*2)
      print "All the Best."

Options :
1. \( \Theta(n^2) \)
2. \( O(n^{1.5}) \)
3. \( \Theta(n \log n) \)
4. \( \Theta((\log n)^2) \)

Question Number : 138  Question Id : 8946583946  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The best-case, the average-case and the worst-case running time of binary search algorithm is ____________ respectively.

Options :
1. \( \Theta(1), \Theta(\log n), \Theta(n) \)
2. \( \Theta(\log n), \Theta(\log n), \Theta(\log n) \)
3. \( \Theta(1), \Theta(1), \Theta(\log n) \)
4. \( \Theta(1), \Theta(\log n), \Theta(\log n) \)

Question Number : 139  Question Id : 8946583947  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which of the following recurrences describes the worst-case running time of quicksort algorithm?
1. \( T(n) = T(n-1) + \Theta(n) \) for \( n \geq 2 \) and \( T(1) = \Theta(1) \)

2. \( T(n) = 2T(n/2) + \Theta(n) \) for \( n \geq 2 \) and \( T(1) = \Theta(1) \)

3. \( T(n) = 2T(n-1) + \Theta(n) \) for \( n \geq 2 \) and \( T(1) = \Theta(1) \)

4. \( T(n) = T(n/2) + \Theta(n) \) for \( n \geq 2 \) and \( T(1) = \Theta(1) \)

Let \( A[1..n] \) be an integer array with \( n \) elements such that each element of \( A \) is at most four positions away from its original position in the sorted order. Which of the following sorting algorithms sorts array \( A \) efficiently?

Options:

1. merge sort

2. insertion sort

3. selection sort

4. bubble sort

In the OSI reference model, a ______ layer manages and synchronizes the conversation between two different applications.

Options:

1. Network

2. session

3. data link
Presentation

4.

Question Number : 142  Question Id : 8946583950  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

How many number of bits for Networks IDs and Host IDs will be available in Class C Network?

Options:
1. 24 and 8
2. 16 and 16
3. 16 and 8
4. 8 and 24

Question Number : 143  Question Id : 8946583951  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The main function of the network layer is routing of _______ from the source machine to the destination machine.

Options:
1. frames
2. wireless
3. packets
4. bit stream

Question Number : 144  Question Id : 8946583952  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

IPv6 addresses are _____ bits long.

Options:
In the OSI reference model, Network layer deals with __________.

Options:
1. IP addressing and subnetting
2. Flow control and IP addressing
3. Classful addressing and congestion control
4. Reliable data transmission and subnetting

User Datagram Protocol (UDP) is an unreliable, __________ protocol for applications that do not want TCPs sequencing.

Options:
1. secure
2. connection less
3. connection oriented
4. control
Which protocol is used for E-Mail server to send a mail?

Options:
1. FTP
2. POP
3. SMTP
4. SNMP

The most common application of the twisted pair is the _______ system.

Options:
1. LAN
2. Wireless
3. Telephone
4. Radio

A _______ cable consists of a stiff copper wire surrounded by an insulated material.

Options:
1. optical
2. coaxial
3. electrical
4. Fibre

Question Number : 150  Question Id : 8946583958  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Using ____________ technique, every incoming packet is sent out on every outgoing line except the one it arrived on.

Options :

1. flow based
2. distance vector
3. flooding
4. link state

Question Number : 151  Question Id : 8946583959  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The shortest Job First scheduling algorithm is provably ____________.

Options :

1. optimal
2. difficult
3. easy
4. Average

Question Number : 152  Question Id : 8946583960  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The degree of multiprogramming is ____________.

Options :

1. the number of processes executed per unit time
2. the number of processes in the ready queue

3. the number of processes in the memory

4. the number of processes in the i/o queue

Question Number : 153  Question Id : 8946583961  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Number of i-nodes in use of Unix file system represents____________.

Options :
1. number of files

2. number of directions

3. number of internal users

4. number of indices

Question Number : 154  Question Id : 8946583962  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Given a logical address with the following format:

<table>
<thead>
<tr>
<th>2 bits</th>
<th>16 bits</th>
<th>8 bits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seg</td>
<td>Page #</td>
<td>Page offset</td>
</tr>
</tbody>
</table>

What is the maximum size of each segment and maximum number of pages per segment?

Options :
1. 16 MB and 64 K

2. 8 MB and 64 K

3. 16 MB and 32 K
8 MB and 32 K

4.

Question Number : 155  Question Id : 8946583963  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
When a device/system attempts to perform two or more operations at the same time on the shared data, the result depends on the order of the usage of shared data is called _____.
Options:
1. critical section
2. starvation
3. race condition
4. deadlock

Question Number : 156  Question Id : 8946583964  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
A process is in ______ state, if it is waiting for an event that will never occur.
Options:
1. deadlock
2. safe
3. unsafe
4. Starvation

Question Number : 157  Question Id : 8946583965  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Resource _________ is one of the methods for eliminating deadlocks.
Options:
1. allocation
preemption

execution

elimination

Operating System performs the following actions when a new process is created:

1. Allocate the memory and other resources to the process
2. Assign process id and priority
3. Create a process control block (PCB) for the process
4. Set up the process environment
5. Initialize resource accounting information for the process.

What would be the correct sequence of the above actions?

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

In which of the following page replacement policies Belady’s anomaly occurs?

Options:
1. FIFO
2. LRU

3. LFU

4. NRU

Question Number : 160  Question Id : 8946583968  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A state is in ______________ state if the system can allocate resources to each process in some order and still avoid a deadlock.

Options :
1. locked

2. concurrent

3. safe

4. unsafe

Question Number : 161  Question Id : 8946583969  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

‘Alter table’ in SQL is one of the following types of command.

Options :
1. DCL command

2. DDL command

3. DML command

4. DAL command

Question Number : 162  Question Id : 8946583970  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
A relation schema $R$ is in ______ normal form if, whenever a nontrivial functional dependency $X \rightarrow A$ holds in $R$, either (a) $X$ is a super key of $R$ or (b) $A$ is a prime attribute of $R$.

Options:

1. 4NF
2. BCNF
3. 3NF
4. 5NF

Which normal form is not based on the concept of functional dependency?

Options:

1. Third normal form
2. Second normal form
3. First normal form
4. Boyce-Codd normal form

A relation $R$ is in Boyce-Codd Normal Form (BCNF) if and only if every determinant is a ____ key.

Options:

1. primary
2. candidate
3.

Auxiliary

4.

Question Number : 165  Question Id : 8946583973  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The conceptual schema insulates users from changes in the physical storage of the data.
This property is referred to as __________

Options :
1. data consistency
2. data insulation
3. logical data independence
4. physical data independence

Question Number : 166  Question Id : 8946583974  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

In an E-R diagram, double ellipse is used to represent __________

Options :
1. multivalued attribute
2. composite attribute
3. weak entity set
4. identifying relationship set

Question Number : 167  Question Id : 8946583975  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The __________ operation between two relations ‘r’ and ‘s’ produces a relation with tuples which are in ‘r’ but not in ‘s’?
intersection

set difference

cartesian product

division

What will be the result of the following SQL query?

SELECT S.sid FROM sailors S
WHERE S.rating >= ALL (SELECT S2.sid FROM sailors S2)

Options:
1. the sailors’ id with the highest rating
2. the sailors’ id with the minimum rating
3. the sailors’ id whose rating is greater than the second set of sailors
4. the sailors’ id with a rating equal to the second set of sailors

Which of the following mechanisms allows us to retrieve rows one at a time from a relation?

Options:
1. view
2. cursor
3. trigger
4. assertion
A relation $R$ is in __________ normal form if and only if all underlying domains contain atomic values only.

Options:
1. second
2. first
3. third
4. Fifth

What is the output of the following (when embedded in a complete program)?
```
int n=5;
while (--n > 0)
{
    if(n == 2)
        exit(0);
    cout<<n<<" ";
}
cout<<"End of loop";
```

Options:
1. 2 3
2. 4 3
3. 3 4
4. 4 5
What is the output of the following (when embedded in a complete program)?

```c
int n=1;
do
cout<< n <<" ";
while (++n <=3);
```

Options:

1. 2 3
2. 4 3 2
3. 2 3 4
4. 3 4 5

A _______ member of the class is accessible by the member functions within its class and any class immediately derived from it.

Options:

1. Private
2. Protected
3. Public
4. Global

Which of the following is the syntactically correct and complete function?

Options:
```c
int func(int a, int b) { cout<"Hello"

func (int c){cin>>"c" }

int func( int a, int b) { a = a+b; return (a);}

int func();
```

Question Number : 175  Question Id : 8946583983  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Combining a number of items such as variables and functions into an object of a class is called _________.

Options :

1. abstraction

2. polymorphism

3. encapsulation

4. structure

Question Number : 176  Question Id : 8946583984  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which of the following statements is a valid syntax for typecast in C++?

Options :

1. (char) a;

2. char (a);

3. type char( a);
char type(a);

4.

Question Number : 177  Question Id : 8946583985  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which header file does contain the methods setw() and get_time()?

Options :
1. iomanip.h
2. iomanip.h, stdio.h
3. iostream.h
4. iostream.h, iomanip.h

Question Number : 178  Question Id : 8946583986  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

__________ refers to the ability to associate multiple meanings to one function name.

Options :
1. Abstraction
2. Polymorphism
3. Encapsulation
4. Structure

Question Number : 179  Question Id : 8946583987  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A/An __________ function of a class is not a member function of the class but has access to the private members of the class just as a member function does.

Options :
1. Member
2. Constructor

3. Overloaded

4. Friend

Question Number : 180  Question Id : 8946583988  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The technique of waiting until run time to determine the implementation of a procedure is called ____________ binding.

Options :
1. static

2. early

3. dynamic

4. positive

Question Number : 181  Question Id : 8946583989  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which of the following methods of String class is used to obtain character at a specified index?

Options :
1. char()

2. Charat()

3. charat()

4. charAt()
Which of the following methods of String class can be used to test strings for equality?

Options:
1. isequal()
2. isequals()
3. equal()
4. equals()

Which of the following statements is not correct?

Options:
1. string is a class
2. strings in java are mutable.
3. every string is an object of class string.
4. java defines a peer class of string, called string buffer, which allows string to be altered.

Which interface in Java threads is used to create?

Options:
1. thread
2. thread. create
3. run
4. **Runnable**

Which Java keyword is used to prevent inheritance?

Options:

1. stop

2. finally

3. final

4. finalize

Which of the following constructs is mandatory to handle user-defined exceptions?

Options:

1. finally

2. final

3. throws

4. Throw
What is the output of this program?

```java
Class string_class {
    public static void main(String args[]) {
        String obj="hello";
        String obj1 ="world";
        String obj2 = obj;
        string obj2 = "world";
        System.out.println(obj + " + obj2);
    }
}
```

Options:
1. hello hello
2. world world
3. hello world
4. world hello

Which of these jump statements can skip processing remainder of code in its body for a particular iteration?

Options:
1. break
2. return
3. exit
4. continue
What is the output of this program?

```java
class selection_statements {

public static void main(String args[]) {
    int var1 = 5;
    int var2 = 6;
    if ((var2 = 1) == var1)
        System.out.print(var2);
    else
        System.out.print(++var2);
}
}
```

Options:

1. 
2. 
3. 
4. 

---

Question Number : 190  Question Id : 8946583998  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
What is the output of this program?

```java
Class string_demo{
    public static void main(String args[])
    {
        String obj="I"+"like"+"Java";
        System.out.println(obj);
    }
}
```

Options:

1. I
2. Like
3. Java
4. I like Java

Which of the following JavaScript statements is the correct definition of an array?

Options:

1. ```javascript
   var a = new Array[100]
   ```
2. ```javascript
   a = new Array[1, 2, 3, 4]
   ```
3. ```javascript
   a = new Array(1, 2, 3, 4)
   ```
4. ```javascript
   a = new Array[]
   ```
JavaScript is contained inside the ______ tags.

Options:
1. `<font>` . . . `</font>`
2. `<script>` . . . `</script>`
3. `<head>` . . . `</head>`
4. `<body>` . . . `</body>`

What is the output of the following PHP code?
```php
<?php
    $username="ECET2019"
    if(ereg("([a-z]).*$\user\name\)\)
        echo"Username must be all lowercase!";
    else
        echo"Username is all lowercase!";
?>
```

Options:
1. error
2. username must be all lowercase!
3. username is all lowercase!
4. no output is returned

Which of the following PHP functions can be used to get the current memory usage?
Options:
1. `get_usage()`

2. `get_peak_usage()`

3. `get_memory_usage()`

4. `get_memory_peak_usage()`

Choose the correct option for PHP:

S1: `echo()` is capable of outputting multiple strings

S2: `echo()` cannot be used as part of a complex expression because it returns void

S3: `Print()` return a Boolean

Options:
1. Only S1

2. S1 and S2 only

3. S1, S2 and S3

4. S1 and S3 only

Which of the following HTML codes displays the content in bold face?

Options:
1. `<b>This text is big</b>`

2. `<b>This text is big</b>`
In HTML document to insert images, we use the ______ tag.

Options:
1. Picture
2. Pic
3. Img
4. Image

Which of the following tags is used to add a row to a table?

Options:
1. `<td> and </td>`
2. `<row> and <row>`
3. `<tablerow> and </tablerow>`
4. `<tr> and </tr>`

Which are the compound data types of PHP?

Options:
Which PHP's super global variable offers information regarding the PHP parser's underlying server environment?

Options:

1. $ - SERVER

2. $ - ENV

3. $ - PARSER

4. $ - COOKIES