

Andhra Pradesh State Council of Higher Education

Notations :

- 1.Options shown in green color and with ✓ icon are correct.
- 2.Options shown in red color and with ✗ icon are incorrect.

Question Paper Name :	Electronics and Instrumentation Engineering 23rd Apr 2026 Shift 2
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Electronics and Instrumentation Engineering

Group Number :	1
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Group Maximum Duration :	0
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Mathematics

Section Id :	779518261
Section Number :	1
Section type :	Online

Mandatory or Optional :	Mandatory
Number of Questions :	50
Number of Questions to be attempted :	50
Section Marks :	50
Section Negative Marks :	0
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	779518277
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 77951813209 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If $3A + 4B^T = \begin{bmatrix} 7 & -10 & 17 \\ 0 & 6 & 31 \end{bmatrix}$ and $2B - 3A^T = \begin{bmatrix} -1 & 18 \\ 4 & -6 \\ -5 & -7 \end{bmatrix}$ then $B =$ _____

Options :

1. ✘ $\begin{bmatrix} 1 & 3 \\ -1 & 0 \\ -2 & -4 \end{bmatrix}$

2. ✘ $\begin{bmatrix} 1 & 3 \\ 1 & 0 \\ 2 & 4 \end{bmatrix}$

3. ✔ $\begin{bmatrix} 1 & 3 \\ -1 & 0 \\ 2 & 4 \end{bmatrix}$

4. ✘ $\begin{bmatrix} -1 & -3 \\ 1 & 0 \\ 2 & 4 \end{bmatrix}$

Question Number : 2 Question Id : 77951813210 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If A and B are 4×4 matrices such that $A^2 + B = A^2B$ then which of the following is correct?

Options :

1. ✘ $AB = I$

2. ✘ $A^2B = I$

3. ✔ $A^2B = BA^2$

4. ✘ $A^2 = I$ or $B = I$

Question Number : 3 Question Id : 77951813211 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If A is a matrix of order 3×3 and $|\text{adj}(\text{adj}(\text{adj}A))| = 12^4$, then the value of $|A^{-1}\text{adj}A| = \underline{\hspace{2cm}}$

Options :

1. ✘ 1

2. ✘ 12

3. ✔ $2\sqrt{3}$

4. ✘ $\sqrt{6}$

Question Number : 4 Question Id : 77951813212 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If A is a 4×4 matrix and $|2A| = 64$, $B = \text{adj}A$ then $|\text{Adj}B| = \underline{\hspace{2cm}}$

Options :

1. ✔ 2^{18}

2. ✘ 2^{36}

3. ✘ 2^6

4. ✘ 2^9

Question Number : 5 Question Id : 77951813213 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

For what value of λ , the system of equations $x+2y+\lambda z=0$, $x+2y+z=6$, $x+2y+3z=10$, has no solution. _____

Options :

1. ✘ 2

2. ✔ 3

3. ✘ 4

4. ✘ 5

Question Number : 6 Question Id : 77951813214 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If $\frac{42-19x}{(x^2+1)(x-4)} = \frac{Ax+B}{x^2+1} + \frac{C}{x-4}$ then $B =$ _____

Options :

1. ✔ -11

2. ✘ 11

3. ✘ -2

4. ✘ 2

Question Number : 7 Question Id : 77951813215 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If $\frac{(x+1)^2}{x^3+x} = \frac{A}{x} + \frac{Bx+C}{x^2+1}$, then $\sin^{-1}\left(\frac{A}{C}\right) =$

Options :

1. ✓ $\frac{\pi}{6}$

2. ✗ $\frac{\pi}{4}$

3. ✗ $\frac{\pi}{3}$

4. ✗ $\frac{\pi}{2}$

Question Number : 8 Question Id : 77951813216 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If $\sin \theta + \cos \theta = \frac{1}{5}$ and $0 \leq \theta < \pi$ then $\tan \theta$ is _____

Options :

1. ✓ $\frac{-4}{3}$

2. ✗ $\frac{3}{4}$

3. ✗ $\frac{-3}{4}$

4. ✗ $\frac{4}{3}$

Question Number : 9 Question Id : 77951813217 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If $f(x) = S\sin^6 x + C\cos^6 x$ then the range of $f(x)$ is _____

Options :

1. ✘ $\left(\frac{1}{4}, \frac{3}{4}\right)$

2. ✘ $\left[\frac{1}{4}, \frac{3}{4}\right]$

3. ✔ $\left[\frac{1}{4}, 1\right]$

4. ✘ $\left[\frac{3}{4}, 1\right]$

Question Number : 10 Question Id : 77951813218 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

$C\cos 20^\circ + C\cos 80^\circ - \sqrt{3}C\cos 50^\circ =$ _____

Options :

1. ✘ -1

2. ✔ 0

3. ✘ 1

4. ✘ $\sqrt{3}$

Question Number : 11 Question Id : 77951813219 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If $A = \sin 45^\circ + \cos 45^\circ$ and $B = \sin 44^\circ + \cos 44^\circ$ then which of the following is TRUE

Options :

1. ✓ $A > B$

2. ✗ $A < B$

3. ✗ $A = B$

4. ✗ $AB = 1$

Question Number : 12 Question Id : 77951813220 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If A, B, C are angles of a triangle such that $C \cot \frac{A}{2} = 3 \tan \frac{C}{2}$ then $\sin A, \sin B, \sin C$ are in _____

Options :

1. ✓ Arithmetic Progression

2. ✗ Geometric Progression

3. ✗ Harmonic Progression

4. ✗ Arithmetic Geometric Progression

Question Number : 13 Question Id : 77951813221 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In $\triangle ABC$, if $\sin A = \sin^2 B$ and $2 \cos^2 A = 3 \cos^2 B$ then the triangle ABC is _____

Options :

1. ✗ equilateral

- 2. ✘ isosceles
- 3. ✔ obtuse angled
- 4. ✘ right angled

Question Number : 14 Question Id : 77951813222 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

$\sec 855^\circ = \underline{\hspace{2cm}}$

Options :

- 1. ✘ 1
- 2. ✘ $\sqrt{2}$
- 3. ✔ $-\sqrt{2}$
- 4. ✘ -1

Question Number : 15 Question Id : 77951813223 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The number of solutions of $\sin x = \frac{x}{10}$ is _____

Options :

- 1. ✘ 10
- 2. ✘ 3
- 3. ✘ 5
- 4. ✔ 7

Question Number : 16 Question Id : 77951813224 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following is not the solution of the equation $\sin 5x = 16\sin^5 x (n \in \mathbb{Z})$?

Options :

1. ✘ $n\pi + \frac{\pi}{6}$

2. ✘ $n\pi - \frac{\pi}{6}$

3. ✘ $n\pi$

4. ✔ $n\pi + \frac{\pi}{3}$

Question Number : 17 Question Id : 77951813225 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If $\frac{\pi}{2} \leq \theta \leq \frac{3\pi}{4}$ then $\cos^{-1}\left(\frac{5}{13}\sin\theta + \frac{12}{13}\cos\theta\right) = \text{---}$

Options :

1. ✘ $\theta - \tan^{-1}\left(\frac{4}{3}\right)$

2. ✘ $\theta + \tan^{-1}\left(\frac{5}{12}\right)$

3. ✘ $\theta + \tan^{-1}\left(\frac{4}{5}\right)$

4. ✔ $\theta - \tan^{-1}\left(\frac{5}{12}\right)$

Question Number : 18 Question Id : 77951813226 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If z is a complex number such that $|z| + z = 3 + i$, where $i = \sqrt{-1}$, then $|z| = \underline{\hspace{2cm}}$

Options :

1. ✓ $\frac{5}{3}$

2. ✗ $\frac{5}{4}$

3. ✗ $\frac{\sqrt{34}}{3}$

4. ✗ $\frac{\sqrt{41}}{4}$

Question Number : 19 Question Id : 77951813227 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In the complex plane, if the points A and B represent $(1+i)$ and $(-1+i)$ then the angle between OA and OB is

Options :

1. ✗ $\frac{3\pi}{4}$

2. ✗ π

3. ✗ $\frac{\pi}{4}$

4. ✓ $\frac{\pi}{2}$

Question Number : 20 Question Id : 77951813228 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The largest distance from $(-3, 2)$ to the circle $x^2 + y^2 - 2x + 2y + 1 = 0$ _____

Options :

1. ✘ 8
2. ✘ 4
3. ✘ 18
4. ✔ 6

Question Number : 21 Question Id : 77951813229 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If the line $3x - 2y + 6 = 0$ meets x-axis and y-axis respectively at A and B , then the equation of the circle with radius AB and centre at A is _____

Options :

1. ✘ $x^2 + y^2 + 4x + 9 = 0$
2. ✔ $x^2 + y^2 + 4x - 9 = 0$
3. ✘ $x^2 + y^2 + 4x + 4 = 0$
4. ✘ $x^2 + y^2 + 4x - 4 = 0$

Question Number : 22 Question Id : 77951813230 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The equation $16x^2 + y^2 + 8xy - 74x - 78y + 212 = 0$ represents _____

Options :

1. ✘ a circle

2. ✓ a parabola

3. ✘ an ellipse

4. ✘ hyperbola

Question Number : 23 Question Id : 77951813231 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The equation of major axis of the ellipse $\frac{(x-1)^2}{9} + \frac{(y-6)^2}{4} = 1$ is

Options :

1. ✘ $y-2=0$

2. ✓ $y=6$

3. ✘ $x-1=0$

4. ✘ $x=9$

Question Number : 24 Question Id : 77951813232 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The equation $\frac{x^2}{7-k} + \frac{y^2}{5-k} = 1$ represents a hyperbola if _____

Options :

1. ✓ $5 < k < 7$

2. ✘ $k > 5$

3. ✘ $k < 5$ or $k > 7$

4. ✘ $k \neq 5, k \neq 7$

Question Number : 25 Question Id : 77951813233 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The vertex of the parabola $y = ax^2 + bx + c$ is _____

Options :

1. ✘ $\left(\frac{b}{2a}, \frac{b^2 - 4ac}{4a} \right)$

2. ✘ $\left(\frac{b}{2a}, \frac{4ac - b^2}{4a} \right)$

3. ✘ $\left(\frac{-b}{2a}, \frac{b^2 - 4ac}{4a} \right)$

4. ✔ $\left(\frac{-b}{2a}, \frac{4ac - b^2}{4a} \right)$

Question Number : 26 Question Id : 77951813234 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

$\lim_{x \rightarrow 0} \left(\frac{|x|}{x} + x + 2 \right) = \underline{\hspace{2cm}}$

Options :

1. ✘ 0

2. ✘ 1

3. ✘ 2

4. ✓ does not exist

Question Number : 27 Question Id : 77951813235 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

$$\lim_{x \rightarrow 0} \frac{e^{x^2} - \cos x}{\sin^2 x} = \underline{\hspace{2cm}}$$

Options :

1. ✗ 3

2. ✓ $\frac{3}{2}$

3. ✗ $\frac{5}{4}$

4. ✗ 2

Question Number : 28 Question Id : 77951813236 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following functions have finite number of points of discontinuity?

Options :

1. ✗ $\tan x$

2. ✗ $x[x]$

3. ✓ $\frac{|x|}{x}$

4. ✗ $\cot x$

Question Number : 29 Question Id : 77951813237 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If $\left(\frac{x}{a}\right)^n + \left(\frac{y}{b}\right)^n = 2$ then $\frac{dy}{dx}$ at (a,b) is _____

Options :

1. ✘ $\frac{a}{b}$

2. ✘ $-\frac{a}{b}$

3. ✘ $\frac{b}{a}$

4. ✔ $-\frac{b}{a}$

Question Number : 30 Question Id : 77951813238 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The set of all points of differentiability of the function $f(x) = e^{-|x|}$ is

Options :

1. ✘ $(0, \infty)$

2. ✘ $[0, \infty)$

3. ✘ $(-\infty, \infty)$

4. ✔ $(-\infty, \infty) - \{0\}$

Correct Marks : 1 Wrong Marks : 0

If there is an error of $\frac{3}{10}\%$ in the volume of a sphere then the percentage error in its radius is

Options :

1. ✓ $\frac{1}{10}$

2. ✗ $\frac{2}{10}$

3. ✗ $\frac{3}{10}$

4. ✗ 3

Question Number : 32 Question Id : 77951813240 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The value of p such that the line joining $(0,3), (5, -2)$ is a tangent to the curve $y = \frac{p}{x+1}$ is

Options :

1. ✗ 23

2. ✓ 4

3. ✗ 3

4. ✗ 1

Question Number : 33 Question Id : 77951813241 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The interval in which $f(x) = 2x^2 - \log x$ increases is _____

Options :

1. ✘ $\left(-\frac{1}{2}, 0\right)$

2. ✘ $\left(0, \frac{1}{2}\right)$

3. ✘ $\left(-\frac{1}{2}, \frac{1}{2}\right)$

4. ✔ $\left(\frac{1}{2}, \infty\right)$

Question Number : 34 Question Id : 77951813242 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The function $y = xe^x$ has _____

Options :

1. ✔ Minimum value at $x = -1$

2. ✘ Minimum value at $x = 0$

3. ✘ Maximum value at $x = -1$

4. ✘ Maximum value at $x = 0$

Question Number : 35 Question Id : 77951813243 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A particle is moving in a straight line such that its distance at any time t is given by

$s = \frac{t^4}{4} - 2t^3 + 4t^2 + 7$ then its acceleration is minimum at $t =$ _____

Options :

1. ✘ 1

2. ✔ 2

3. ✘ $\frac{1}{2}$

4. ✘ $\frac{3}{2}$

Question Number : 36 Question Id : 77951813244 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If $\int \frac{1}{(x+100)\sqrt{x+99}} dx = f(x) + c$ then $f(x) =$ _____

Options :

1. ✘ $2\sqrt{(x+100)}$

2. ✘ $3\sqrt{(x+100)}$

3. ✔ $2 \tan^{-1} \sqrt{x+99}$

4. ✘ $2 \tan^{-1} \sqrt{x+100}$

Question Number : 37 Question Id : 77951813245 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

$\int \frac{1 + \cos 4x}{\cot x - \tan x} dx =$ _____

Options :

1. ✘ $\frac{1}{4} \cos 4x + c$

2. ✘ $\frac{1}{8} \cos 4x + c$

3. ✘ $-\frac{1}{4} \cos 4x + c$

4. ✔ $-\frac{1}{8} \cos 4x + c$

Question Number : 38 Question Id : 77951813246 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If $I_n = \int \frac{t^n}{1+t^2} dt$ then $I_6 + I_4 =$ _____

Options :

1. ✘ $\frac{t^3}{3}$

2. ✘ $\frac{t^4}{4}$

3. ✔ $\frac{t^5}{5}$

4. ✘ $\frac{t^7}{7}$

Question Number : 39 Question Id : 77951813247 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

$\int (x+1)^2 e^x dx =$ _____

Options :

1. ✘ $xe^x + c$

2. ✘ $x^2 e^x + c$

3. ✘ $(x+1)e^x + c$

4. ✔ $(x^2 + 1)e^x + c$

Question Number : 40 Question Id : 77951813248 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If $\int \frac{2x^2 + a^2}{x^2(x^2 + a^2)} dx = \frac{k}{x} + \frac{1}{a} \tan^{-1} \frac{x}{a} + c$ then $k =$ _____

Options :

1. ✘ 0

2. ✔ -1

3. ✘ 1

4. ✘ $\frac{1}{a}$

Question Number : 41 Question Id : 77951813249 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If $k \int_0^1 xf(3x) dx = \int_0^3 tf(t) dt$ then $k =$ _____

Options :

1. ✔ 9

2. ✘ 3

3. ✘ $\frac{1}{9}$

4. ✘ $\frac{1}{3}$

Question Number : 42 Question Id : 77951813250 Question Type : MCQ
 Correct Marks : 1 Wrong Marks : 0

$$\int_a^b (|x-a| + |x-b|) dx = \text{_____}, (0 < a < b)$$

Options :

1. ✔ $(b-a)^2$

2. ✘ $(b-a)$

3. ✘ $(b+a)$

4. ✘ $(b+a)^2$

Question Number : 43 Question Id : 77951813251 Question Type : MCQ
 Correct Marks : 1 Wrong Marks : 0

$$\int_0^2 [x^2] dx = \text{_____}$$

Options :

1. ✘ 0

2. ✔ $5 - \sqrt{2} - \sqrt{3}$

3. ✘

$$5 + \sqrt{2} + \sqrt{3}$$

4. ✘ $\sqrt{2} + \sqrt{3} + \sqrt{5}$

Question Number : 44 Question Id : 77951813252 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If the order and degree of a differential equation $\left(\frac{d^4 y}{dx^4} + \frac{d^2 y}{dx^2}\right)^{\frac{5}{2}} = 10 \frac{d^2 y}{dx^2}$ are p and q respectively, then $p + q =$

Options :

1. ✔ 9

2. ✘ 6

3. ✘ 7

4. ✘ 10

Question Number : 45 Question Id : 77951813253 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The differential equation of the family of concentric circles with Centre at the origin is

Options :

1. ✘ $x = y \frac{dy}{dx}$

2. ✘ $\frac{dy}{dx} = \frac{y}{x}$

3. ✔ $x dx + y dy = 0$

4. ✘ $x dy + y dx = 0$

Question Number : 46 Question Id : 77951813254 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

$\frac{dy}{dx} = xy + x + y + 1$ has the solution

Options :

1. ✘ $\log(y+1) = x^2 + x + c$

2. ✘ $\log(y+1) = x + c$

3. ✘ $\log(y+1) = -x + c$

4. ✔ $\log(y+1) = \frac{x^2}{2} + x + c$

Question Number : 47 Question Id : 77951813255 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The general solution of $\frac{ydx - xdy}{y^2} = 0$ represents a family of

Options :

1. ✔ Straight lines passing through the origin

2. ✘ Circles

3. ✘ parabolas

4. ✘ Hyperbolas

Question Number : 48 Question Id : 77951813256 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following is an integrating factor for the differential equation

$$x \cos x \frac{dy}{dx} + (x \sin x + \cos x)y = 1 ?$$

Options :

1. ✘ $x \cos x$
2. ✘ $x \sin x$
3. ✔ $x \sec x$
4. ✘ $x \operatorname{cosec} x$

Question Number : 49 Question Id : 77951813257 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The equation of the curve passing through the origin and satisfying the differential equation

$$\frac{dy}{dx} = (x - y)^2 \text{ is } \underline{\hspace{2cm}}$$

Options :

1. ✔ $e^{2x}(1 - x + y) = 1 + x - y$
2. ✘ $e^{2x}(1 + x - y) = 1 - x + y$
3. ✘ $e^{2x}(1 + x + y) = 1 - x + y$
4. ✘ $e^{2x}(1 - x + y) = -(1 + x + y)$

Question Number : 50 Question Id : 77951813258 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If the solution $y(x)$ of the given differential equation $(e^y + 1) \cos x dx + e^y \sin x dy = 0$ passes

through the point $(\frac{\pi}{2}, 0)$, then the value of $e^{y(\frac{\pi}{6})}$ is

Options :

1. ✘ 2

2. ✔ 3

3. ✘ e^2

4. ✘ e^{-3}

Physics

Section Id :	779518262
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	25
Number of Questions to be attempted :	25
Section Marks :	25
Section Negative Marks :	0
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	779518278
Question Shuffling Allowed :	Yes

Question Number : 51 Question Id : 77951813259 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If F is the force, S is the displacement and V is the velocity of the particle, the dimensions of the ratio FS/V^2 will be

Options :

1. ✘

2. ✓ $M^1L^0T^0$

3. ✗ M^0L^0T

4. ✗ $M^0L^0T^0$

Question Number : 52 Question Id : 77951813260 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Among the following, unit less quantity is

Options :

1. ✗ Velocity gradient

2. ✗ Pressure gradient

3. ✓ Displacement gradient

4. ✗ Force gradient

Question Number : 53 Question Id : 77951813261 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If the component of one vector in the direction of another vector is zero, then those two vectors are

Options :

1. ✗ parallel to each other

2. ✓ perpendicular to each other

3. ✘ opposite to each other

4. ✘ coplanar vectors

Question Number : 54 Question Id : 77951813262 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If the resultant of two vectors is equal to either of vectors, the angle between them is

Options :

1. ✘ 30^0

2. ✘ 60^0

3. ✘ 90^0

4. ✔ 120^0

Question Number : 55 Question Id : 77951813263 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The angle made by the vector $(2\hat{i}+2\hat{j})$ with X-axis is

Options :

1. ✔ 45^0

2. ✘ 60^0

3. ✘ 90^0

4. ✖ 120^0

Question Number : 56 Question Id : 77951813264 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The length of a vector $(3\hat{i} + \hat{j} + 2\hat{k})$ in XY plane is

Options :

1. ✖ $\sqrt{14}$

2. ✖ 2

3. ✔ $\sqrt{10}$

4. ✖ $\sqrt{5}$

Question Number : 57 Question Id : 77951813265 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A stone projected up with a velocity 'u' reaches two points A and B at a distance 'h' with velocities $u/2$ and $u/3$. The maximum height reached by the stone is

Options :

1. ✖ $\frac{9h}{5}$

2. ✖ $\frac{27h}{4}$

3. ✖ $\frac{36h}{27}$

4. ✔

Question Number : 58 Question Id : 77951813266 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A ball is thrown at a speed of 20 m s^{-1} at an angle of 30° with the horizontal. The maximum height reached by the ball is ($g = 10 \text{ ms}^{-2}$)

Options :

1. ✘ 2 m
2. ✘ 3 m
3. ✘ 4 m
4. ✔ 5 m

Question Number : 59 Question Id : 77951813267 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A body of mass 2 kg is moving with a constant acceleration of $(2\hat{i}+3\hat{j}-\hat{k}) \text{ ms}^{-2}$. If the displacement made by the body is $(3\hat{i}-\hat{j} + 2\hat{k}) \text{ m}$ then the work done is

Options :

1. ✔ 2 J
2. ✘ 10 J
3. ✘ 12 J
4. ✘ 22 J

Question Number : 60 Question Id : 77951813268 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The average power generated by a 90 kg mountain climber who climbs a summit of height 600 m in 90 minutes is ($g = 10 \text{ ms}^{-2}$)

Options :

1. ✓ 100 W
2. ✗ 25 W
3. ✗ 200 W
4. ✗ 50 W

Question Number : 61 Question Id : 77951813269 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A body of mass 16 kg explodes into two pieces of masses 4 kg and 12 kg. The velocity of the 12 kg mass is 4 ms^{-1} . The kinetic energy of the second piece is

Options :

1. ✗ 96 J
2. ✗ 144 J
3. ✗ 192 J
4. ✓ 288 J

Question Number : 62 Question Id : 77951813270 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Two bodies of masses of 1 g and 4 g are moving with equal kinetic energies. The ratio of the magnitudes of their linear momenta is

Options :

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

Question Number : 63 Question Id : 77951813271 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A sound absorber attenuates the sound level by 20 dB. The intensity decreases by a factor of

Options :

1. ✘ 10
2. ✔ 100
3. ✘ 1000
4. ✘ 10000

Question Number : 64 Question Id : 77951813272 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A source of sound is moving towards a wall with a speed of 20 ms^{-1} . The frequency of the sound produced by the source is 400 Hz . If the speed of the sound is 340 ms^{-1} , the beat frequency heard by a person standing near the wall is

Options :

1. ✓ 0 Hz
2. ✗ 2Hz
3. ✗ 5 Hz
4. ✗ 10 Hz

Question Number : 65 Question Id : 77951813273 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A person standing between two parallel hills fires a gun. He hears the first echo after 1.5 sec and second echo after 2.5 sec. If the speed of a sound is 332 ms^{-1} , the distance between the hills is

Options :

1. ✗ 654 m
2. ✓ 664 m
3. ✗ 674 m
4. ✗ 684 m

Question Number : 66 Question Id : 77951813274 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The velocity of sound in air is 330 ms^{-1} . To increase the apparent frequency of the sound by 50 %, the source should move towards the stationary observer with a velocity equal to

Options :

1. ✖ 330 ms^{-1}
2. ✖ 220 ms^{-1}
3. ✖ 165 ms^{-1}
4. ✔ 110 ms^{-1}

**Question Number : 67 Question Id : 77951813275 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0**

If the total absorption of a hall is doubled, the reverberation time will

Options :

1. ✖ Double
2. ✔ Become half
3. ✖ Remain same
4. ✖ Become four times

**Question Number : 68 Question Id : 77951813276 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0**

The volume V of an enclosure contains a mixture of gases like 16 g of oxygen, 28 g of nitrogen and 44 g of carbon dioxide at absolute temperature T . The pressure of the mixture of gases is (R is universal gas constant)

Options :

1. ✘ $3RT/V$
2. ✘ $4RT/V$
3. ✔ $5RT/2V$
4. ✘ $88RT/V$

Question Number : 69 Question Id : 77951813277 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Certain quantity of heat is supplied to a monoatomic ideal gas which expands at constant pressure. The percentage of heat that goes into work done by the gas is

Options :

1. ✘ 20%
2. ✔ 40%
3. ✘ 60%
4. ✘ 80%

Question Number : 70 Question Id : 77951813278 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The wrong statement among the following is

Options :

1. ✘ During free expansion, temperature of ideal gas does not change
2. ✘ During free expansion, temperature of real gas decreases
3. ✔ During free expansion of real gas temperature does not change
4. ✘ Free expansion is conducted in adiabatic manner

Question Number : 71 Question Id : 77951813279 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A monoatomic ideal gas, initially at temperature T_1 is enclosed in a cylinder fitted with a frictionless piston. The gas is allowed to expand adiabatically to a temperature T_2 by releasing the piston suddenly. If L_1 and L_2 are the lengths of the gas column, before and after the expansion, then the value of T_1/T_2 will be

Options :

1. ✘ $(L_1/L_2)^{2/3}$
2. ✔ $(L_2/L_1)^{2/3}$
3. ✘ L_2/L_1
4. ✘ L_1/L_2

Question Number : 72 Question Id : 77951813280 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A gas behaves more closely as an ideal gas at

Options :

1. ✘ Low pressure and low temperature
2. ✔ Low pressure and high temperature
3. ✘ High pressure and low temperature
4. ✘ High pressure and high temperature

Question Number : 73 Question Id : 77951813281 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

If the maximum kinetic energy of emitted photo electrons from a metal is 0.9 eV and work function is 2.2 eV then the energy and wavelength of incident radiation are

Options :

1. ✔ 3.1 eV, 4000 \AA
2. ✘ 2.2 eV, 2000 \AA
3. ✘ 2.2 eV, 4000 \AA
4. ✘ 3.1 eV, 2000 \AA

Question Number : 74 Question Id : 77951813282 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The core of an optical fibre is surrounded by

Options :

1. ✓ Cladding
2. ✘ Plastic jacket
3. ✘ Air
4. ✘ Metal sheath

Question Number : 75 Question Id : 77951813283 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The favourable condition for superconducting state of a matter is

Options :

1. ✘ A weak electron-phonon interaction
2. ✓ A strong electron-phonon interaction
3. ✘ A strong phonon -phonon interaction
4. ✘ A weak phonon -phonon interaction

Chemistry

Section Id :	779518263
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	25
Number of Questions to be attempted :	25
Section Marks :	25

Section Negative Marks :	0
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	779518279
Question Shuffling Allowed :	Yes

Question Number : 76 Question Id : 77951813284 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In which of the following, the number of unpaired electrons is maximum?

Options :

1. ✘ P^{3-} (Z=15)
2. ✔ S (Z=16)
3. ✘ Cl (Z=17)
4. ✘ Al^{3+} (Z=13)

Question Number : 77 Question Id : 77951813285 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The n, l values possible for a sublevel with seven degenerate orbitals are respectively (where n, l represent the symbols of principal and Azimuthal quantum numbers respectively)

Options :

1. ✔ 4, 3
2. ✘ 3, 4
3. ✘ 5, 1
4. ✘ 6, 2

Question Number : 78 Question Id : 77951813286 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The number of electrons with magnetic quantum number, $m_l = 0$ in chloride ion is (Cl ($Z=17$))

Options :

1. ✘ 6
2. ✘ 8
3. ✔ 10
4. ✘ 18

Question Number : 79 Question Id : 77951813287 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Atomic numbers of four elements A, B, C and D are $(Z-1)$, $(Z+2)$, Z and $(Z+1)$, respectively. If $Z=9$, the type of bonding between A and B is (where Z = Atomic number of element)

Options :

1. ✘ Dative bond
2. ✘ Polar Covalent bond
3. ✔ Electrovalent bond
4. ✘ Non polar Covalent bond

Question Number : 80 Question Id : 77951813288 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Identify the molecule in which central atom is not obeying the octet rule.

Options :

1. ✘ H_2O
2. ✘ PCl_3
3. ✔ BF_3
4. ✘ NH_3

Question Number : 81 Question Id : 77951813289 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The mass of Na_2CO_3 (in g) (M.wt=106) present in 1.0 L of 0.05 M solution is

Options :

1. ✘ 0.53
2. ✘ 53.0
3. ✘ 26.5
4. ✔ 5.30

Question Number : 82 Question Id : 77951813290 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A gaseous mixture contains 14 g of N_2 , 8.0 g of O_2 and 8.0 g of H_2 . Total number of molecules present in the mixture is (N_A = Avogadro number)

(At.wt; H=1, N=14, O=16)

Options :

1. ✘ $2.75 N_A$
2. ✘

3.75 N_A

3. ✓ 4.75 N_A

4. ✗ 1.50 N_A

Question Number : 83 Question Id : 77951813291 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The ratio of equivalent weights of HNO_3 and H_2SO_4 is

Options :

1. ✗ 9:5

2. ✗ 6:5

3. ✗ 7:9

4. ✓ 9:7

Question Number : 84 Question Id : 77951813292 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following cannot act as a buffer?

Options :

1. ✗ $NH_4OH + NH_4Cl$

2. ✗ $CH_3COOH + CH_3COONa$

3. ✗ $H_2CO_3 + Na_2CO_3$

4. ✓ $HCl + NaCl$

Question Number : 85 Question Id : 77951813293 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

200 mL of 0.1 M NaOH is allowed to react completely with 100 mL of 0.1 M HCl and the solution is diluted to 1.0 L by adding water. The pH of the mixture is

Options :

1. ✘ 3
2. ✘ 11
3. ✘ 2
4. ✔ 12

Question Number : 86 Question Id : 77951813294 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following is an example of non-electrolyte?

Options :

1. ✘ CH_3COONa
2. ✘ NaCl
3. ✘ NaOH
4. ✔ $\text{C}_2\text{H}_5\text{OH}$

Question Number : 87 Question Id : 77951813295 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In a galvanic cell, electrons flow from

Options :

1. ✘ anode to cathode through the solution
2. ✘ cathode to anode through the solution
3. ✔ anode to cathode through the external circuit
4. ✘ cathode to anode through the external circuit

Question Number : 88 Question Id : 77951813296 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Saturated solution of KNO_3 is used to make salt bridge because

Options :

1. ✘ Velocity of K^+ is greater than NO_3^-
2. ✘ Velocity of NO_3^- is greater than K^+
3. ✔ Velocity of K^+ approximately equal to NO_3^-
4. ✘ KNO_3 is highly soluble in water

Question Number : 89 Question Id : 77951813297 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A 2 kg water sample contains 408 mg of $CaSO_4$ (M.wt =136). The hardness in terms of $CaCO_3$ equivalents (in ppm) is

Options :

1. ✘ 100

2. ✘ 136

3. ✔ 150

4. ✘ 204

Question Number : 90 Question Id : 77951813298 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of following is responsible for temporary hardness of water?

Options :

1. ✘ NaHCO_3

2. ✔ $\text{Ca}(\text{HCO}_3)_2$

3. ✘ NaHSO_4

4. ✘ CaCl_2

Question Number : 91 Question Id : 77951813299 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Demineralised water can be obtained by using

Options :

1. ✘ Clark's method

2. ✘ Permutit method

3. ✘ Calgon's method

4. ✓ Ion exchange resin method

Question Number : 92 Question Id : 77951813300 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following is considered as high corrosive resistant material?

Options :

1. ✘ Cast iron
2. ✓ Stainless steel
3. ✘ Zinc
4. ✘ Mild steel

Question Number : 93 Question Id : 77951813301 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The wrong statement about corrosion is

Options :

1. ✘ Corrosion involves oxidation
2. ✘ Hydrated ferric oxide is called rust
3. ✓ Lesser the potential difference between the two metals, greater will be the corrosion of anodic metal
4. ✘ Coating of zinc on iron is an example of anodic coating

Question Number : 94 Question Id : 77951813302 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

An example for condensation polymer is

Options :

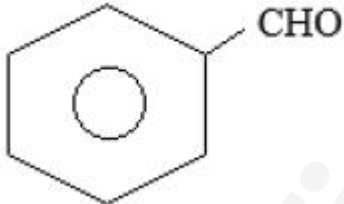
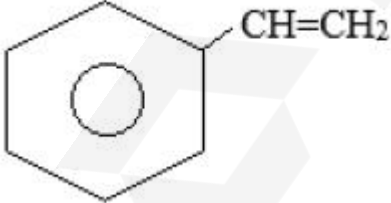
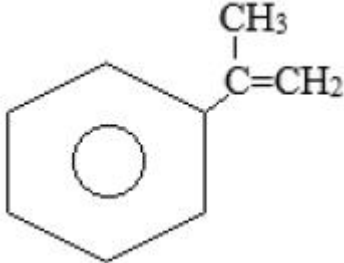
1. ✘ Neoprene rubber
2. ✘ Natural rubber
3. ✔ Urea - formaldehyde resin
4. ✘ Polytetrafluoroethylene

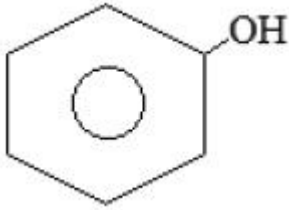
Question Number : 95 Question Id : 77951813303 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Buna-S is a polymer of monomers X and Y. If X is $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$, then what is Y?

Options :

1. ✘ 
2. ✔ 
3. ✘ 



4. ✘

Question Number : 96 Question Id : 77951813304 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following is an elastomer?

Options :

1. ✔ Neoprene

2. ✘ Polyvinyl chloride

3. ✘ Bakelite

4. ✘ Teflon

Question Number : 97 Question Id : 77951813305 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The monomer of Teflon is

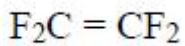
Options :

1. ✘ $F_2C = CF(Cl)$

2. ✘ $F_2C = CCl_2$

3. ✘ $F_2C = C(Br)Cl$

4. ✔



Question Number : 98 Question Id : 77951813306 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The major component of biogas is

Options :

1. ✓ CH_4

2. ✗ CO

3. ✗ N_2

4. ✗ NH_3

Question Number : 99 Question Id : 77951813307 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Ageing of skin, cataract and skin cancer are the result of

Options :

1. ✗ Acid rain

2. ✗ Green-house effect

3. ✓ Depletion of O_3 layer

4. ✗ CO Pollution

Question Number : 100 Question Id : 77951813308 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following is not a green-house effect gas?

Options :

1. ✘ N_2O
2. ✘ CH_4
3. ✘ CO_2
4. ✔ N_2

Electronics and Instrumentation Engineering

Section Id :	779518264
Section Number :	4
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	100
Number of Questions to be attempted :	100
Section Marks :	100
Section Negative Marks :	0
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	779518280
Question Shuffling Allowed :	Yes

Question Number : 101 Question Id : 77951813309 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which law states that the sum of all voltage drops and EMFs in a closed loop is zero?

Options :

1. ✘ Ohm's law
2. ✘ Kirchhoff's current law

3. ✓ Kirchhoff's voltage law

4. ✗ Faraday's law

Question Number : 102 Question Id : 77951813310 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A voltage source having source resistance $R_S=10\Omega$ is connected to a variable load resistance R_L . To achieve maximum power transfer, R_L should be

Options :

1. ✗ 0Ω

2. ✗ 5Ω

3. ✓ 10Ω

4. ✗ 20Ω

Question Number : 103 Question Id : 77951813311 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If the current passing through a heater is doubled, the heat produced becomes

Options :

1. ✗ Doubled

2. ✗ Halved

3. ✓ Four times

4. ✗ One fourth

Correct Marks : 1 Wrong Marks : 0

A transformer works on the principle of

Options :

1. ✘ Self-induction
2. ✔ Mutual induction
3. ✘ Ohm's law
4. ✘ Dynamic induction

Question Number : 105 Question Id : 77951813313 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What happens if a DC shunt motor is connected across an AC supply?

Options :

1. ✘ Runs at high speed
2. ✘ Runs at a lower speed
3. ✔ Will not run and may burn
4. ✘ Runs normally

Question Number : 106 Question Id : 77951813314 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The frequency (f) of the voltage generated in an Alternator is given by

(P=Poles, N=Speed in rpm)

Options :

1. ✘ $f=PN/60$

2. ✘ $f=120/PN$
3. ✘ $f=PN/100$
4. ✔ $f=PN/120$

Question Number : 107 Question Id : 77951813315 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A Photo transistor works on the principle of converting light energy into

Options :

1. ✘ Voltage
2. ✔ Current
3. ✘ Resistance
4. ✘ Inductance

Question Number : 108 Question Id : 77951813316 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the process of increasing the number of electrons in a Photo Multiplier Tube (PMT) called?

Options :

1. ✔ Secondary emission
2. ✘ Photo electric effect
3. ✘ Thermionic emission
4. ✘

Question Number : 109 Question Id : 77951813317 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Why is a resistor typically used in series with the input LED of an Opto Coupler?

Options :

1. ✘ To increase the voltage
2. ✘ To increase the isolation voltage
3. ✔ To limit the LED current
4. ✘ To decrease the output voltage

Question Number : 110 Question Id : 77951813318 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Induction heating is primarily used for which of the following materials?

Options :

1. ✘ Insulating materials
2. ✘ Non – metallic materials
3. ✘ Transparent materials
4. ✔ Conducting materials

Question Number : 111 Question Id : 77951813319 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What is the main, fundamental limitation of a standard 7-segment display?

Options :

1. ✘ It cannot display decimals
2. ✘ It consumes too much power
3. ✔ It cannot show complex alphanumeric characters
4. ✘ It only works with AC signals

Question Number : 112 Question Id : 77951813320 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

For a unity negative feedback control system with an open-loop transfer

function $G(s) = \frac{10}{s(s+2)}$. What is the closed loop transfer function?

Options :

1. ✔ $\frac{10}{s^2 + 2s + 10}$
2. ✘ $\frac{10}{s^2 + 2s - 10}$
3. ✘ $\frac{10}{s^2 + 10s + 2}$
4. ✘ $\frac{1}{s^2 + 2s + 10}$

Question Number : 113 Question Id : 77951813321 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Consider a simple Signal Flow Graph with input node 'R' and output node 'C'.
One forward path with gain $G_1=5$. One feedback loop that touches the forward path with gain $L_1=-2$. Using Mason's gain formula, what is the transfer function C/R ?

Options :

1. ✘ 5
2. ✔ 1.66
3. ✘ 0.625
4. ✘ 0.2

Question Number : 114 Question Id : 77951813322 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The Routh-Hurwitz criterion is used to determine

Options :

1. ✘ Relative stability
2. ✔ Absolute stability
3. ✘ Time response
4. ✘ Gain margin only

Question Number : 115 Question Id : 77951813323 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The time taken for the response to reach the first peak of the maximum overshoot is called

Options :

1. ✘ Rise time

2. ✘ Delay time
3. ✘ Settling time
4. ✔ Peak time

Question Number : 116 Question Id : 77951813324 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following is considered as a Solid-State (electronic) switch?

Options :

1. ✘ Push button
2. ✘ Toggle switch
3. ✔ Bipolar Junction Transistor
4. ✘ Rotary switch

Question Number : 117 Question Id : 77951813325 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which microphone is ideal for picking up sound from a specific, narrow direction?

Options :

1. ✘ Omnidirectional
2. ✘ Bidirectional
3. ✘ Cardioid

4. ✓ Shotgun

Question Number : 118 Question Id : 77951813326 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

When a PN junction is formed, which region becomes positively charged?

Options :

1. ✓ N-region

2. ✗ P-region

3. ✗ The central depletion region

4. ✗ Both sides equally

Question Number : 119 Question Id : 77951813327 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In an NPN transistor circuit, the arrow in the symbol points

Options :

1. ✓ Away from the base

2. ✗ Towards the base

3. ✗ Towards the collector

4. ✗ Away from the collector

Question Number : 120 Question Id : 77951813328 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

When a Zener diode is operating in the breakdown region, the voltage across it

Options :

1. ✓ Remains constant
2. ✗ Becomes zero
3. ✗ Increases with current
4. ✗ Decreases with current

Question Number : 121 Question Id : 77951813329 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In which region does a MOSFET operate as a constant current source?

Options :

1. ✗ Triode region
2. ✗ Ohmic region
3. ✓ Saturation region
4. ✗ Cut-off region

Question Number : 122 Question Id : 77951813330 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Why is a “bleeder resistor” usually connected in parallel with the load in an LC filter?

Options :

1. ✗ To increase the output voltage
2. ✗ To reduce the ripple factor

3. ✓ To prevent high voltage at no-load and ensure minimum current
4. ✗ To act as a shunt for high frequencies

Question Number : 123 Question Id : 77951813331 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Transformer coupled amplifiers are primarily used in

Options :

1. ✓ Audio power amplifiers
2. ✗ DC amplifiers
3. ✗ High frequency voltage amplifiers
4. ✗ High gain, small signal applications

Question Number : 124 Question Id : 77951813332 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What type of feedback is used in a Wien bridge oscillator for oscillations?

Options :

1. ✗ Negative feedback
2. ✓ Positive feedback
3. ✗ Cascaded feedback
4. ✗ Ratio feedback

Correct Marks : 1 Wrong Marks : 0

What is the primary purpose of a Bootstrap sweep circuit?

Options :

1. ✓ To generate a perfectly linear ramp (Saw tooth) wave
2. ✗ To amplify a high frequency signal
3. ✗ To act as a voltage regulator
4. ✗ To convert AC to DC

Question Number : 126 Question Id : 77951813334 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In a Miller sweep circuit, the sweep initiates when the switch is

Options :

1. ✗ Closed
2. ✗ Shorted
3. ✗ Bypassed
4. ✓ Opened

Question Number : 127 Question Id : 77951813335 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

How many stable states does a monostable multivibrator have?

Options :

1. ✗ 0

2. ✓ 1

3. ✗ 2

4. ✗ 3

Question Number : 128 Question Id : 77951813336 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The octal number system is a base-8 system that uses digits ranging from

Options :

1. ✓ 0-7

2. ✗ 0-9

3. ✗ 1-8

4. ✗ 1-7

Question Number : 129 Question Id : 77951813337 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

How many NAND gates are required to implement an OR gate?

Options :

1. ✓ 3

2. ✗ 1

3. ✗ 2

4. ✗ 4

Question Number : 130 Question Id : 77951813338 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

To implement a full adder using only half adders, what is needed?

Options :

1. ✓ Two half adders and one OR gate
2. ✗ One half adder and two OR gates
3. ✗ Two half adders and one AND gate
4. ✗ Three half adders

Question Number : 131 Question Id : 77951813339 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

When both inputs J and K are set to 1 in a master-slave JK flip-flop, the output

Options :

1. ✗ Remains at 0
2. ✗ Remains at 1
3. ✗ Toggle on the leading edge
4. ✓ Toggle on the trailing edge (end of clock pulse)

Question Number : 132 Question Id : 77951813340 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What type of register allows data bits to be shifted left or right?

Options :

1. ✗ Parallel register

2. ✓ Shift register
3. ✗ Buffer register
4. ✗ Counter

Question Number : 133 Question Id : 77951813341 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

To load 4 bits of data in parallel into a 4-bit universal shift register, how many clock pulses are required?

Options :

1. ✓ 1
2. ✗ 2
3. ✗ 3
4. ✗ 4

Question Number : 134 Question Id : 77951813342 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The circuit used to store one bit of data is known as

Options :

1. ✗ Encoder
2. ✗ Decoder
3. ✓ Flip-flop

4. ✘ OR gate

Question Number : 135 Question Id : 77951813343 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In a N-bit successive approximation ADC, how many clock pulses are typically required for one full conversion?

Options :

1. ✘ N

2. ✔ N+1

3. ✘ 2N

4. ✘ 2^N

Question Number : 136 Question Id : 77951813344 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following is a major advantage of the R-2R ladder DAC over the weighted register DAC?

Options :

1. ✘ It requires fewer components

2. ✔ It uses only two different resistor values (R and 2R)

3. ✘ It is faster

4. ✘ It has high power dissipation

Question Number : 137 Question Id : 77951813345 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A binary weighed resistor DAC uses resistors with values that are multiples of what number?

Options :

1. ✓ 2
2. ✗ 1
3. ✗ 10
4. ✗ 16

Question Number : 138 Question Id : 77951813346 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following is used to extend the range of an analogue multi range ohm meter?

Options :

1. ✗ Series inductor
2. ✗ Series resistor
3. ✓ Selector switch with internal resistors
4. ✗ Variable voltage source

Question Number : 139 Question Id : 77951813347 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following is an alternative name for a differential voltmeter?

Options :

1. ✗ Moving iron voltmeter
2. ✓ Potentiometric voltmeter

3. ✘ Electrostatic voltmeter
4. ✘ True RMS meter

Question Number : 140 Question Id : 77951813348 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a digital frequency meter, the input signal is converted into

Options :

1. ✘ Saw tooth wave
2. ✘ Triangle wave
3. ✘ Sine wave
4. ✔ Square / Pulse wave

Question Number : 141 Question Id : 77951813349 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following is an application of a CRO?

Options :

1. ✘ Controlling analog signals
2. ✔ Displaying waveform
3. ✘ Amplifying signals
4. ✘ Generating power

Correct Marks : 1 Wrong Marks : 0

What is the typical frequency range of an AF oscillator?

Options :

1. ✓ 20 Hz – 20 kHz
2. ✗ 0-10 Hz
3. ✗ 1 MHz – 100 MHz
4. ✗ Above 1 GHz

Question Number : 143 Question Id : 77951813351 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In an RF signal generator, the frequency of the AC voltage supplied is

Options :

1. ✗ Fixed
2. ✓ Variable
3. ✗ Non – existent
4. ✗ Always 50 Hz

Question Number : 144 Question Id : 77951813352 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A Q-meter is generally used for measurement at

Options :

1. ✓ High frequencies (RF)

2. ✘ Low frequencies
3. ✘ DC only
4. ✘ Audio frequencies only

Question Number : 145 Question Id : 77951813353 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the difference between logic analyzer and an oscilloscope?

Options :

1. ✘ Oscilloscopes have more channels
2. ✔ Logic analyzers are better for timing, Oscilloscopes are better for analog shape
3. ✘ Logic analyzers display analog, oscilloscopes display digital
4. ✘ There is no difference

Question Number : 146 Question Id : 77951813354 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The sensitivity of an LVDT is normally expressed in which units?

Options :

1. ✔ Millivolts per millimeter (mV/mm)
2. ✘ Ohms per centimeter (Ω/cm)
3. ✘ Microfarad per meter ($\mu F/m$)
4. ✘ Volts per second (V/Sec)

Question Number : 147 Question Id : 77951813355 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A potentiometer displacement sensor works on the principle of

Options :

1. ✘ Mutual inductance
2. ✘ Self-inductance
3. ✔ Variable resistance transduction
4. ✘ Hall effect

Question Number : 148 Question Id : 77951813356 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Thermo couple is an example of

Options :

1. ✘ Passive transducer
2. ✔ Active transducer
3. ✘ Secondary transducer
4. ✘ Digital transducer

Question Number : 149 Question Id : 77951813357 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A Pyrometer is used for the measurement of

Options :

1. ✓ Very high temperatures
2. ✗ Low temperature
3. ✗ Pressure
4. ✗ Velocity

**Question Number : 150 Question Id : 77951813358 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0**

Which material is commonly used for electric elements to ensure high elastic limit and fatigue resistance?

Options :

1. ✗ Lead
2. ✗ Copper
3. ✓ Beryllium Copper or Stainless Steel
4. ✗ Aluminum

**Question Number : 151 Question Id : 77951813359 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0**

Piezo electric sensors are considered “self-generating” because

Options :

1. ✗ They need a battery
2. ✗ They use a bridge circuit
3. ✓

They convert energy directly

4. ✘ They are very small

Question Number : 152 Question Id : 77951813360 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following is a head type flow meter?

Options :

1. ✘ Turbine meter

2. ✔ Orifice plate

3. ✘ Electromagnetic meter

4. ✘ Nutating disk

Question Number : 153 Question Id : 77951813361 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which type of Anemometer is most common in traditional weather stations?

Options :

1. ✘ Hot-wire anemometer

2. ✘ Pitot tube

3. ✘ Laser Doppler anemometer

4. ✔ Cup anemometer

Question Number : 154 Question Id : 77951813362 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Ultrasonic flow meters are capable of measuring

Options :

1. ✘ Forward flow only
2. ✘ Reverse flow only
3. ✔ Both forward and reverse flow
4. ✘ Only gas flow

Question Number : 155 Question Id : 77951813363 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What is the standard SI unit for weight flow rate?

Options :

1. ✘ Kg.s
2. ✘ m^3/s
3. ✔ N/s
4. ✘ Pa.s

Question Number : 156 Question Id : 77951813364 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What is the value of relative humidity when the air is fully saturated?

Options :

1. ✘ 0%

2. ✘ 50%

3. ✔ 100%

4. ✘ 200%

Question Number : 157 Question Id : 77951813365 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What happens to the viscosity of liquids with an increase in temperature?

Options :

1. ✔ Decreases

2. ✘ Increases

3. ✘ Remains the same

4. ✘ Becomes infinite

Question Number : 158 Question Id : 77951813366 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A thermistor is a type of device whose resistance varies based on

Options :

1. ✘ Pressure

2. ✘ Light

3. ✔ Temperature

4. ✘ Humidity

Question Number : 159 Question Id : 77951813367 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which type of fluids can be measured using an electromagnetic flow meter?

Options :

1. ✘ Non-conductive liquids
2. ✔ Electrically conductive liquids and slurries
3. ✘ Gases
4. ✘ Steam

Question Number : 160 Question Id : 77951813368 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

On-off control is also known as

Options :

1. ✘ Proportional control
2. ✘ Derivative control
3. ✔ Two-position control
4. ✘ Integral control

Question Number : 161 Question Id : 77951813369 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

As the proportional band is decreased (i.e., gain is increased), the system response becomes

Options :

1. ✓ Less stable and faster
2. ✗ More stable and faster
3. ✗ Less stable and slower
4. ✗ More stable and slower

Question Number : 162 Question Id : 77951813370 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What is the primary purpose of an integral controller in process control?

Options :

1. ✗ To increase stability
2. ✗ To reduce the rise time
3. ✓ To eliminate off-set (steady state error)
4. ✗ To increase the speed of response

Question Number : 163 Question Id : 77951813371 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The Derivative controller acts as a

Options :

1. ✗ Phase – lag compensator
2. ✓ Phase – lead compensator
3. ✗

4. ✘ Integrator

Question Number : 164 Question Id : 77951813372 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What does the “reset windup” phenomenon refer to in a PID controller?

Options :

1. ✔ The controller output saturates due to accumulated integral error

2. ✘ The derivative term is too high

3. ✘ The process variable matches the set point

4. ✘ The proportional band is too wide

Question Number : 165 Question Id : 77951813373 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What is the ultimate gain in the Ziegler-Nichols tuning method?

Options :

1. ✘ The gain that causes the process to stop

2. ✘ The gain that results in a 1% overshoot

3. ✔ The proportional gain at which the system produces sustained oscillations

4. ✘ The maximum possible gain of the valve

Correct Marks : 1 Wrong Marks : 0

Which type of pneumatic actuator is most commonly used to operate industrial globe control valves?

Options :

1. ✓ Spring and diaphragm actuator
2. ✗ Vane actuator
3. ✗ Stepper motor
4. ✗ Rack and Pinion actuator

Question Number : 167 Question Id : 77951813375 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In an electro – hydraulic actuator, what is the primary role of the “electro” component?

Options :

1. ✗ To increase the viscosity of the hydraulic fluid
2. ✓ To provide electrical power to a motor that drives a hydraulic pump
3. ✗ To directly move the piston using magnetic field
4. ✗ To acts as a receiver for the hydraulic coil

Question Number : 168 Question Id : 77951813376 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In a cascade control scheme, the inner loop is typically designed to be

Options :

1. ✗ Slower than the outer loop

2. ✘ As fast as the outer loop
3. ✔ Much faster than the outer loop
4. ✘ Un affected by noise

Question Number : 169 Question Id : 77951813377 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What is a common disadvantage of using radio controllers in a process control environment?

Options :

1. ✘ Low signal amplitude
2. ✔ Susceptibility to interference and noise
3. ✘ Inability to use PID algorithms
4. ✘ High power consumption of the transducer

Question Number : 170 Question Id : 77951813378 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The three main functions of an Adaptive control system are

Options :

1. ✔ Identification, Decision, Modification
2. ✘ Simulation, Calculation, Optimization
3. ✘ Sensing, Actuating, Recording

4. ✘ Filtering, Feedback, Feed forward

Question Number : 171 Question Id : 77951813379 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A pressure control loop has a tag “PT-200”. What does ‘PT’ stand for?

Options :

1. ✘ Pipe Transmitter
2. ✘ Pressure Temperature
3. ✔ Pressure Transmitter
4. ✘ Process Transducer

Question Number : 172 Question Id : 77951813380 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A line with a “D” in the middle typically represents what kind of signal?

Options :

1. ✘ Digital network
2. ✔ Digital data link
3. ✘ Digital pneumatic
4. ✘ Direct signal

Question Number : 173 Question Id : 77951813381 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following is NOT a common actuator component?

Options :

1. ✘ Diaphragm
2. ✘ Stem
3. ✘ Yoke
4. ✔ Impeller

Question Number : 174 Question Id : 77951813382 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following is considered a non-linear application of an op-amp?

Options :

1. ✘ Inverting amplifier
2. ✔ Schmitt trigger
3. ✘ Non-inverting amplifier
4. ✘ Instrumentation amplifier

Question Number : 175 Question Id : 77951813383 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

How many pins does a standard 555 timer IC package have?

Options :

1. ✘ 4
2. ✘ 6

3. ✓ 8

4. ✘ 18

Question Number : 176 Question Id : 77951813384 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Why is a voltage follower used in circuit design?

Options :

1. ✘ To amplify weak signals

2. ✘ To invert the output signal

3. ✓ To provide high input impedance and low output impedance

4. ✘ To act as a filter

Question Number : 177 Question Id : 77951813385 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A square wave generator is also known as a

Options :

1. ✘ One shot multivibrator

2. ✓ Astable multivibrator

3. ✘ Bistable multivibrator

4. ✘ Schmitt trigger

Correct Marks : 1 Wrong Marks : 0

The Wien bridge oscillator is commonly used in which frequency range?

Options :

1. ✘ Radio Frequency (RF)
2. ✔ Audio Frequency (AF)
3. ✘ Microwave Frequency
4. ✘ Very High Frequency (VHF)

Question Number : 179 Question Id : 77951813387 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

How many operational amplifiers are typically used to build a standard instrumentation amplifier circuit?

Options :

1. ✘ 1
2. ✘ 2
3. ✔ 3
4. ✘ 4

Question Number : 180 Question Id : 77951813388 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The output of a Schmitt trigger circuit is always

Options :

1. ✘ Analog

2. ✘ Triangular
3. ✔ Digital (high or low)
4. ✘ A saw tooth wave

Question Number : 181 Question Id : 77951813389 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which block in the Phase Locked Loop circuit compares the input frequency with the feedback frequency?

Options :

1. ✘ Low pass filter
2. ✘ Amplifier
3. ✔ Phase detector
4. ✘ VCO

Question Number : 182 Question Id : 77951813390 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which radiation region is commonly used in Fourier Transform Infrared (FTIR) Spectrometers?

Options :

1. ✘ Ultra Violet
2. ✔ Infrared
3. ✘

4. ✘ Radio waves

Question Number : 183 Question Id : 77951813391 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following components in a Flame Photometer is used to introduce the sample into the flame?

Options :

1. ✔ Nebulizer / Aspirator
2. ✘ Burner
3. ✘ Monochromator
4. ✘ Photo decoder

Question Number : 184 Question Id : 77951813392 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which gas is commonly used as a carrier gas in gas chromatography-based analyzers?

Options :

1. ✘ Carbon dioxide
2. ✘ Oxygen
3. ✘ Nitrogen
4. ✔ Hydrogen or Helium

Question Number : 185 Question Id : 77951813393 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

On what basis does a mass spectrometer separate ions?

Options :

1. ✘ Mass
2. ✘ Charge
3. ✘ Molecular weight
4. ✔ Mass to charge ratio

Question Number : 186 Question Id : 77951813394 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following light sources is commonly used in a standard Polarimeter?

Options :

1. ✘ Deuterium lamp
2. ✘ Tungsten lamp
3. ✔ Sodium vapor lamp
4. ✘ Xenon arc lamp

Question Number : 187 Question Id : 77951813395 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In a double-beam Spectrophotometer, the light is split to pass through

Options :

1. ✘

Two different samples

2. ✘ The sample twice
3. ✔ The sample and a reference (blank) simultaneously
4. ✘ A filter and a monochromator

Question Number : 188 Question Id : 77951813396 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the frequency range of a normal EEG signal?

Options :

1. ✔ 0.5-50 Hz
2. ✘ 100-500 Hz
3. ✘ 500-1000 Hz
4. ✘ 0.01-0.1 Hz

Question Number : 189 Question Id : 77951813397 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A Pacemaker is primarily designed for

Options :

1. ✘ Monitoring blood pressure
2. ✘ Defibrillation
3. ✘

4. ✓ Initiation of heart beats

Question Number : 190 Question Id : 77951813398 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the function of the vacuum inside an X-ray tube?

Options :

1. ✗ To increase the speed of X-rays
2. ✓ To prevent collision of electrons with gas molecules
3. ✗ To cool the anode
4. ✗ To increase the voltage

Question Number : 191 Question Id : 77951813399 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the CT number for water?

Options :

1. ✗ -1000
2. ✓ 0
3. ✗ +1000
4. ✗ +100

Question Number : 192 Question Id : 77951813400 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What type of waveform is typically used in modern, efficient defibrillators?

Options :

1. ✘ Monophasic
2. ✘ Sine wave
3. ✘ Square wave
4. ✔ Biphasic

Question Number : 193 Question Id : 77951813401 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What does ARM stand for in ARM Microcontroller?

Options :

1. ✘ Advanced Robotics Microcontroller
2. ✘ Advanced Radio Module
3. ✔ Advanced RISC Machine
4. ✘ Advanced Remote Monitoring

Question Number : 194 Question Id : 77951813402 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which register is used as the Program Counter (PC) in ARM architecture?

Options :

1. ✘ R0

2. ✘ R13

3. ✘ R14

4. ✔ R15

Question Number : 195 Question Id : 77951813403 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In advanced ARM controllers, what does the “DSP extension” provide?

Options :

1. ✘ Increased flash memory

2. ✘ Enhanced security

3. ✔ Single – cycle Multiply Accumulate (MAC) instruction

4. ✘ Faster I/O toggling

Question Number : 196 Question Id : 77951813404 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

How many analog input pins are available on a standard Arduino UNO board?

Options :

1. ✔ 6

2. ✘ 4

3. ✘ 8

4. ✘ 12

Question Number : 197 Question Id : 77951813405 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What language is a typical Arduino code based on?

Options :

1. ✘ JAVA
2. ✘ Python
3. ✘ Assembly code
4. ✔ C/C++

Question Number : 198 Question Id : 77951813406 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which instruction is used to reset a Retentive Timer (RTO) or a counter?

Options :

1. ✘ CLR
2. ✔ RES (reset)
3. ✘ OTL
4. ✘ OTU

Question Number : 199 Question Id : 77951813407 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What is the physical structure of the robot that moves around called?

Options :

1. ✔

2. ✘ End – effector

3. ✘ Joint

4. ✘ Link

Question Number : 200 Question Id : 77951813408 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What is the full form of CNC?

Options :

1. ✘ Computer Network Control

2. ✘ Computer Number Control

3. ✔ Computer Numerical Control

4. ✘ Computer Numerical Centre