

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 19th Sep 2021 Shift2
Duration :	180
Total Marks :	200
Display Marks:	No
Calculator :	None
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console? (SA type of questions will be always auto saved) :	Yes
Is this Group for Examiner? :	No

Section Id :	477203409
Section Number :	1
Mandatory or Optional :	Mandatory
Number of Questions :	50
Section Marks :	50
Enable Mark as Answered Mark for Review and Clear Response :	Yes

Question Number : 1 Question Id : 47720320833 Display Question Number : Yes Is Question Mandatory : No

If $k \neq -5$ is a real number, then, the number of solutions to the following system of equations

$$3x - y + 4z = 3$$

$$x + 2y - 3z = -2$$

$$6x + 5y + kz = -3 \quad \text{is}$$

Options :

1. ✘ 0

2. ✔ 1

3. ✘ 2

4. ✘ *infinitely many*

Question Number : 2 Question Id : 47720320834 Display Question Number : Yes Is Question Mandatory : No

$$\begin{vmatrix} 1 & 1+p & 1+p+q \\ 2 & 3+2p & 4+3p+2q \\ 3 & 6+3p & 10+6p+3q \end{vmatrix} =$$

Options :

1. ✘ 0

2. ✔ 1

3. ✘ 2

4. ✘ 3

Question Number : 3 Question Id : 47720320835 Display Question Number : Yes Is Question

Mandatory : No

Let $|A|$ denote the determinant of the matrix A . If A is a square matrix of order 3, and $|4A| = r|A|$, then the value of r is

Options :

1. ✘ 0

2. ✘ 4

3. ✘ 16

4. ✔ 64

Question Number : 4 Question Id : 47720320836 Display Question Number : Yes Is Question

Mandatory : No

If $\begin{vmatrix} y & y \\ 1 & y \end{vmatrix} = \begin{vmatrix} 3 & 4 \\ 1 & 2 \end{vmatrix}$, then the value of y is

Options :

1. ✘ 0

2. ✘ 1

3. ✔ 2

4. ✘ 3

Question Number : 5 Question Id : 47720320837 Display Question Number : Yes Is Question Mandatory : No

Let $\begin{vmatrix} 2 & 3+i & -1 \\ 3-i & 0 & -1+i \\ -1 & -1-i & 1 \end{vmatrix} = a + ib$, where a and b are real numbers. Then the value of b is

Options :

1. ✔ 0

2. ✘ 1

3. ✘ 3

4. ✘ 4

Question Number : 6 Question Id : 47720320838 Display Question Number : Yes Is Question Mandatory : No

If $\frac{y^2-5y+1}{(y+1)(y+2)(y+3)} = \frac{a}{y+1} + \frac{b}{(y+1)(y+2)} + \frac{c}{(y+1)(y+2)(y+3)}$, then,

Options :

1. ✘ $a = 1, b = 10, c = 25$
2. ✔ $a = 1, b = -10, c = 25$
3. ✘ $a = 5, b = 10, c = 25$
4. ✘ $a = 5, b = -10, c = 25$

Question Number : 7 Question Id : 47720320839 Display Question Number : Yes Is Question Mandatory : No

$$\frac{2x+3}{(x^2+1)(x+4)} =$$

Options :

1. ✘ $\frac{5}{17(x+4)} + \frac{5x+14}{17(x^2+1)}$
2. ✘ $\frac{-5}{17(x+4)} - \frac{5x+14}{17(x^2+1)}$
3. ✔ $\frac{-5}{17(x+4)} + \frac{5x+14}{17(x^2+1)}$

$$\frac{-5}{17(x+4)} + \frac{5x-14}{17(x^2+1)}$$

4. ✘

Question Number : 8 Question Id : 47720320840 Display Question Number : Yes Is Question Mandatory : No

If x and y are two distinct real numbers, then, the number of values of θ in $[0, 2\pi]$ for which $\operatorname{cosec} \theta = \frac{x^2 - y^2}{x^2 + y^2}$ is

Options :

1. ✔ 0

2. ✘ 1

3. ✘ 2

4. ✘ 3

Question Number : 9 Question Id : 47720320841 Display Question Number : Yes Is Question Mandatory : No

If $\cos(\alpha - \beta) + \cos(\beta - \gamma) + \cos(\gamma - \alpha) = -\frac{3}{2}$, then $\cos \alpha + \cos \beta + \cos \gamma =$

Options :

1. ✘ $-\frac{3}{2}$

2. ✘ -1

3. ✔ 0

4. ✘ 1

Question Number : 10 Question Id : 47720320842 Display Question Number : Yes Is Question Mandatory : No

For all real numbers θ , the value of $\sin^2 \theta + \cos^4 \theta$ is greater than or equal to

Options :

1. ✔ $\frac{3}{4}$

2. ✘ 1

3. ✘ $\frac{5}{4}$

4. ✘ 2

Question Number : 11 Question Id : 47720320843 Display Question Number : Yes Is Question Mandatory : No

Let x be a real number such that $\tan\left(\frac{\pi}{4} + x\right) + \tan\left(\frac{\pi}{4} - x\right) = 2$. Then x is of the form $x = n\pi + a$, where $n \in \mathbb{Z}$, and $a =$

Options :

1. ✔ 0

2. ✘ $\frac{\pi}{3}$

3. ✘ $\frac{\pi}{4}$

4. ✘ $\frac{\pi}{6}$

Question Number : 12 Question Id : 47720320844 Display Question Number : Yes Is Question Mandatory : No

If $(\sin^{-1} x) > (\cos^{-1} x)$, then x belongs to the interval

Options :

1. ✘ $[0, \frac{1}{\sqrt{2}})$

2. ✔ $(\frac{1}{\sqrt{2}}, 1]$

3. ✘ $[\frac{1}{\sqrt{2}}, 1]$

4. ✘ $[0, \frac{1}{\sqrt{2}}]$

Question Number : 13 Question Id : 47720320845 Display Question Number : Yes Is Question Mandatory : No

Consider a triangle ΔABC , with sides of length a, b and c , and angles A, B and C . If

a, b, c and the area of the triangle ΔABC are all rational, then

Options :

1. ✘ $\tan \frac{B}{2}$ is rational and $\tan \frac{C}{2}$ is irrational.

2. ✘

$\tan \frac{B}{2}$ is irrational and $\tan \frac{C}{2}$ is rational.

3. ✓ $\tan \frac{B}{2}$ and $\tan \frac{C}{2}$ are both rational.

4. ✗ $\tan \frac{B}{2}$ and $\tan \frac{C}{2}$ are both irrational.

Question Number : 14 Question Id : 47720320846 Display Question Number : Yes Is Question Mandatory : No

Consider a triangle $\triangle ABC$, with sides of length a, b and c , and angles A, B and C . If

$3a=b+c$, then the value of $\cot \frac{B}{2} \cdot \cot \frac{C}{2}$ is

Options :

1. ✗ 0

2. ✗ $\frac{1}{2}$

3. ✗ $\sqrt{3}$

4. ✓ 2

Question Number : 15 Question Id : 47720320847 Display Question Number : Yes Is Question Mandatory : No

$2 \tan^{-1} \left(\frac{3}{4} \right) - \tan^{-1} \left(\frac{17}{31} \right) =$

Options :

1. ✘ 0

2. ✔ $\frac{\pi}{4}$

3. ✘ $\frac{\pi}{2}$

4. ✘ π

Question Number : 16 Question Id : 47720320848 Display Question Number : Yes Is Question Mandatory : No

Consider a triangle $\triangle ABC$ with angles A, B and C . If $\cos A + \cos B + \cos C = \frac{3}{2}$, then the triangle $\triangle ABC$ is

Options :

1. ✔ equilateral.

2. ✘ isosceles, and right-angled.

3. ✘ isosceles, with one of the angles equal to $\frac{\pi}{6}$.

4. ✘ scalene

Question Number : 17 Question Id : 47720320849 Display Question Number : Yes Is Question Mandatory : No

The value of $\cos^2 x + \cos^2 \left(x + \frac{\pi}{3}\right) + \cos^2 \left(x - \frac{\pi}{3}\right)$ is

Options :

1. ✘ 1

2. ✔ $\frac{3}{2}$

3. ✘ 2

4. ✘ $\frac{5}{2}$

Question Number : 18 Question Id : 47720320850 Display Question Number : Yes Is Question Mandatory : No

The value of $\left(\frac{\sqrt{3}+i}{\sqrt{3}-i}\right)^3$ is

Options :

1. ✘ $-2\sqrt{2}$

2. ✔ -1

3. ✘ 0

4. ✘ $2\sqrt{2}$

Question Number : 19 Question Id : 47720320851 Display Question Number : Yes Is Question Mandatory : No

If $x + iy = \frac{a+ib}{a-ib}$, then $x^2 + y^2 =$

Options :

1. ✘ 0

2. ✔ 1

3. ✘ 2

4. ✘ 4

Question Number : 20 Question Id : 47720320852 Display Question Number : Yes Is Question Mandatory : No

If a circle of radius 5 touches the circle $x^2 + y^2 - 2x - 4y = 20$ at the point $(5,5)$, then, its center is

Options :

1. ✘ (8,8)

2. ✘ (8,9)

3. ✔ (9,8)

4. ✘ (9,9)

Question Number : 21 Question Id : 47720320853 Display Question Number : Yes Is Question Mandatory : No

The equation $9x^2 - 24xy + 16y^2 - 20x - 15y = 60$ represents

Options :

1. ✓ a parabola

2. ✘ an ellipse

3. ✘ a hyperbola

4. ✘ a circle

Question Number : 22 Question Id : 47720320854 Display Question Number : Yes Is Question Mandatory : No

Let $(x_j, y_j), j=1,2,3,4$, be points of intersection of the parabola $y^2 = 4ax$ and the circle $x^2 + y^2 + 2gx + 2fy + c = 0$.

Then $y_1 + y_2 + y_3 + y_4 =$

Options :

1. ✘ -2

2. ✘ $-\frac{1}{2}$

3. ✓ 0

4. ✘ $\frac{1}{2}$

Question Number : 23 Question Id : 47720320855 Display Question Number : Yes Is Question Mandatory : No

The length of the major axis of the ellipse $9x^2 + 5y^2 - 30y = 0$ is

Options :

1. ✘ $\sqrt{5}$

2. ✘ 3

3. ✘ $2\sqrt{5}$

4. ✔ 6

Question Number : 24 Question Id : 47720320856 Display Question Number : Yes Is Question Mandatory : No

If $S(-1, 1)$ is one of the foci of a hyperbola, $x - y + 3 = 0$ is its directrix corresponding to S and 3 is its eccentricity, then, the equation of the hyperbola is

Options :

1. ✘ $7x^2 + 18xy + 7y^2 + 50x + 50y + 77 = 0$

2. ✘ $7x^2 + 18xy + 7y^2 + 50x - 50y + 77 = 0$

3. ✔ $7x^2 - 18xy + 7y^2 + 50x - 50y + 77 = 0$

4. ✘ $7x^2 - 18xy - 7y^2 - 50x + 50y + 77 = 0$

Question Number : 25 Question Id : 47720320857 Display Question Number : No Is Question Mandatory : No

The equation $4(x - 2y + 1)^2 + 9(2x + y + 2)^2 = 25$ represents

Options :

1. ✘ a parabola
2. ✔ an ellipse
3. ✘ a hyperbola
4. ✘ a circle

Question Number : 26 Question Id : 47720320858 Display Question Number : Yes Is Question

Mandatory : No

Let f be a twice differentiable function such that $f''(x) + f(x) = 0$, and $f'(x) = g(x)$. If $h(x) = [f(x)]^2 + [g(x)]^2$, and $h(10) = 20$, then $h(40) =$

Options :

1. ✔ 20
2. ✘ 40
3. ✘ 80
4. ✘ 160

Question Number : 27 Question Id : 47720320859 Display Question Number : Yes Is Question

Mandatory : No

$$\lim_{x \rightarrow \frac{\pi}{2}} \left(\frac{\cot x - \cos x}{\cos^2 x} \right) =$$

Options :

1. ✘ -1

2. ✔ 0

3. ✘ $\sqrt{3}$

4. ✘ $\frac{\pi}{2}$

Question Number : 28 Question Id : 47720320860 Display Question Number : Yes Is Question Mandatory : No

Let \mathbb{R} be the set of all real numbers. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ satisfy the condition:

$|f(x) - f(y)| \leq |x - y|^{2021}$, for all $x, y \in \mathbb{R}$. Then the value of $f'(2022)$ is

Options :

1. ✔ 0

2. ✘ 1

3. ✘ 2021

4. ✘ 2022

Question Number : 29 Question Id : 47720320861 Display Question Number : Yes Is Question

Mandatory : No

The number of real roots of the equation $x + e^x = 0$ is

Options :

1. ✘ 0

2. ✔ 1

3. ✘ 2

4. ✘ Infinitely many

Question Number : 30 Question Id : 47720320862 Display Question Number : Yes Is Question

Mandatory : No

If $y = \text{Tan}^{-1} \left(\frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}} \right)$, then $\frac{dy}{dx} =$

Options :

1. ✘ $\cot^2 x$

2. ✘ $\sec^2 x$

3. ✔ $-\frac{1}{2}$

4. ✘ $\frac{1}{2}$

Question Number : 31 Question Id : 47720320863 Display Question Number : Yes Is Question Mandatory : No

The equation of the tangent to the curve $x = \sin 3t, y = \cos 2t$, at $t = \frac{\pi}{4}$ is given by

Options :

1. ✘ $\sqrt{2}x - 3y - 2 = 0$

2. ✘ $\sqrt{2}x + 3y - 2 = 0$

3. ✔ $2\sqrt{2}x - 3y - 2 = 0$

4. ✘ $2\sqrt{2}x - 3y + 2 = 0$

Question Number : 32 Question Id : 47720320864 Display Question Number : Yes Is Question Mandatory : No

An open tank with a square base (with side x) and vertical sides (with height y) is to be constructed from a metal sheet so as to hold a given quantity of water. The cost of the material will be the least if

Options :

1. ✘ $x=y$

2. ✔ $x=2y$

3. ✘ $2x=y$

4. ✘

$$4x=y$$

Question Number : 33 Question Id : 47720320865 Display Question Number : Yes Is Question Mandatory : No

The function $f(x) = x^3 - 12x^2 + 36x + 48$, is decreasing in the interval

Options :

1. ✘ $(-\infty, 2)$

2. ✘ $(-\infty, 6)$

3. ✔ $(2, 6)$

4. ✘ $(6, \infty)$

Question Number : 34 Question Id : 47720320866 Display Question Number : Yes Is Question Mandatory : No

A shopkeeper can buy x items for Rs. $\left(\frac{x}{5} + 500\right)$. He can sell the x items at the rate

Rs. $\left(5 - \frac{x}{100}\right)$ per item. Then the number of items he should sell to make maximum

profit is

Options :

1. ✔ 240

2. ✘ 360

3. ✘ 400

4. ✘ 500

Question Number : 35 Question Id : 47720320867 Display Question Number : Yes Is Question Mandatory : No

$$\text{If } z = ax^2 + 2hxy + by^2, \text{ then } x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} =$$

Options :

1. ✘ z

2. ✘ z^2

3. ✘ $\frac{1}{2}z$

4. ✔ $2z$

Question Number : 36 Question Id : 47720320868 Display Question Number : Yes Is Question Mandatory : No

$$\int_{-1}^1 \frac{x \sin^{-1} x}{\sqrt{1-x^2}} dx =$$

Options :

1. ✘ 0

2. ✘ 1

3. ✘ $\frac{3}{2}$

4. ✔ 2

Question Number : 37 Question Id : 47720320869 Display Question Number : Yes Is Question Mandatory : No

The area of the region bounded by the curve $y = x^2 + 4$, the x-axis and the ordinates at $x=1$ and $x=5$ is

Options :

1. ✘ $\frac{147}{3}$

2. ✔ $\frac{172}{3}$

3. ✘ $\frac{187}{3}$

4. ✘ $\frac{227}{3}$

Question Number : 38 Question Id : 47720320870 Display Question Number : Yes Is Question Mandatory : No

$$\lim_{n \rightarrow \infty} \sum_{k=0}^{n-1} \frac{1}{\sqrt{n^2 - k^2}} =$$

Options :

1. ✘ 0

2. ✔

$$\frac{\pi}{2}$$

3. ✘ π

4. ✘ 2π

Question Number : 39 Question Id : 47720320871 Display Question Number : Yes Is Question Mandatory : No

$$\int_0^1 \frac{2x}{1+x^2} dx =$$

Options :

1. ✘ 1

2. ✘ 2

3. ✔ $\log 2$

4. ✘ $3 \log 2$

Question Number : 40 Question Id : 47720320872 Display Question Number : Yes Is Question Mandatory : No

$$\int \frac{e^{ax} - e^{-ax}}{e^{ax} + e^{-ax}} dx =$$

(In the following, c is a constant.)

Options :

1. ✓ $\frac{1}{a} \log |e^{ax} + e^{-ax}| + c$

2. ✗ $\frac{1}{a} \log |e^{ax} - e^{-ax}| + c$

3. ✗ $\frac{1}{2a} \log |e^{ax} + e^{-ax}| + c$

4. ✗ $\frac{1}{2a} \log |e^{ax} - e^{-ax}| + c$

Question Number : 41 Question Id : 47720320873 Display Question Number : Yes Is Question Mandatory : No

$$\int_0^{\pi} \frac{e^{\cos x}}{e^{\cos x} + e^{-\cos x}} dx =$$

Options :

1. ✗ $-\pi$

2. ✗ 0

3. ✓ $\frac{\pi}{2}$

4. ✗ π

Question Number : 42 Question Id : 47720320874 Display Question Number : Yes Is Question Mandatory : No

$$\int_{-\pi}^{\pi} \sin^5 x \, dx =$$

Options :

1. ✓ 0

2. ✗ $\frac{\pi}{2}$

3. ✗ π

4. ✗ 2π

Question Number : 43 Question Id : 47720320875 Display Question Number : Yes Is Question Mandatory : No

The area of the region bounded by $y=|x+3|$, the x-axis and the lines $x = -6$ and $x = 0$ is

Options :

1. ✗ 3 square units

2. ✓ 9 square units

3. ✗ 12 square units

4. ✗ 18 square units

Question Number : 44 Question Id : 47720320876 Display Question Number : Yes Is Question

Mandatory : No

The degree of the differential equation $7x \left(\frac{dy}{dx}\right)^2 - \frac{d^2y}{dx^2} + 10y = \log x$ is

Options :

1. ✓ 1

2. ✗ 2

3. ✗ 3

4. ✗ 4

Question Number : 45 Question Id : 47720320877 Display Question Number : Yes Is Question

Mandatory : No

The solution of the differential equation $\frac{dy}{dx} = y \tan x$, given that $y=1$ when $x=0$, is given by

Options :

1. ✗ $y = \cos x$

2. ✗ $y = \cos 2x$

3. ✓ $y = \sec x$

4. ✗ $y = \sec 2x$

Question Number : 46 Question Id : 47720320878 Display Question Number : Yes Is Question

Mandatory : No

The solution to the differential equation $(3x^2 + y) \frac{dx}{dy} = x$, ($x > 0$), such that $y=1$ if $x=1$ is

Options :

1. ✘ $y = 2x^2 - x$

2. ✔ $y = 3x^2 - 2x$

3. ✘ $y = 4x^2 - 3x$

4. ✘ $y = 5x^2 - 4x$

Question Number : 47 Question Id : 47720320879 Display Question Number : Yes Is Question

Mandatory : No

The differential equation of the family of parabolas having vertex at the origin and axis along the positive y-axis is

Options :

1. ✘ $xy' = 2$

2. ✔ $xy' = 2y$

3. ✘ $xy' = -2y$

4. ✘ $xy' = 2y^2$

Question Number : 48 Question Id : 47720320880 Display Question Number : Yes Is Question

Mandatory : No

The solution of the differential equation $\frac{dy}{dx} + y \cot x = 4x \operatorname{cosec} x$, ($x \neq 0$), given that $y=0$ when $x = \frac{\pi}{2}$ is

Options :

$$y \operatorname{cosec} x = x^2 - \frac{\pi^2}{4}$$

1. ✘

$$y \operatorname{cosec} x = 2x^2 - \frac{\pi^2}{2}$$

2. ✘

$$y \sin x = x^2 - \frac{\pi^2}{4}$$

3. ✘

$$y \sin x = 2x^2 - \frac{\pi^2}{2}$$

4. ✔

Question Number : 49 Question Id : 47720320881 Display Question Number : Yes Is Question

Mandatory : No

The general solution of the differential equation $\log_e \left(\frac{dy}{dx} \right) = ax + by$ is given by

Options :

$$ae^{ax} + be^{-by} + C = 0$$

1. ✘

$$ae^{ax} - be^{-by} + C = 0$$

2. ✘

$$\frac{1}{a}e^{ax} + \frac{1}{b}e^{-by} + C = 0$$

3. ✔

4. ✘ $\frac{1}{a}e^{ax} - \frac{1}{b}e^{-by} + C = 0$

Question Number : 50 Question Id : 47720320882 Display Question Number : Yes Is Question Mandatory : No

The particular integral of the differential equation $(D^2 + D - 2)y = \sin x$ is given by

Options :

1. ✘ $-\frac{1}{10}(\cos x + \sin x)$

2. ✔ $-\frac{1}{10}(\cos x + 3 \sin x)$

3. ✘ $-\frac{1}{10}(\cos 3x + \sin 3x)$

4. ✘ $-\frac{1}{10}(3 \cos x + \sin x)$

Physics

Section Id :	477203410
Section Number :	2
Mandatory or Optional :	Mandatory
Number of Questions :	25
Section Marks :	25
Enable Mark as Answered Mark for Review and	Yes

Clear Response :

Question Number : 51 Question Id : 47720320883 Display Question Number : Yes Is Question Mandatory : No

The dimensional formula for gravitational constant, G is

Options :

1. ✘ $M^1L^3T^{-2}$

2. ✔ $M^{-1}L^3T^{-2}$

3. ✘ $M^0L^3T^{-2}$

4. ✘ $M^2L^3T^{-2}$

Question Number : 52 Question Id : 47720320884 Display Question Number : Yes Is Question Mandatory : No

Which of the following quantities have not been expressed in proper units?

Options :

1. ✘ electric field = Newton/Coulomb

2. ✘ surface tension = Newton/meter

3. ✔ energy = kg m/s

4. ✘ pressure = Newton/m²

Question Number : 53 Question Id : 47720320885 Display Question Number : Yes Is Question

Mandatory : No

A vector A is along positive x-axis. If B is another vector such that $A \times B$ is zero, then B could be

Options :

1. ✘ $4\hat{j}$

2. ✔ $-4\hat{i}$

3. ✘ $-(\hat{i} + \hat{j})$

4. ✘ $(\hat{j} + \hat{k})$

Question Number : 54 Question Id : 47720320886 Display Question Number : Yes Is Question

Mandatory : No

The scalar product of two vectors is $2\sqrt{3}$ and the magnitude of their vector product is 2.

The angle between them is

Options :

1. ✔ 30°

2. ✘ 45°

3. ✘ 60°

4. ✘ 90°



Question Number : 55 Question Id : 47720320887 Display Question Number : Yes Is Question

Mandatory : No

The work done by a force is defined as $W = \mathbf{F} \cdot \mathbf{S}$. In a certain situation \mathbf{F} and \mathbf{S} are not zero but the work done is zero when

Options :

1. ✘ \mathbf{F} and \mathbf{S} are in the same direction
2. ✘ \mathbf{F} and \mathbf{S} are in opposite direction
3. ✔ \mathbf{F} and \mathbf{S} are at right angles
4. ✘ \mathbf{F} and \mathbf{S} are at 45°

Question Number : 56 Question Id : 47720320888 Display Question Number : Yes Is Question

Mandatory : No

A body starts from rest and travels a distance x in first two seconds and a distance y in next two seconds. The relation between x and y is

Options :

1. ✘ $y = 4x$
2. ✘ $y = x$
3. ✔ $y = 3x$
4. ✘ $y = 2x$

Question Number : 57 Question Id : 47720320889 Display Question Number : Yes Is Question

Mandatory : No

A projectile is projected with initial velocity $(6\hat{i} + 8\hat{j})$ m/s. If $g = 10 \text{ m/s}^2$ then horizontal range is

Options :

1. ✘ 4.8 m
2. ✔ 9.6 m
3. ✘ 19.2 m
4. ✘ 14.0 m

Question Number : 58 Question Id : 47720320890 Display Question Number : Yes Is Question

Mandatory : No

The maximum range of a projectile fired with some initial velocity is found to be 1000 m/s, in the absence of wind and air resistance. The maximum height reached by this projectile is

Options :

1. ✔ 250 m
2. ✘ 500 m
3. ✘ 1000 m
4. ✘ 2000 m

Question Number : 59 Question Id : 47720320891 Display Question Number : Yes Is Question

Mandatory : No

The force of friction between two bodies is

Options :

1. ✓ parallel to the contact surface
2. ✗ perpendicular to the contact surface
3. ✗ inclined at 30^0 to the contact surface
4. ✗ inclined at 60^0 to the contact surface

Question Number : 60 Question Id : 47720320892 Display Question Number : Yes Is Question

Mandatory : No

A body is sliding down an inclined plane under its own weight at constant speed. If the inclination of the plane to the horizontal is 30^0 , the angle of friction is

Options :

1. ✓ 30^0
2. ✗ 60^0
3. ✗ 45^0
4. ✗ 90^0

Question Number : 61 Question Id : 47720320893 Display Question Number : Yes Is Question

Mandatory : No

A block of mass 5 kg is resting on a smooth surface. At what angle, a force of 20 N be acted on the body so that it will acquire a kinetic energy of 40 J after moving 4m

Options :

1. ✘ 30^0

2. ✘ 45^0

3. ✔ 60^0

4. ✘ 120^0

Question Number : 62 Question Id : 47720320894 Display Question Number : Yes Is Question

Mandatory : No

Two men with the weights in the ratio 4:3 run up a staircase in time, in the ratio 12:11. The ratio of power of the first to that of second is

Options :

1. ✘ $\frac{4}{3}$

2. ✘ $\frac{12}{11}$

3. ✘ $\frac{48}{33}$

4. ✔ $\frac{11}{9}$

Question Number : 63 Question Id : 47720320895 Display Question Number : Yes Is Question Mandatory : No

Energy harnessed from flowing water is called-----energy

Options :

1. ✘ Solar
2. ✔ Hydel
3. ✘ Tidal
4. ✘ Geothermal

Question Number : 64 Question Id : 47720320896 Display Question Number : Yes Is Question Mandatory : No

The total mechanical energy of a spring-mass system in simple harmonic motion is $E = 0.5 m\omega^2 A^2$. If the oscillating particle is replaced by another particle of double the mass while the amplitude A remains the same. The new mechanical energy is

Options :

1. ✘ $2E$
2. ✘ $0.5 E$
3. ✘ $\sqrt{2} E$
4. ✔ E

Question Number : 65 Question Id : 47720320897 Display Question Number : Yes Is Question

Mandatory : No

Sound of frequency 1000 Hz from a stationary source is reflected from an object approaching the source at 30 m/s back to a stationary observer located at the source. The speed of sound in air is 330 m/s. The frequency of the sound heard by the observer is

Options :

1. ✓ 1200 Hz
2. ✗ 1000 Hz
3. ✗ 1090 Hz
4. ✗ 1100 Hz

Question Number : 66 Question Id : 47720320898 Display Question Number : Yes Is Question

Mandatory : No

The frequency of a pendulum if it is taken from the earth's surface to deep into a mine

Options :

1. ✗ increases
2. ✓ decreases
3. ✗ first increases then decreases
4. ✗ remains unchanged

Question Number : 67 Question Id : 47720320899 Display Question Number : Yes Is Question Mandatory : No

Two waves of lengths 50 cm and 51 cm produced 12 beats per second. The velocity of sound is

Options :

1. ✘ 340 m/s
2. ✘ 2. 331 m/s
3. ✔ 306 m/s
4. ✘ 360 m/s

Question Number : 68 Question Id : 47720320900 Display Question Number : Yes Is Question Mandatory : No

According to reverberation time the final intensity is around

Options :

1. ✘ one-hundredth of the initial intensity
2. ✘ one-tenth of the initial intensity
3. ✘ one-thousandth of the initial intensity
4. ✔ one-millionth of the initial intensity

Question Number : 69 Question Id : 47720320901 Display Question Number : Yes Is Question Mandatory : No

An ideal gas has volume V at pressure P and temperature T . Mass of each molecule is m . The density of the gas is

Options :

1. ✘ mKT

2. ✘ $\frac{P}{KT}$

3. ✘ $\frac{P}{KTV}$

4. ✔ $\frac{Pm}{KT}$

Question Number : 70 Question Id : 47720320902 Display Question Number : Yes Is Question Mandatory : No

Work done by 0.1 mole of a gas at 27°C to double its volume at constant pressure is
($R=2 \text{ cal/mol/K}$)

Options :

1. ✘ 54 cal

2. ✘ 600 cal

3. ✔ 60 cal

4. ✘

546 cal

Question Number : 71 Question Id : 47720320903 Display Question Number : Yes Is Question Mandatory : No

If the pressure of a gas contained in a closed vessel is increased by 0.4%, when heated by 1°C , its initial temperature is

Options :

1. ✓ 250 K

2. ✗ 150 K

3. ✗ 100 K

4. ✗ 50 K

Question Number : 72 Question Id : 47720320904 Display Question Number : Yes Is Question Mandatory : No

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 expansion respectively, T_1/T_2 is given by

Options :

1. ✗ $\left(\frac{L_1}{L_2}\right)^{2/3}$

2. ✓ $\left(\frac{L_2}{L_1}\right)^{2/3}$

3. ✘ $\frac{L_1}{L_2}$

4. ✘ $\frac{L_2}{L_1}$

Question Number : 73 Question Id : 47720320905 Display Question Number : Yes Is Question Mandatory : No

A Carnot's engine operates with source at 127°C and sink at 27°C . If the source supplies 40 kJ of heat energy, the work done by the engine is

Options :

1. ✘ 30 kJ

2. ✔ 10 kJ

3. ✘ 4 kJ

4. ✘ 1 kJ

Question Number : 74 Question Id : 47720320906 Display Question Number : Yes Is Question Mandatory : No

The optical fibre consisting of a central core is clad by material of

Options :

1. ✔ slightly lower refractive index

2. ✘

slightly higher refractive index

equal refractive index

3. ✘

very high refractive index

4. ✘

Question Number : 75 Question Id : 47720320907 Display Question Number : Yes Is Question Mandatory : No

The susceptibility of the superconductor is

Options :

1. ✘ positive and small

2. ✘ negative and small

3. ✘ positive and unity

4. ✔ negative and unity

Chemistry

Section Id :	477203411
Section Number :	3
Mandatory or Optional :	Mandatory
Number of Questions :	25
Section Marks :	25

Enable Mark as Answered Mark for Review and
Clear Response :

Yes

Question Number : 76 Question Id : 47720320908 Display Question Number : Yes Is Question
Mandatory : No

The nucleus of tritium consists of -----

Options :

1. ✘ 1 proton + 1 neutron
2. ✘ 1 proton + 3 neutrons
3. ✘ 1 proton + zero neutron
4. ✔ 1 proton + 2 neutrons

Question Number : 77 Question Id : 47720320909 Display Question Number : Yes Is Question
Mandatory : No

Which of the following electronic configuration is not possible?

Options :

1. ✘ $1s^2 2s^2 2p^6$
2. ✔ $1s^2 2s^2 2p^7$
3. ✘ $1s^2 2s^2$
4. ✘ $1s^2 2s^2 2p^5$

Question Number : 78 Question Id : 47720320910 Display Question Number : Yes Is Question Mandatory : No

Radius of 3rd Bohr orbit of hydrogen atom is -----

Options :

1. ✘ 6.529A^0

2. ✔ 4.761A^0

3. ✘ 2.116A^0

4. ✘ 8.464A^0

Question Number : 79 Question Id : 47720320911 Display Question Number : Yes Is Question Mandatory : No

Covalent compounds are generally soluble in -----

Options :

1. ✔ Non-polar solvents

2. ✘ Polar solvents

3. ✘ Concentrated acids

4. ✘ All solvents

Question Number : 80 Question Id : 47720320912 Display Question Number : Yes Is Question Mandatory : No

Six electrons are mutually shared in -----

Options :

1. ✘ F_2

2. ✘ Cl_2

3. ✘ O_2

4. ✔ N_2

Question Number : 81 Question Id : 47720320913 Display Question Number : Yes Is Question Mandatory : No

To half the molarity of a solution, the following should be adopted.

Options :

1. ✘ Weight of the solute to be doubled

2. ✘ Weight of the solvent to be doubled

3. ✘ Volume of the solvent to be doubled

4. ✔ Volume of the solution to be doubled

Question Number : 82 Question Id : 47720320914 Display Question Number : Yes Is Question Mandatory : No

The molecular weight of KMnO_4 is "M". In a reaction KMnO_4 is reduced to K_2MnO_4 . The equivalent weight of KMnO_4 is

Options :

1. ✓ M
2. ✗ $M/2$
3. ✗ $M/3$
4. ✗ $M/4$

Question Number : 83 Question Id : 47720320915 Display Question Number : Yes Is Question Mandatory : No

Calculate the weight of NaOH present in 500 ml of 0.5 N Solution

Options :

1. ✗ 5 g
2. ✓ 10 g
3. ✗ 12 g
4. ✗ 15 g

Question Number : 84 Question Id : 47720320916 Display Question Number : Yes Is Question Mandatory : No

On addition of NaOH to water

Options :

1. ✘ Ionic product will increase
2. ✘ Ionic product will decrease
3. ✔ No change in ionic product of water
4. ✘ H_3O^+ concentration increases

Question Number : 85 Question Id : 47720320917 Display Question Number : Yes Is Question Mandatory : No

Which of the following is not a buffer solution?

Options :

1. ✘ $(\text{CH}_3\text{COOH}/\text{CH}_3\text{COONa})$
2. ✔ (HCl/NaCl)
3. ✘ $(\text{HCOOH}/\text{HCOONa})$
4. ✘ $(\text{NH}_4\text{OH}/\text{NH}_4\text{Cl})$

Question Number : 86 Question Id : 47720320918 Display Question Number : Yes Is Question Mandatory : No

Which of the following is a good conductor of electricity?

Options :

1. ✘ Diamond
2. ✔ Graphite
3. ✘ Solid NaCl
4. ✘ Wood

Question Number : 87 Question Id : 47720320919 Display Question Number : Yes Is Question Mandatory : No

Which of the following (1M) conducts more electricity?

Options :

1. ✘ Acetic acid
2. ✘ Boric acid
3. ✘ Phosphorous acid
4. ✔ Sulphuric acid

Question Number : 88 Question Id : 47720320920 Display Question Number : Yes Is Question Mandatory : No

In electrolysis of dilute H_2SO_4 , which of the following is liberated at anode in presence of inert electrode?

Options :

1. ✘ H_2
2. ✘ SO_2
3. ✔ O_2
4. ✘ SO_3

Question Number : 89 Question Id : 47720320921 Display Question Number : Yes Is Question Mandatory : No

The EMF of the cell $Ni/Ni^{2+} (0.01M) / Cl^-(0.01M) / Cl_2, Pt$ is ---V if the SRP of nickel and chlorine electrodes are -0.25V and +1.36V respectively

Options :

1. ✘ + 1.61
2. ✘ - 1.61
3. ✔ + 1.79
4. ✘ - 1.79

Question Number : 90 Question Id : 47720320922 Display Question Number : Yes Is Question Mandatory : No

Which of the following is correct relation used to measures the hardness of water?

Options :

1. ✓ $1 \text{ mg/L} = 1 \text{ ppm} = 0.07^\circ\text{Cl} = 0.1^\circ\text{Fr}$
2. ✗ $1 \text{ mg/L} = 0.1 \text{ ppm} = 0.7^\circ\text{Cl} = 0.1^\circ\text{Fr}$
3. ✗ $1 \text{ mg/L} = 1 \text{ ppm} = 0.7^\circ\text{Cl} = 0.01^\circ\text{Fr}$
4. ✗ $1 \text{ mg/L} = 1 \text{ ppm} = 0.7^\circ\text{Cl} = 1^\circ\text{Fr}$

Question Number : 91 Question Id : 47720320923 Display Question Number : Yes Is Question Mandatory : No

Which of the following is used as effective coagulant in the municipal water treatment to remove fine suspended and colloidal impurities?

Options :

1. ✗ $\text{Fe}_2\text{SO}_4(\text{NH}_4)_2\text{SO}_4 \cdot 7\text{H}_2\text{O}$
2. ✓ $\text{K}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$
3. ✗ $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
4. ✗ $\text{Na}_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$

Question Number : 92 Question Id : 47720320924 Display Question Number : Yes Is Question Mandatory : No

The general chemical formula of zeolite is

Options :

1. ✓ $\text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot x \text{SiO}_2 \cdot y \text{H}_2\text{O}$
2. ✗ $\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$
3. ✗ $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
4. ✗ $\text{MgSO}_4 \cdot 5\text{H}_2\text{O}$

Question Number : 93 Question Id : 47720320925 Display Question Number : Yes Is Question Mandatory : No

----- is resulted when electrochemical corrosion happened in acidic environment.

Options :

1. ✗ Evolution of oxygen
2. ✗ Absorption of oxygen
3. ✓ Evolution of hydrogen
4. ✗ Absorption of hydrogen

Question Number : 94 Question Id : 47720320926 Display Question Number : Yes Is Question Mandatory : No

Impure metal corrodes faster than pure metal due to

Options :

1. ✓ Heterogeneity
2. ✗ Homogeneity
3. ✗ Non-galvanic cell
4. ✗ localize corrosion

Question Number : 95 Question Id : 47720320927 Display Question Number : Yes Is Question Mandatory : No

The number of repeating units in a polymer is called

Options :

1. ✗ Functionality
2. ✗ Tacticity
3. ✓ degree of polymerization
4. ✗ Specificity

Question Number : 96 Question Id : 47720320928 Display Question Number : Yes Is Question Mandatory : No

The process of vulcanisation makes rubber -----

Options :

1. ✘ Soft
2. ✔ Hard
3. ✘ Elastic
4. ✘ Swells oils

Question Number : 97 Question Id : 47720320929 Display Question Number : Yes Is Question Mandatory : No

Which of the following is thermosetting plastic

Options :

1. ✘ PVC
2. ✘ Polystyrene
3. ✘ Teflon
4. ✔ Bakelite

Question Number : 98 Question Id : 47720320930 Display Question Number : Yes Is Question Mandatory : No

The boiling range of petrol fraction is found to be

Options :

1. ✘ $120^{\circ}\text{C}-180^{\circ}\text{C}$

2. ✘ $250^{\circ}\text{C}-320^{\circ}\text{C}$

3. ✔ $40^{\circ}\text{C}-120^{\circ}\text{C}$

4. ✘ $180^{\circ}\text{C}-250^{\circ}\text{C}$

Question Number : 99 Question Id : 47720320931 Display Question Number : Yes Is Question Mandatory : No

Which of the following is not a common component of photochemical smog?

Options :

1. ✘ Ozone

2. ✘ Acrolein

3. ✘ Peroxyacetyl nitrate

4. ✔ Chlorofluorocarbons

Question Number : 100 Question Id : 47720320932 Display Question Number : Yes Is Question Mandatory : No

White lung cancer is caused by

Options :

1. ✘ Asbestos

2. ✔ Textiles

3. ✖ Paper

4. ✖ Silica

Electronics and Instrumentation Engineering

Section Id :	477203412
Section Number :	4
Mandatory or Optional :	Mandatory
Number of Questions :	100
Section Marks :	100
Enable Mark as Answered Mark for Review and Clear Response :	Yes

Question Number : 101 Question Id : 47720320933 Display Question Number : Yes Is Question Mandatory : No

With 100 V applied across ten $50\ \Omega$ resistances in parallel, the current through each resistance equals

Options :

1. ✖ 100 A

2. ✖ 50 A

3. ✖ 10 A

4. ✔ 2 A

Question Number : 102 Question Id : 47720320934 Display Question Number : Yes Is Question

Mandatory : No

Which of the following motors has a high starting torque?

Options :

1. ✘ AC series motor
2. ✔ DC series motor
3. ✘ Induction motor
4. ✘ Synchronous motor

Question Number : 103 Question Id : 47720320935 Display Question Number : Yes Is Question

Mandatory : No

A current source has

Options :

1. ✘ Series resistance
2. ✔ Parallel resistance
3. ✘ Series capacitance
4. ✘ Parallel capacitance

Question Number : 104 Question Id : 47720320936 Display Question Number : Yes Is Question

Mandatory : No

Voltage equation of a DC motor is

Options :

1. ✓ $V = E_b + I_a R_a.$
2. ✗ $E_b = V + I_a R_a.$
3. ✗ $V = E_b / I_a R_a.$
4. ✗ $V = E_b + I_a 2R_a.$

Question Number : 105 Question Id : 47720320937 Display Question Number : Yes Is Question Mandatory : No

Which machine is used for battery charging?

Options :

1. ✗ DC series generator
2. ✗ Compounded DC generator
3. ✓ DC shunt generator
4. ✗ AC series generator

Question Number : 106 Question Id : 47720320938 Display Question Number : Yes Is Question Mandatory : No

Star – delta starter of an induction motor

Options :

1. ✗ Inserts resistance in rotor circuit.

2. ✘ Inserts resistance in stator circuit.
3. ✔ Applies reduced voltage to stator.
4. ✘ Applies reduced voltage to rotor

Question Number : 107 Question Id : 47720320939 Display Question Number : Yes Is Question Mandatory : No

Solar cell works based on

Options :

1. ✘ Laser technology
2. ✔ Photo conduction
3. ✘ Thermal emission
4. ✘ Tyndall effect

Question Number : 108 Question Id : 47720320940 Display Question Number : Yes Is Question Mandatory : No

Which of the following methods of heating is not dependent on the frequency of supply?

Options :

1. ✘ Induction Heating
2. ✘ Dielectric Heating

3. ✓ Electric Resistance Heating

4. ✗ Radiation Heating

Question Number : 109 Question Id : 47720320941 Display Question Number : Yes Is Question Mandatory : No

Ultrasonic waves have frequency

Options :

1. ✓ Greater than 20 kHz

2. ✗ Less than 20 kHz

3. ✗ Between 20 Hz – 20 kHz

4. ✗ Less than 20 Hz

Question Number : 110 Question Id : 47720320942 Display Question Number : Yes Is Question Mandatory : No

The transient response, with feedback system,

Options :

1. ✗ Rises slowly

2. ✗ Rises quickly

3. ✘ Decays slowly

4. ✔ Decays quickly

Question Number : 111 Question Id : 47720320943 Display Question Number : Yes Is Question Mandatory : No

Adding a pole to a system transfer function in terms of compensator represents

Options :

1. ✘ Lead Compensator

2. ✔ Lag Compensator

3. ✘ Lead-Lag Compensator

4. ✘ Lag-Lead Compensator

Question Number : 112 Question Id : 47720320944 Display Question Number : Yes Is Question Mandatory : No

Which of the following is the best method for determining the stability and transient response?

Options :

1. ✔ Root locus

2. ✘ Bode plot

3. ✘ Nyquist plot

4. ✘ Nicholes

Question Number : 113 Question Id : 47720320945 Display Question Number : Yes Is Question Mandatory : No

In control system, integrator is represented by

Options :

1. ✘ s

2. ✘ s^2

3. ✘ $1/s^2$

4. ✔ $1/s$

Question Number : 114 Question Id : 47720320946 Display Question Number : Yes Is Question Mandatory : No

A system with a double pole at the origin is unstable since the corresponding term in the time domain

Options :

1. ✘ Is a constant

2. ✔ Grows linearly with time

3. ✘ Grows exponentially with time

4. ✘ Decays linearly with time

Question Number : 115 Question Id : 47720320947 Display Question Number : Yes Is Question Mandatory : No

Which of the following is a first order system

Options :

1. ✘ Damped vibrator

2. ✘ Interacting system of two tanks in series

3. ✔ Mercury in glass thermometer kept in boiling water

4. ✘ Interacting system of two tanks in parallel

Question Number : 116 Question Id : 47720320948 Display Question Number : Yes Is Question Mandatory : No

A resistor with colour bands Red, Violet, Green and Black will have a value

Options :

1. ✘ $27\text{ K} \pm 10\% \text{ K}$

2. ✔ $2.7\text{ M} \pm 20\% \text{ K}$

3. ✘ $270\text{ K} \pm 5\% \text{ K}$

4. ✘ $2.7 \text{ K} \pm 2\% \text{ K}$

Question Number : 117 Question Id : 47720320949 Display Question Number : Yes Is Question Mandatory : No

A $10\text{-}\mu\text{F}$ capacitance charged to 10 V has a stored charge equal to

Options :

1. ✘ $10 \mu\text{C}$

2. ✔ $100 \mu\text{C}$

3. ✘ $200 \mu\text{C}$

4. ✘ 100 C

Question Number : 118 Question Id : 47720320950 Display Question Number : Yes Is Question Mandatory : No

P-N junction is

Options :

1. ✔ A rectifier

2. ✘ An amplifier

3. ✘ An Oscillator

4. ✘ A Coupler

Question Number : 119 Question Id : 47720320951 Display Question Number : Yes Is Question Mandatory : No

When I_C in a junction transistor is 99.9 mA and I_B is 0.1 mA, how much is I_E ?

Options :

1. ✘ 0.1 mA
2. ✘ 1 mA
3. ✘ 10 mA
4. ✔ 100 mA

Question Number : 120 Question Id : 47720320952 Display Question Number : Yes Is Question Mandatory : No

Resistance of a wire is r ohms. The wire is stretched to double its length, then its resistance in ohms is

Options :

1. ✘ $r/2$
2. ✔ $4r$
3. ✘ $2r$
4. ✘ $r/4$

Question Number : 121 Question Id : 47720320953 Display Question Number : Yes Is Question

Mandatory : No

Which of the following is an emitter follower circuit ?

Options :

1. ✘ CE

2. ✔ CC

3. ✘ CB

4. ✘ BE

Question Number : 122 Question Id : 47720320954 Display Question Number : Yes Is Question

Mandatory : No

In a differential amplifier an ideal CMRR is

Options :

1. ✔ Infinity

2. ✘ zero

3. ✘ -1

4. ✘ +1

Question Number : 123 Question Id : 47720320955 Display Question Number : Yes Is Question

Mandatory : No

The following characteristic makes FET superior to BJT

Options :

1. ✓ High input impedance
2. ✗ High gain-bandwidth product
3. ✗ Its current controlled behaviour
4. ✗ High noise immunity

Question Number : 124 Question Id : 47720320956 Display Question Number : Yes Is Question Mandatory : No

In a Zener diode large reverse current is due to

Options :

1. ✗ Collision
2. ✗ Presence of impurities
3. ✗ Rupture of bonds
4. ✓ Lower resistance in reverse biased region

Question Number : 125 Question Id : 47720320957 Display Question Number : Yes Is Question Mandatory : No

How many diodes are required for a full wave rectifier ?

Options :

1. ✗

8

2. ✘ 6

3. ✔ 2

4. ✘ 1

Question Number : 126 Question Id : 47720320958 Display Question Number : Yes Is Question Mandatory : No

A device whose characteristics are very close to that of an ideal current source is

Options :

1. ✘ A gas diode

2. ✘ A BJT in CB mode

3. ✔ A BJT in CE mode

4. ✘ A triode

Question Number : 127 Question Id : 47720320959 Display Question Number : Yes Is Question Mandatory : No

Which of the following device can be used as an ideal voltage source ?

Options :

1. ✘ A vacuum diode

2. ✘ A DIAC

3. ✘ A FET

4. ✔ A zener diode

Question Number : 128 Question Id : 47720320960 Display Question Number : Yes Is Question Mandatory : No

What is the binary equivalent of the decimal number 368 ?

Options :

1. ✔ 101110000

2. ✘ 110110000

3. ✘ 111010000

4. ✘ 111100000

Question Number : 129 Question Id : 47720320961 Display Question Number : Yes Is Question Mandatory : No

The digital logic family which has minimum power dissipation is

Options :

1. ✘ TTL

2. ✘ RTL

3. ✓ CMOS

4. ✗ DTL

Question Number : 130 Question Id : 47720320962 Display Question Number : Yes Is Question Mandatory : No

The output of a logic gate is 1 when all its inputs are at logic 0. The gate is either

Options :

1. ✗ A NAND or an EX-OR

2. ✗ An OR or an EX-NOR

3. ✗ An AND or an EX-OR

4. ✓ A NOR or an EX-NOR

Question Number : 131 Question Id : 47720320963 Display Question Number : Yes Is Question Mandatory : No

Data selectors are basically the same as

Options :

1. ✗ Counters

2. ✓ Multiplexers

3. ✘ Demultiplexers

4. ✘ Encoders

Question Number : 132 Question Id : 47720320964 Display Question Number : Yes Is Question Mandatory : No

The speed of conversion is maximum in

Options :

1. ✘ Successive-approximation A/D converter

2. ✔ Parallel-comparative A/D converter

3. ✘ Counter ramp A/D converter

4. ✘ Dual-slope A/D converter

Question Number : 133 Question Id : 47720320965 Display Question Number : Yes Is Question Mandatory : No

A Flip-Flop is in the toggle condition when

Options :

1. ✘ $J=1, K=0$

2. ✘ $J=0, K=1$

3. ✓ J=1, K=1

4. ✗ J=0, K=0

Question Number : 134 Question Id : 47720320966 Display Question Number : Yes Is Question Mandatory : No

The 2's complement of the number 1101101 is

Options :

1. ✗ 0101110

2. ✗ 0111110

3. ✗ 0110010

4. ✓ 0010011

Question Number : 135 Question Id : 47720320967 Display Question Number : Yes Is Question Mandatory : No

To serially shift a byte of data into a shift register, there must be

Options :

1. ✗ One clock pulse

2. ✗ One load pulse

3. ✓ Eight clock pulses

4. ✗ One clock pulse for each 1 in the data

Question Number : 136 Question Id : 47720320968 Display Question Number : Yes Is Question Mandatory : No

When the set of input data to an even parity generator is 0111, the output will be

Options :

1. ✗ 1

2. ✓ 0

3. ✗ Unpredictable

4. ✗ Depends on the previous input

Question Number : 137 Question Id : 47720320969 Display Question Number : Yes Is Question Mandatory : No

An 8-bit DAC has a resolution of

Options :

1. ✗ 0.1%

2. ✗ 1%

3. ✓

0.392%

4. ✘ 3.92%

Question Number : 138 Question Id : 47720320970 Display Question Number : Yes Is Question Mandatory : No

Watt hour is the unit of

Options :

1. ✘ Electric power

2. ✘ Electric capacity

3. ✔ Electric energy

4. ✘ Electric charge

Question Number : 139 Question Id : 47720320971 Display Question Number : Yes Is Question Mandatory : No

In an ammeter, the shunt is used to

Options :

1. ✘ Decrease the voltage range

2. ✘ Increase the voltage range

3. ✘

Decrease the current range

4. ✓ Increase the current range

Question Number : 140 Question Id : 47720320972 Display Question Number : Yes Is Question Mandatory : No

Triggering in a CRO

Options :

1. ✗ Generates the sweep signal
2. ✗ Provides input to the vertical plates
3. ✓ Provides stability in a repeated waveform
4. ✗ Chops the input signal

Question Number : 141 Question Id : 47720320973 Display Question Number : Yes Is Question Mandatory : No

The time base signal in a CRO is a

Options :

1. ✗ Rectangular waveform
2. ✗ High frequency sinusoidal wave form
3. ✓ High frequency sawtooth wave form

4. ✘ Square wave form

Question Number : 142 Question Id : 47720320974 Display Question Number : Yes Is Question Mandatory : No

In a signal generator, energy is

Options :

1. ✘ Created

2. ✘ Generated

3. ✘ Supplied by ac input to the generator

4. ✔ Converted from a dc source into ac energy at a particular frequency

Question Number : 143 Question Id : 47720320975 Display Question Number : Yes Is Question Mandatory : No

The principle of operation of Q-meter is based on

Options :

1. ✘ Self inductance

2. ✘ Mutual inductance

3. ✔ Series resonance

4. ✘ Parallel resonance

Question Number : 144 Question Id : 47720320976 Display Question Number : Yes Is Question Mandatory : No

The internal resistance of the ammeter should ideally be

Options :

1. ✓ Zero
2. ✗ Very Large
3. ✗ Very Small
4. ✗ Infinite

Question Number : 145 Question Id : 47720320977 Display Question Number : Yes Is Question Mandatory : No

Astable multivibrators can be used to generate

Options :

1. ✗ Only a square wave
2. ✓ Both square and triangular waves
3. ✗ Only a triangular wave
4. ✗ A sine wave

Question Number : 146 Question Id : 47720320978 Display Question Number : Yes Is Question

Mandatory : No

Which of the following type of bourdon tube shape has a small tip travel and necessitates amplification?

Options :

1. ✓ C-type

2. ✗ Spiral

3. ✗ Helical

4. ✗ Square

Question Number : 147 Question Id : 47720320979 Display Question Number : Yes Is Question

Mandatory : No

Load cells are used for the measurement of

Options :

1. ✗ Strain

2. ✗ Stress

3. ✗ Velocity

4. ✓ Weight

Question Number : 148 Question Id : 47720320980 Display Question Number : Yes Is Question

Mandatory : No

Working principle of radiation pyrometer is based on the

Options :

1. ✘ Wien's law
2. ✔ Stefan-Boltzman law
3. ✘ Kirchoffs law
4. ✘ Seebeck effect

Question Number : 149 Question Id : 47720320981 Display Question Number : Yes Is Question Mandatory : No

An LVDT is an inductive transducer which functions due to

Options :

1. ✘ Change in the air gap
2. ✘ Change in the amount of core material
3. ✘ Mutual inductance
4. ✔ Variation in the position of the core

Question Number : 150 Question Id : 47720320982 Display Question Number : Yes Is Question Mandatory : No

The following transducer is generally used for dynamic rather than static measurements?

Options :

1. ✘ Capacitive
2. ✘ Resistive
3. ✔ Piezo-electric
4. ✘ Inductive transducer

Question Number : 151 Question Id : 47720320983 Display Question Number : Yes Is Question Mandatory : No

Which of the following instruments is a rate meter?

Options :

1. ✔ Venturimeter
2. ✘ Hot wire anemometer
3. ✘ Nutating disk meter
4. ✘ Current meter

Question Number : 152 Question Id : 47720320984 Display Question Number : Yes Is Question Mandatory : No

Hot wire anemometer is used to measure

Options :

1. ✘ Pressure in gases
2. ✘ Liquid discharges
3. ✔ Gas velocities
4. ✘ Wind velocities at airports

Question Number : 153 Question Id : 47720320985 Display Question Number : Yes Is Question Mandatory : No

The electrical output from a thermocouple circuit is detected by using

Options :

1. ✘ Wheatstone bridge
2. ✔ Voltage balancing circuit
3. ✘ Current sensitive device
4. ✘ Current balancing circuit

Question Number : 154 Question Id : 47720320986 Display Question Number : Yes Is Question Mandatory : No

Psychrometer determines the

Options :

1. ✘ Water of crystallisation

2. ✘ Moisture content of solids
3. ✔ Humidity of gases
4. ✘ Hygroscopic nature of solids

Question Number : 155 Question Id : 47720320987 Display Question Number : Yes Is Question Mandatory : No

A dead weight tester is used for

Options :

1. ✔ Calibrating pressure measuring instruments
2. ✘ Testing the magnitude of a given weight
3. ✘ Producing high pressures
4. ✘ Accurate measurement of load

Question Number : 156 Question Id : 47720320988 Display Question Number : Yes Is Question Mandatory : No

Liquid discharge from a tank or reservoir can not be measured by

Options :

1. ✔ Orifice meters
2. ✘ Weirs

3. ✘ Notches

4. ✘ Mouthpieces

Question Number : 157 Question Id : 47720320989 Display Question Number : Yes Is Question Mandatory : No

The use of semi conductor strain gauge is limited due to their

Options :

1. ✘ High frequency response

2. ✘ High value of gauge factor

3. ✘ Small size and high cost auxiliary equipment

4. ✔ Poor linearity and sensitivity to temperature changes

Question Number : 158 Question Id : 47720320990 Display Question Number : Yes Is Question Mandatory : No

Magnetic flow meters are generally not used for the velocity/flow measurement of hydrocarbons due to their

Options :

1. ✔ Low electrical conductivity

2. ✘ Low flash point

3. ✘ Low thermal conductivity

4. ✘ High viscosity index

Question Number : 159 Question Id : 47720320991 Display Question Number : Yes Is Question Mandatory : No

Which instrument arrangement has the manual null balance operation?

Options :

1. ✔ Optical pyrometer

2. ✘ Resistance thermometer

3. ✘ Liquid in glass thermometer

4. ✘ Thermistor

Question Number : 160 Question Id : 47720320992 Display Question Number : Yes Is Question Mandatory : No

Flapper Nozzle is used in the following controller

Options :

1. ✘ Hydraulic

2. ✘ Electric

3. ✓ Pneumatic

4. ✗ Electronic

Question Number : 161 Question Id : 47720320993 Display Question Number : Yes Is Question Mandatory : No

On-Off Controllers are normally used for

Options :

1. ✓ Low Loads

2. ✗ High Loads

3. ✗ Temperature changes

4. ✗ Flow Rate changes

Question Number : 162 Question Id : 47720320994 Display Question Number : Yes Is Question Mandatory : No

The best example of a first order instrument is:

Options :

1. ✗ Piezoelectric pick up

2. ✗ Amplifier

3. ✓ Thermocouple

4. ✘ Spring mass system

Question Number : 163 Question Id : 47720320995 Display Question Number : Yes Is Question Mandatory : No

The most common pneumatic signal standard for industrial process instruments is:

Options :

1. ✘ 0 to 20 psi

2. ✔ 3 to 15 psi

3. ✘ 4 to 20 psi

4. ✘ 0 to 10 psi

Question Number : 164 Question Id : 47720320996 Display Question Number : Yes Is Question Mandatory : No

Which of the following have the ability to receive input, to perform a mathematical function with the input, and produce an output signal?:

Options :

1. ✘ Actuators

2. ✘ Transmitters

3. ✘ Transducers

4. ✔

Controllers

Question Number : 165 Question Id : 47720320997 Display Question Number : Yes Is Question Mandatory : No

Which of the following is the most common final control element in process control industries?

Options :

1. ✘ Agitator
2. ✘ Pump motor
3. ✔ Valve
4. ✘ Louver

Question Number : 166 Question Id : 47720320998 Display Question Number : Yes Is Question Mandatory : No

What does the acronym P&ID stand for?

Options :

1. ✘ Piping and Instrument Designing
2. ✔ Piping and Instrumentation Drawing
3. ✘ Process Control and Installation Drawing
4. ✘ Proportional, Integral and Derivative control

Question Number : 167 Question Id : 47720320999 Display Question Number : Yes Is Question Mandatory : No

In a feedback control system, the controller gets its input from the

Options :

1. ✘ Load variable
2. ✘ Manipulated variable
3. ✔ Controlled variable
4. ✘ Dynamic variable

Question Number : 168 Question Id : 47720321000 Display Question Number : Yes Is Question Mandatory : No

The main purpose of a control valve positioner is to

Options :

1. ✔ Improve the precision of the valve
2. ✘ Alter the characterization of the valve
3. ✘ Increase transmitter accuracy
4. ✘ Eliminate cavitation in the valve

Question Number : 169 Question Id : 47720321001 Display Question Number : Yes Is Question Mandatory : No

Cavitation in a control valve is caused by:

Options :

1. ✘ Process noise
2. ✘ Vibration in the piping
3. ✘ The Von Karman effect
4. ✔ Pressure recovery

Question Number : 170 Question Id : 47720321002 Display Question Number : Yes Is Question Mandatory : No

Which of the following is not a “final control element”?

Options :

1. ✔ A pressure transmitter
2. ✘ An electric motor
3. ✘ A heating element
4. ✘ A control valve

Question Number : 171 Question Id : 47720321003 Display Question Number : Yes Is Question Mandatory : No

The most common analog signal standard for industrial process instruments is:

Options :

1. ✘ 10 to 50 milliamps DC
2. ✔ 4 to 20 milliamps DC
3. ✘ 0 to 5 amps AC
4. ✘ 0 to 20 milliamps

Question Number : 172 Question Id : 47720321004 Display Question Number : Yes Is Question Mandatory : No

When a step-input is given to an op-amp integrator, the output will be

Options :

1. ✔ A ramp
2. ✘ A sinusoidal wave
3. ✘ A rectangular wave
4. ✘ A triangular wave with dc bias

Question Number : 173 Question Id : 47720321005 Display Question Number : Yes Is Question Mandatory : No

An ideal differential amplifier has CMRR equalling

Options :

1. ✘ Unity

2. ✘ -1

3. ✔ Infinity

4. ✘ Zero

Question Number : 174 Question Id : 47720321006 Display Question Number : Yes Is Question Mandatory : No

Which factor makes the differentiator circuit unstable?

Options :

1. ✘ Output impedance

2. ✘ Input voltage

3. ✘ Noise

4. ✔ Gain

Question Number : 175 Question Id : 47720321007 Display Question Number : Yes Is Question Mandatory : No

What happens if 741 op-amp is configured as a closed loop inverting amplifier?

Options :

1. ✘ Gain increases
2. ✔ Gain roll-off at a rate 20dB/decade
3. ✘ No gain roll-off takes place
4. ✘ Gain decreases

Question Number : 176 Question Id : 47720321008 Display Question Number : Yes Is Question Mandatory : No

Find out the value that is related to the resolution of an 8 bit ADC?

Options :

1. ✘ 562
2. ✘ 625
3. ✔ 256
4. ✘ 265



Question Number : 177 Question Id : 47720321009 Display Question Number : Yes Is Question Mandatory : No

Misalignment of a super heterodyne receiver does not affect

Options :

1. ✘ Bandwidth
2. ✔ Distortion
3. ✘ Noise
4. ✘ Output

Question Number : 178 Question Id : 47720321010 Display Question Number : Yes Is Question Mandatory : No

Which circuit converts irregularly shaped waveform to regular shaped waveforms?

Options :

1. ✔ Schmitt trigger
2. ✘ Voltage limiter
3. ✘ Comparator
4. ✘ integrator

Question Number : 179 Question Id : 47720321011 Display Question Number : Yes Is Question Mandatory : No

A highly stable resonance characteristic is the property of which oscillator ?

Options :

1. ✘ Hartley
2. ✘ Colpitts
3. ✘ Weinbridge
4. ✔ Crystal

Question Number : 180 Question Id : 47720321012 Display Question Number : Yes Is Question Mandatory : No

Positive feedback is used in

Options :

1. ✘ Amplifiers
2. ✔ Oscillators
3. ✘ Tuned amplifiers
4. ✘ Video amplifiers

Question Number : 181 Question Id : 47720321013 Display Question Number : Yes Is Question Mandatory : No

Zero Crossing Detectors are also called as

Options :

1. ✘ Square to sine wave generator
2. ✔ Sine to square wave generator
3. ✘ Sine to triangular wave generator
4. ✘ Triangular to sine wave generator

Question Number : 182 Question Id : 47720321014 Display Question Number : Yes Is Question

Mandatory : No

A wide range of oscillations in the audio range is obtained with

Options :

1. ✘ Phase shift oscillator
2. ✔ Wien bridge oscillator
3. ✘ Hartley oscillator
4. ✘ Colpitts oscillator

Question Number : 183 Question Id : 47720321015 Display Question Number : Yes Is Question

Mandatory : No

Bio medical signals are often corrupted by

Options :

1. ✓ Noise
2. ✗ Electrodes
3. ✗ Amplifiers used
4. ✗ Power

Question Number : 184 Question Id : 47720321016 Display Question Number : Yes Is Question Mandatory : No

X-ray tubes make use of

Options :

1. ✗ Thermionic emission
2. ✓ High field emission
3. ✗ Secondary emission
4. ✗ Photoelectric emission

Question Number : 185 Question Id : 47720321017 Display Question Number : Yes Is Question Mandatory : No

Which of the following medical technique gives a detailed structure of internal organs especially of soft tissues?

Options :

1. ✘ ECG

2. ✘ EEG

3. ✘ X-Ray

4. ✔ MRI

Question Number : 186 Question Id : 47720321018 Display Question Number : Yes Is Question Mandatory : No

Absorbance may be referred to

Options :

1. ✔ Optical density

2. ✘ Specific extinction

3. ✘ Radiant energy

4. ✘ Concentration

Question Number : 187 Question Id : 47720321019 Display Question Number : Yes Is Question Mandatory : No

Beer's Law is a limiting law and should be expected to apply only at

Options :

1. ✘ High concentrations
2. ✘ Medium concentrations
3. ✔ Low concentrations
4. ✘ Any concentrations

Question Number : 188 Question Id : 47720321020 Display Question Number : Yes Is Question Mandatory : No

Which of the following is used as monochromator most commonly

Options :

1. ✘ Glass
2. ✘ Convex lense
3. ✘ Concave lense
4. ✔ Prism

Question Number : 189 Question Id : 47720321021 Display Question Number : Yes Is Question Mandatory : No

Photoconductive cells are made from the following

Options :

1. ✔ Lead sulphide

2. ✘ Tin sulphide

3. ✘ Zinc sulphide

4. ✘ Magnesium sulphide

Question Number : 190 Question Id : 47720321022 Display Question Number : Yes Is Question Mandatory : No

Flame photometry is mostly concerned with

Options :

1. ✘ Molecules

2. ✔ Atoms

3. ✘ Ions

4. ✘ Gases

Question Number : 191 Question Id : 47720321023 Display Question Number : Yes Is Question Mandatory : No

The principal difference between various types of spectrometers lies in the means for separating the ions according to their

Options :

1. ✘ Charge

2. ✘

Mass

3. ✓ Mass to charge ratio

4. ✗ Atomic weight

Question Number : 192 Question Id : 47720321024 Display Question Number : Yes Is Question Mandatory : No

Thermal detectors used in HPLC are also known as

Options :

1. ✓ Micro-adsorption detectors

2. ✗ Conductivity detectors

3. ✗ Refractive detectors

4. ✗ Fluorescence Detectors

Question Number : 193 Question Id : 47720321025 Display Question Number : Yes Is Question Mandatory : No

The internal RAM memory of the 8051 is

Options :

1. ✗ 32 bytes

2. ✘ 64 bytes

3. ✔ 128 bytes

4. ✘ 256 bytes

Question Number : 194 Question Id : 47720321026 Display Question Number : Yes Is Question Mandatory : No

MOV A, @ R1 will

Options :

1. ✘ Copy R1 to the accumulator

2. ✘ Copy the accumulator to R1

3. ✔ Copy the contents of memory whose address is in R1 to the accumulator

4. ✘ Copy the accumulator to the contents of memory whose address is in R1

Question Number : 195 Question Id : 47720321027 Display Question Number : Yes Is Question Mandatory : No

The total external data memory that can be interfaced to the 8051 is

Options :

1. ✘ 32K

2. ✓ 64K

3. ✗ 128K

4. ✗ 256K

Question Number : 196 Question Id : 47720321028 Display Question Number : Yes Is Question Mandatory : No

What is the difference between the 8031 and the 8051?

Options :

1. ✗ The 8031 has no interrupts

2. ✓ The 8031 is ROM-less

3. ✗ The 8051 is ROM-less

4. ✗ The 8051 has 64 bytes more memory

Question Number : 197 Question Id : 47720321029 Display Question Number : Yes Is Question Mandatory : No

An OR function implemented in ladder logic uses:

Options :

1. ✗ Normally Open contacts in series

2. ✓ Normally Open contacts in parallel
3. ✗ Normally Closed contacts in parallel
4. ✗ Normally Closed contacts in series

Question Number : 198 Question Id : 47720321030 Display Question Number : Yes Is Question Mandatory : No

An alternate function of port P3.4 in the 8051 is

Options :

1. ✓ Timer 0
2. ✗ Timer 1
3. ✗ Interrupt 0
4. ✗ Interrupt 1

Question Number : 199 Question Id : 47720321031 Display Question Number : Yes Is Question Mandatory : No

The cycle time of a PLC is the time it takes to:

Options :

1. ✗ Read an input signal

2. ✘ Read all the input and output signals
3. ✘ Check all the input signals against the program
4. ✔ Read all the inputs, run the program, and update all outputs

Question Number : 200 Question Id : 47720321032 Display Question Number : Yes Is Question Mandatory : No

The acronym SCADA stands for

Options :

1. ✘ Super Computer And Data Acquisition
2. ✘ Super Computer And Data Analysis
3. ✘ Supervisory control And Data Analysis
4. ✔ Supervisory Control And Data Acquisition