Telangana State Council 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 Communication Engineering 12th Aug 2021 Shift 1
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Magnifying Glass Required? :	No
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Eraser Required? :	No
Scratch Pad Required? :	No
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Electronics and Communication Engineering

Group Number :	1
Group Id :	63643124
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Group Minimum Duration :	120

Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	120
Is this Group for Examiner? :	No

Mathematics

Section Id :	63643144
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	10
Section Marks :	10
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	63643144
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 6364312761 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $2x - y + z = 0$, $4x - 2y + 2z = 0$ and $6x - 3y + 3z = 0$, then $(x, y, z) =$

Options :

1. ✔ $(1, 2, 0)$

2. ✖ $(1, 1, -1)$

3. ✖ $(0, 1, 1)$

4. ✖ $(3, 2, -4)$

Question Number : 2 Question Id : 6364312762 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is a repeated Eigen value of the matrix $\begin{bmatrix} -1 & 2 & 2 \\ 2 & -1 & 2 \\ 2 & 2 & -1 \end{bmatrix}$

Options :

1. ✖ 3

2. ✔ -3

3. ✖ 4

4. ✖ -4

Question Number : 3 Question Id : 6364312763 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$$\int_{|z|=2} \frac{\sin z}{z^5} dz =$$

Options :

1. ✔ 0

2. ✖ πi

3. ✖ $-\pi i$

4. ✖ $2\pi i$

Question Number : 4 Question Id : 6364312764 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $z = \cos^2(x+y) + \sin^2(x-y)$, then $\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial y^2} =$

Options :

1. ✖ $\frac{\partial^2 z}{\partial x \partial y}$

2. ✖ $2\frac{\partial^2 z}{\partial x \partial y}$

3. ✖ $3\frac{\partial^2 z}{\partial x \partial y}$

4. ✔ 0

Question Number : 5 Question Id : 6364312765 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If C is the curve $x^2 + y^2 = 1$, then $\int_C \left(x^2 + 3xy^2\right)dx + \left(3x^2y + y^4\right)dy =$

Options :

1. ✖ 2π

2. ✖ π

3. ✖ $\frac{\pi}{2}$

4. ✔ 0

Question Number : 6 Question Id : 6364312766 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The particular integral of $\mathbf{y'' + 4y = x \cos x}$ is $\mathbf{a \sin x + b x \cos x}$, where (a, b) =

Options :

1. ✖ $\left(\frac{1}{3}, \frac{2}{9}\right)$

2. ✔ $\left(\frac{2}{9}, \frac{1}{3}\right)$

3. ✖ $\left(\frac{-2}{9}, \frac{1}{3}\right)$

4. ✖ $\left(\frac{2}{3}, \frac{1}{9}\right)$

Question Number : 7 Question Id : 6364312767 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The solution of $y'' + y = xe^x$ satisfying $y(0) = 0$ and $y'(0) = 1$ is $y = k(\cos x + 2\sin x)$, where k =

Options :

1. ✖ 1

2. ✖ $\frac{1}{3}$

3. ✔ $\frac{1}{2}$

4. ✖ $\frac{1}{4}$

Question Number : 8 Question Id : 6364312768 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a normal distribution, the ratio between quartile deviation, mean deviation and standard deviation is

Options :

1. ✖ 3 : 4 : 5

2. ✖ 7 : 8 : 10

3. ✔ 10 : 12 : 15

4. ✖ 8 : 12 : 15

Question Number : 9 Question Id : 6364312769 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A variate X has the probability distribution

x	−1	0	1	2
P(X = x)	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{3}{4}$

Then E(X) =

Options :

1. ✖ 4

2. ✖ $\frac{8}{7}$

3. ✔ $\frac{4}{3}$

4. ✖ $\frac{8}{3}$

Question Number : 10 Question Id : 6364312770 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The largest positive root of the equation $x^3 - 5x^2 + 6x - 1 = 0$ lies in the interval

Options :

1. ✖ $(2, 3)$

2. ✔ $(3, 4)$

3. ✖ $(4, 5)$

4. ✖ $(5, 6)$

Electronics and Communication Engineering

Section Id :	63643145
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	110
Number of Questions to be attempted :	110
Section Marks :	110
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	63643145
Question Shuffling Allowed :	Yes

Question Number : 11 Question Id : 6364312771 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The unit of $\frac{R}{2}\sqrt{\frac{L}{C}}$ is

Options :

1. ✖ No unit

2. ✖ Ω

3. ✖ ΩH rad

4. ✔ Ω^2

Question Number : 12 Question Id : 6364312772 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The initial value of $z(t)$, $z(s) = \frac{s^2+3}{s^3+4s^2+6}$ is

Options :

1. ✖ s

2. ✔ 1

3. ✖ 0

4. ✖ s^2

Question Number : 13 Question Id : 6364312773 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a two port reciprocal bilateral network the transmission parameters are

$A = 1, B = 5$, and $D = 1$, the parameter C will be

Options :

1. ✖ 0.8

2. ✔ 1.4

3. ✖ 0.7

4. ✖ 1.2

Question Number : 14 Question Id : 6364312774 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A typical two port network is characterized by $2V_1 + 4V_2 = I_1$ and

$6V_1 + V_2 = 8I_2$. The value of h_{21} is

Options :

1. ✖ 0.235

2. ✖ 0.325

3. ✔ 0.375

4. ✖ 0.525

Question Number : 15 Question Id : 6364312775 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

When determining Thevenin's resistance of a circuit

Options :

1. ✖ All sources must be open circuited

2. ✖ All sources must be short circuited

3. ✖ All voltage sources must be open circuited and all current sources must be short circuited

4. ✔ All sources must be replaced by their internal resistances

Question Number : 16 Question Id : 6364312776 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Three resistance of 15Ω each are connected in delta. The resistance of equivalent star will have a value of

Options :

1. ✖ 12Ω

2. ✔ 5Ω

3. ✖ 5/3Ω

4. ✖ 45Ω

Question Number : 17 Question Id : 6364312777 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If a two-port network is reciprocal, then the usual relationship is

Options :

1. ✔ $h_{12} = -h_{21}$

2. ✖ $h_{12} = h_{21}$

3. ✖ $h_{11} = h_{22}$

4. ✖ $h_{11}h_{22} - h_{12}h_{21} = 1$

Question Number : 18 Question Id : 6364312778 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A non-ideal voltage source V_s has an internal impedance of z_s. If a purely resistive load is to be chosen that maximizes the power transferred to the load, its values must be

Options :

1. ✔ Magnitude of z_s

2. ✖ 0

3. ✖ Real part of z_s

4. ✖ Complex conjugate of z_s

Question Number : 19 Question Id : 6364312779 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The graph of an electrical network has N nodes and B branches. The number of links L, with respect to the choice of a tree is given by

Options :

1. ✖ N – B + 1

2. ✖ $B + N$

3. ✔ $B - N + 1$

4. ✖ $N - 2B - 1$

Question Number : 20 Question Id : 6364312780 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A unit step voltage is applied at t = 0 to a series RL circuit with zero initial conditions

Options :

1. ✖ It is possible for the current to be oscillatory.

2. ✔ The voltage across the resistor at $t = 0^+$ is zero.

3. ✖ The energy stored in inductor in the steady state is zero.

4. ✖ The resistor current eventually falls to zero.

Question Number : 21 Question Id : 6364312781 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a voltage source

Options :

1. ✖ Terminal voltage is equal to the source e.m.f.

2. ✔ Terminal voltage cannot exceed source e.m.f.

3. ✖ Terminal voltage is always lower than source e.m.f.

4. ✖ Terminal voltage is higher than source e.m.f.

Question Number : 22 Question Id : 6364312782 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The theorem that enables a number of voltage (or current) sources to be combined directly into a single voltage (or current) source is the

Options :

1. ✖ Compensation theorem

2. ✖ Reciprocity theorem

3. ✔ Milliman's theorem

4. ✖ Maxwell's theorem

Question Number : 23 Question Id : 6364312783 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Nodal analysis is based on

Options :

1. ✔ KCL

2. ✖ KVL

3. ✖ KCL and KVL

4. ✖ Law of conservation of energy

Question Number : 24 Question Id : 6364312784 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A network consists only of independent current sources and resistors. If the values of all the current sources are doubled, then values of node voltages

Options :

1. ✖ Remains same

2. ✔ Will be doubled

3. ✖ Will be halved

4. ✖ Changes in some other way

Question Number : 25 Question Id : 6364312785 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The type of systems which are characterized by the input and output quantized at certain levels are called as

Options :

1. ✔ Analog

2. ✖ Discrete

3. ✖ Continuous

4. ✖ Digital

Question Number : 26 Question Id : 6364312786 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An example of a discrete set of information/system is

Options :

1. ✖ The trajectory of the Sun

2. ✔ Data on a CD

3. ✖ Universe time scale

4. ✖ Movement of water through a pipe

Question Number : 27 Question Id : 6364312787 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A system which is linear is said to obey the rules of

Options :

1. ✖ Scaling

2. ✖ Additivity

3. ✔ Both scaling and additivity

4. ✖ Homogeneity

Question Number : 28 Question Id : 6364312788 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A time invariant system is a system whose output

Options :

1. ✖ Increases with a delay in input

2. ✖ Decreases with a delay in input

3. ✔ Remains same with a delay in input

4. ✖ Vanishes with a delay in input

Question Number : 29 Question Id : 6364312789 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

All real time systems concerned with the concept of causality are

Options :

1. ✖ Non causal

2. ✔ Causal

3. ✖ Neither causal nor non causal

4. ✖ Memoryless

Question Number : 30 Question Id : 6364312790 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A system is said to be defined as non-causal, when

Options :

1. ✖ The output at the present depends on the input at an earlier time

2. ✖ The output at the present does not depend on the factor of time at all

3. ✖ The output at the present depends on the input at the current time

4. ✔ The output at the present depends on the input at a time instant in the future

Question Number : 31 Question Id : 6364312791 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $F(s) = L\{f(t)\}=(2s+1)/s^2+4s+1$ then the initial and final values of f(t) are respectively

Options :

1. ✖ 0, 2

2. ✔ 2, 0

3. ✖ 0, 2/7

4. ✖ 2/7, 0

Question Number : 32 Question Id : 6364312792 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A system with transfer function H(z) has impulse response h(.) defined as h(2) =1, h(3) = -1 and h(k) = 0 otherwise. Consider the following statements

S_1: H(z) is a low pass filter

S_2: H(z) is an FIR filter

Which of the following is correct

Options :

1. ✔ Only S_1 is true

2. ✖ Both S_1 and S_2 are false

3. ✖ Both S_1 and S_2 are true and S_2 is a reaction for S_1

4. ✖ Both S_1 and S_2 are true and S_2 is not a reaction for S_1

Question Number : 33 Question Id : 6364312793 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The 3-dB bandwidth of the low pass signal e^{-t} u(t) where u(t) is the unit step function is given by

Options :

1. ✔ 1/2pi Hz

2. ✖ $\frac{\sqrt{\sqrt{2}-1}}{2\pi}$ Hz

3. ✖ Infinity

4. ✖ 1 Hz

Question Number : 34 Question Id : 6364312794 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Laplace transform of a continuous time signal x(t) is $X(s)=(5-s)/s^2-s-2$. If the Fourier transform of this signal exists, then x(t) is

Options :

1. ✖ $e^{2t}\,u(t) - 2\,e^{-t}\,u(t)$

2. ✖ $-e^{2t}\,u(-t) + 2\,e^{-t}\,u(t)$

3. ✖ $-e^{2t}\,u(-t) - 2\,e^{-t}\,u(t)$

4. ✔ $e^{2t}\,u(-t) - 2\,e^{-t}\,u(t)$

Question Number : 35 Question Id : 6364312795 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If the impulse response of a discrete-time system is $h[n] = -5^{-n}\, u[-n-1]$ then the system function H(z) is equal to

Options :

1. ✖ $\frac{-z}{z-5}$ and the system is stable

2. ✔ $\frac{z}{z-5}$ and the system is stable

3. ✖ $\frac{-z}{z-5}$ and the system is unstable

4. ✖ $\frac{z}{z-5}$ and the system is unstable

Question Number : 36 Question Id : 6364312796 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The impulse response functions of four linear systems are S_1, S_2, S_3, and S_4 are given respectively by

$h_1(t) = 1$, $h_2(t) = t.u(t)$, $h_3(t) = u(t)/t+1$, $h_4(t) = e^{-3t}u(t)$

where u(t) is the unit step function. Which of these systems is time invariant, causal and stable

Options :

1. ✖ S_1

2. ✖ S_2

3. ✖ S_3

4. ✔ S_4

Question Number : 37 Question Id : 6364312797 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Fourier transform of a conjugate symmetric function is always

Options :

1. ✖ Imaginary

2. ✖ Conjugate anti-symmetric

3. ✔ Real

4. ✖ Conjugate symmetric

Question Number : 38 Question Id : 6364312798 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a BJT the common base current gain $\alpha = 0.98$ and the collector base junction reverse bias saturation current $I_{CO} = 0.6\mu A$. This BJT is connected in the common emitter mode and operated in the active region with a base drive current $I_B = 20\ \mu A$. The collector current I_C for this mode of operation is

Options :

1. ✖ 0.98 mA

2. ✖ 0.99 mA

3. ✖ 1.0 mA

4. ✔ 1.01 mA

Question Number : 39 Question Id : 6364312799 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

At room temperature, a possible value for the mobility of electrons in the inversion layer of silicon n-channel MOSFET is

Options :

1. ✖ $450\ cm^2/V\text{-}s$

2. ✔ $1350\ cm^2/V\text{-}s$

3. ✖ $1800\ cm^2/V\text{-}s$

4. ✖ $3600\ cm^2/V\text{-}s$

Question Number : 40 Question Id : 6364312800 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a uniformly doped BJT, assume that N_E, N_B and N_C are the emitter, base and collector dopings in atoms/cm^3, respectively. If the emitter injection efficiency of the BJT is close to unity, which one of the following conditions is true

Options :

1. ✖ $N_E = N_B = N_C$

2. ✔ $N_E \geq N_B$ and $N_B > N_C$

3. ✖ $N_E = N_B$ and $N_B < N_C$

4. ✖ $N_E < N_B < N_C$

Question Number : 41 Question Id : 6364312801 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider the following two statements about the internal conditions in an n-channel MOSFET operating in the active region

S1: The inversion charge decreases from source to drain

S2: The channel potential increases from source to drain

Options :

1. ✖ Only S_2 is true

2. ✖ Both S_1 and S_2 false

3. ✖ Both S_1 and S_2 are true but S_2 is not a reason of S_1

4. ✔ Both S_1 and S_2 are true but S_2 is a reason of S_1

Question Number : 42 Question Id : 6364312802 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Thin gate oxide in a CMOS process is preferably grown using

Options :

1. ✖ Wet oxidation

2. ✔ Dry oxidation

3. ✖ Epitaxial deposition

4. ✖ Ion implantation

Question Number : 43 Question Id : 6364312803 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In an n-type silicon crystal at room temperature, which of the following can have a concentration of 4×10^{-19} cm^{-3}

Options :

1. ✖ Silicon atom

2. ✖ Holes

3. ✔ Dopant atoms

4. ✖ Valence electrons

Question Number : 44 Question Id : 6364312804 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is not associated with a p-n junction

Options :

1. ✖ Junction capacitance

2. ✖ Charge storage capacitance

3. ✖ Depletion capacitance

4. ✔ Channel length modulation

Question Number : 45 Question Id : 6364312805 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A p^+n junction has a built-in potential of 0.8 V. The depletion layer width at a reverse bias of 1.2 V is 2μm. For a reverse bias of 7.2 V, the depletion layer width will be

Options :

1. ✔ 4 μm

2. ✖ 4.9 μm

3. ✖ 8 μm

4. ✖ 12 μm

Question Number : 46 Question Id : 6364312806 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Under low level injection assumption, the injected minority carrier current for an extrinsic semiconductor is essentially, the

Options :

1. ✔ Diffusion current

2. ✖ Drift current

3. ✖ Recombination current

4. ✖ Induced current

Question Number : 47 Question Id : 6364312807 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A Silicon PN junction at a temperature of 20° C has a reverse saturation current of 10 pico-Amperes (pA). The reverse saturation current at 40° C for the same bias is approximately

Options :

1. ✖ 30 pA

2. ✔ 40 pA

3. ✖ 50 pA

4. ✖ 60 pA

Question Number : 48 Question Id : 6364312808 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The drain of an n-channel MOSFET is shorted to the gate so that $V_{GS} = V_{DS}$. The threshold voltage (V_T) of MOSFET is 1V. If the drain current (I_D) is 1mA for $V_{GS} = 2V$, then for $V_{GS} = 3V$, I_D is

Options :

1. ✖ 2 mA

2. ✖ 3 mA

3. ✖ 9 mA

4. ✔ 4 mA

Question Number : 49 Question Id : 6364312809 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Consider an abrupt p-junction. Let V_{bi} be the built-in potential of this junction and V_R be the applied reverse bias. If the junction capacitance (C_j) is 1pF for $V_{bi} + V_R = 1V$, then for $V_{bi} + V_R = 4V$, C_j will be

Options :

1. ✖ 4 pF

2. ✖ 2 pF

3. ✖ 0.25 pF

4. ✔ 0.5 pF

Question Number : 50 Question Id : 6364312810 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

If P is passivation, Q is n-well implant, R is metallization, and S is source/drain diffusion, then the order in which they are carried out in a standard n-well CMOS fabrication process, is

Options :

1. ✖ P-Q-R-S

2. ✔ Q-S-R-P

3. ✖ R-P-S-Q

4. ✖ S-R-Q-P

Question Number : 51 Question Id : 6364312811 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The input impedance (Z_i) and output impedance (Z_o) of an ideal transconductance (Voltage Controlled Current Source)

Options :

1. ✖ $Z_i = 0, Z_o = 0$

2. ✖ $Z_i = \infty, Z_o = 0$

3. ✔ $Z_i = \infty, Z_o = \infty$

4. ✖ $Z_i = 0, Z_o = \infty$

Question Number : 52 Question Id : 6364312812 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

As a temperature increased, the voltage across a diode carrying a constant current

Options :

1. ✔ Decreases

2. ✖ Increases

3. ✖ Remain constant

4. ✖ May increase or decrease depending upon the doping levels in the junction

Question Number : 53 Question Id : 6364312813 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The use of rectifier filter in a capacitor circuit gives satisfactory performance only when load

Options :

1. ✖ Current is high

2. ✖ Voltage is high

3. ✔ Current is low

4. ✖ Voltage is low

Question Number : 54 Question Id : 6364312814 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The threshold voltage of an n-channel MOSFET can be increased by

Options :

1. ✖ Reducing gate oxide thickness

2. ✖ Increasing channel doping concentration

3. ✔ Reducing channel length

4. ✖ Decreasing channel doping concentration

Question Number : 55 Question Id : 6364312815 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If differential amplifier has differential gain of 20,000. CMRR = 80dB then common mode gain is

Options :

1. ✖ 1

2. ✔ 2

3. ✖ 0.5

4. ✖ 0

Question Number : 56 Question Id : 6364312816 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Advantage of negative feedback is

Options :

1. ✖ Decreased bandwidth

2. ✔ Increased stability

3. ✖ Reduction in gain

4. ✖ Higher output impedance

Question Number : 57 Question Id : 6364312817 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A two-stage amplifier with negative feedback has an overshoot when damping factor K is

Options :

1. ✖ Negative

2. ✖ Positive

3. ✔ Less than unity

4. ✖ Greater than unity

Question Number : 58 Question Id : 6364312818 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Silicon diode is less suited for low voltage rectifier operation because

Options :

1. ✔ Its cut-in voltage is high

2. ✖ It cannot withstand with high temperature

3. ✖ Its breakdown voltage is high

4. ✖ Its reverse saturation current is low

Question Number : 59 Question Id : 6364312819 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following power amplifier has maximum efficiency

Options :

1. ✖ Class B

2. ✖ Class AB

3. ✔ Class C

4. ✖ Class A

Question Number : 60 Question Id : 6364312820 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What is the drain current for a D-MOSFET having the characteristics values of I_{DSS} 10 mA, $V_{GS(off)}$ of -4V and V_{GS} of +2V

Options :

1. ✖ 18.5 mA

2. ✖ 5.0mA

3. ✔ 22.5mA

4. ✖ 2.25mA

Question Number : 61 Question Id : 6364312821 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A Hartley oscillator is used for generating

Options :

1. ✖ Microwave oscillation

2. ✖ Very low frequency oscillation

3. ✔ Radio-frequency oscillation

4. ✖ Audio frequency oscillation

Question Number : 62 Question Id : 6364312822 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The maximum power dissipation capacity of a transistor is 50 mW. If the collector emitter voltage is 10 V. What is the safe collector current that can be allowed through the transistors

Options :

1. ✖ 2mA

2. ✖ 1mA

3. ✖ 2.5 mA

4. ✔ 5 mA

Question Number : 63 Question Id : 6364312823 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An operational-amplifier possesses

Options :

1. ✖ Very small input resistance and very large output resistance

2. ✖ Very large input resistance and very large output resistance

3. ✖ Very small input resistance and very small output resistance

4. ✔ Very large input resistance and very small output resistance

Question Number : 64 Question Id : 6364312824 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An RC amplifier stage has bandwidth of 500 KHz. What will be the rise time of the amplifier stage

Options :

1. ✖ 0.35ms

2. ✖ 0.1ms

3. ✔ 0.7 µs

4. ✖ 2.0 µs

Question Number : 65 Question Id : 6364312825 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An amplifier will generate stable sinusoidal oscillations if we provide feedback such that

Options :

1. ✖ Its poles lie on the negative real axis in the s-plane

2. ✖ It poles lie anywhere in the s-plane

3. ✔ Its poles lie close to jω-axis in the right half of s-plane

4. ✖ Its poles lie close to jω-axis in the left half of s-plane

Question Number : 66 Question Id : 6364312826 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If X=1 in the logic equation $[X+Z\{\bar{Y} + (\bar{Z} + X\bar{Y})\}]\ \{\bar{X} + \bar{Z}(X+Y)\}=1$. Then

Options :

1. ✖ $Y = Z$

2. ✖ $Y = \bar{Z}$

3. ✖ $Z = 1$

4. ✔ $Z = 0$

Question Number : 67 Question Id : 6364312827 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

X = 01110 and Y = 11001 are two 5-bit binary numbers represented in two's complement format. The sum of X and Y represented in two's complement format using 6 bits is

Options :

1. ✖ 100111

2. ✗ 001000

3. ✓ 000111

4. ✗ 101001

Question Number : 68 Question Id : 6364312828 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Boolean function Y = AB + CD is to be realized using only 2-input NAND gates. The minimum number of gates required is

Options :

1. ✗ 2

2. ✓ 3

3. ✗ 4

4. ✗ 5

Question Number : 69 Question Id : 6364312829 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A new Binary Coded Pentary (BCP) number system is proposed in which every digit of a base-5 number is represented by its corresponding 3-bit binary code. For example, the base-5 number 24 will be represented by its BCP code 010100. In this numbering system, the BCP code 100010011001 corresponds to the following number in base-5 system

Options :

1. ✖ 423

2. ✖ 1324

3. ✖ 2201

4. ✔ 4231

Question Number : 70 Question Id : 6364312830 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The minimum number of 2 to 1 multiplexers required to realize a 4 to 1 multiplexers is

Options :

1. ✖ 1

2. ✖ 2

3. ✔ 3

4. ✖ 4

Question Number : 71 Question Id : 6364312831 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

11001, 1001 and 111001 correspond to the 2's complement representation of which one of the following sets of number

Options :

1. ✖ 25, 9 and 57 respectively

2. ✖ -6, -6 and -6 respectively

3. ✔ -7, -7 and -7 respectively

4. ✖ -25, -9 and -57 respectively

Question Number : 72 Question Id : 6364312832 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A 0 to 6 counter consists of 3 flip flops and a combination of 2 input gate(s). The combination circuit consists of

Options :

1. ✖ One AND gate

2. ✖ One OR gate

3. ✖ One AND gate and one OR gate

4. ✔ Two AND gates

Question Number : 73 Question Id : 6364312833 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The output of the 74 series of TTL gates is taken from a BJT in

Options :

1. ✖ Totem pole and common collector configuration

2. ✔ Either totem pole or open collector configuration

3. ✖ Common base configuration

4. ✖ Common collector configuration

Question Number : 74 Question Id : 6364312834 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

After executing the below code, contents of Accumulator (A) and Z, AC, CY flag bits are_____

```
MIV  A, F9H
ANI  83  H
```

Options :

1. ✔ A = 81H, Z = 0, AC = 0, CY = 0

2. ✖ A = F3H, Z = 1, AC = 0, CY = 1

3. ✖ A = F9H, Z = 1, AC = 0, CY = 0

4. ✖ A = 83H, Z = 0, AC = 0, CY = 0

Question Number : 75 Question Id : 6364312835 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A digital system is required to amplify a binary-encoded audio signal. The user should be able to control the gain of the amplifier from a minimum to a maximum in 100 increments. The minimum number of bits required to encode, in straight binary is

Options :

1. ✖ 8

2. ✖ 6

3. ✖ 5

4. ✔ 7

Question Number : 76 Question Id : 6364312836 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The Boolean expression AC+B$\bar{C}$ is equivalent to

Options :

1. ✖ $\bar{A}$C+B$\bar{C}$+AC

2. ✖ $\bar{B}C + AC + B\bar{C}+\bar{A}C\bar{B}$

3. ✖ $AC + B\bar{C}+\bar{B}C + ABC$

4. ✔ $ABC + AB\bar{C} + \bar{A}B\bar{C}+A\bar{B}C$

Question Number : 77 Question Id : 6364312837 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Two D flip-flops are connected as a synchronous counter that goes through the following Q_B, Q_A sequence

$00 \rightarrow 01 \rightarrow 11 \rightarrow 10 \rightarrow 00 \rightarrow \ldots\ldots$

The combination to the inputs D_A and D_B are

Options :

1. ✖ $D_A = Q_B ;\ D_B = Q_A$

2. ✖ $D_A = \bar{Q}_A ;\ D_B = \bar{Q}_B$

3. ✖ $D_A = (Q_A \bar{Q}_B + Q_B \bar{Q}_A) ;\ D_B = \bar{Q}_A$

4. ✔ $D_A = (Q_A Q_B + \bar{Q}_A \bar{Q}_B) ;\ D_B = \bar{Q}_B$

Question Number : 78 Question Id : 6364312838 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The range of the signed decimal numbers that can be represented by 6-bit 1's complement number is

Options :

1. ✔ -31 to +31

2. ✖ -63 to +64

3. ✖ -64 to +63

4. ✖ -32 to +31

Question Number : 79 Question Id : 6364312839 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

When a human being tries to approach an object, his brain acts as

Options :

1. ✖ An actuator

2. ✔ A controller

3. ✖ An amplifier

4. ✖ An error measuring device

Question Number : 80 Question Id : 6364312840 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The impulse response of a linear time invariant system is given as
$g(t) = e^{-t}$, t >0
The transfer function of the system is equal to

Options :

1. ✖ $\frac{S}{(S+1)}$

2. ✖ $\frac{1}{S(S+1)}$

3. ✔ $\frac{1}{(S+1)}$

4. ✖ $\frac{1}{S}$

Question Number : 81 Question Id : 6364312841 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

If the characteristics equation of a closed loop system is $2S^2 + 6S + 6 = 0$ then system is

Options :

1. ✖ Undamped

2. ✔ Underdamped

3. ✖ Overdamped

4. ✖ Critically damped

Question Number : 82 Question Id : 6364312842 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Given a unity feedback system $G(S) = \frac{K}{S(S+4)}$ .What is the value of K for a damping ratio of 0.5

Options :

1. ✖ 2

2. ✖ 4

3. ✔ 16

4. ✖ 1

Question Number : 83 Question Id : 6364312843 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A system has single pole at origin, its impulse response will be

Options :

1. ✖ Ramp

2. ✖ Oscillatory

3. ✔ Constant

4. ✖ Decaying exponential

Question Number : 84 Question Id : 6364312844 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The feedback system with the characteristics equation $S^4 + 20KS^3 + 5S^2 + 10S + 15 = 0$, system is

Options :

1. ✖ Stable for non-zero value of K

2. ✖ Stable for all value of K

3. ✔ Unstable for all value of K

4. ✖ Stable for $\infty > K > 7$

Question Number : 85 Question Id : 6364312845 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If the gain of open loop system is doubled then the gain margin of the system is

Options :

1. ✔ Halved

2. ✖ Doubled

3. ✖ Not effected

4. ✖ One fourth of original value

Question Number : 86 Question Id : 6364312846 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the root-locus for open loop transfer function

$$G(S)H(S) = \frac{K(S+6)}{(S+3)(S+5)}$$

The break away points are located respectively at

Options :

1. ✖ 2

2. ✖ -4.27

3. ✖ 1

4. ✔ -7.73

Question Number : 87 Question Id : 6364312847 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The frequency where magnitude M has a peak value in frequency response is

Options :

1. ✖ Tuned frequency

2. ✔ Resonant Frequency

3. ✖ Peak frequency

4. ✖ Normalized frequency

Question Number : 88 Question Id : 6364312848 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Considered the following open loop transfer function

$G(S) = \frac{K(S+2)}{(S+1)(S+4)}$

Characteristics equation of the unity negative feedback will be

Options :

1. ✖ $S^2 + 5S + 14 + K(S + 2) = 0$

2. ✖ $S^2 + 10S + 4 + K(S + 1) = 0$

3. ✖ $S^2 + 10S - 4 + K(S + 2) = 0$

4. ✔ $S^2 + 5S + 4 + K(S + 2) = 0$

Question Number : 89 Question Id : 6364312849 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The attenuation (magnitude) by a lead compensator at a frequency of maximum phase lead $\omega_m = \sqrt{ab}$ is

Options :

1. ✖ $\sqrt{a+b}$

2. ✖ $\sqrt{b-a}$

3. ✔ $\sqrt{\frac{a}{b}}$

4. ✖ $\sqrt{\frac{b}{a}}$

Question Number : 90 Question Id : 6364312850 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A unity-feedback control system has open loop transfer function

$G(S) = \frac{4(2S+1)}{S^2(S+2)}$

If the input to the system is unit ramp, then steady state error will be

Options :

1. ✖ 5

2. ✔ 0

3. ✖ 2

4. ✖ Infinite

Question Number : 91 Question Id : 6364312851 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statement is correct

Options :

1. ✖ Phase margin is always negative for stable system

2. ✔ Phase margin is always positive for stable system

3. ✖ Phase margin can be negative or positive for stable system

4. ✖ Phase margin is always zero for stable system

Question Number : 92 Question Id : 6364312852 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The state space representation of a linear time invariant system is

$X(t) = AX(t) + Bu(t); \quad Y(t) = CX(t);$

What is the transfer function H(s) of the system

Options :

1. ✔ $C(sI - A)^{-1}B$

2. ✖ $B(sI - A)^{-1}C$

3. ✖ $C(sI - A)B$

4. ✖ $B(sI - A)C$

Question Number : 93 Question Id : 6364312853 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Open loop transfer function of a system having one zero with positive real value is

Options :

1. ✖ Positive phase function

2. ✔ Non-minimum phase function

3. ✖ Negative phase function

4. ✖ Zero phase function

Question Number : 94 Question Id : 6364312854 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The modulation index of an AM wave is changed from 0 to 1. Transmitted power is

Options :

1. ✖ Halved

2. ✖ Quadrupled

3. ✖ Unchanged

4. ✔ Increased by 50 %

Question Number : 95 Question Id : 6364312855 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

A linear system has the transfer function

$$H(j) = \frac{1}{(j\omega+1)}$$

When it is subjected to an input white noise process with a constant spectral density 'A', the spectral density of the output will be

Options :

1. ✖ $\frac{1}{(j\omega+1)}$

2. ✖ $\frac{A}{(j\omega+1)^2}$

3. ✔ $\frac{A}{(\omega^2+1)}$

4. ✖ $\frac{A}{\sqrt{(\omega^2+1)}}$

Question Number : 96 Question Id : 6364312856 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An antenna has 40 ohm antenna resistance and 60 ohm radiation resistance. The efficiency of the antenna is

Options :

1. ✔ 60 %

2. ✖ 80%

3. ✖ 20%

4. ✖ 40%

Question Number : 97 Question Id : 6364312857 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A communication channel with AWGN operating at a signal to noise ratio SNR>>1 and bandwidth B has capacity C_1. If the SNR is doubled keeping B constant. The resultant capacity C_2 is

Options :

1. ✖ $C_2=2\ C_1$

2. ✖ $C_2= C_1+2B$

3. ✖ $C_2= C_1+0.3B$

4. ✔ $C_2= C_1+B$

Question Number : 98 Question Id : 6364312858 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If E denotes expectation, the variance of a random variable X is given as

Options :

1. ✖ $E[X^2] + E^2[X]$

2. ✔ $E[X^2] - E^2[X]$

3. ✖ $E^2[X]$

4. ✖ $E[X^2]$

Question Number : 99 Question Id : 6364312859 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following analog modulation scheme required minimum transmitted power and minimum bandwidth

Options :

1. ✖ Amplitude Modulation

2. ✔ SSB

3. ✖ DSB-SC

4. ✖ DSB-FC

Question Number : 100 Question Id : 6364312860 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The random variable

$$Y = \int_{-\infty}^{\infty} W(t)\emptyset(t)dt$$

Where $\emptyset(t) = \begin{cases} 1; & 5 \le t \le 7 \\ 0; & otherwise \end{cases}$

and W(t) is a real white Gaussian noise process with two-sided power spectral density $S_{W(f)}$=3W/Hz, for all f. The variance of Y is

Options :

1. ✖ 2

2. ✔ 6

3. ✖ 7

4. ✖ 9

Question Number : 101 Question Id : 6364312861 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A single bit, equally likely to be 1 and 0, is to be sent across an AWGN channel with PSD $N_O/2$. Binary signaling, with 0 for P(t) and 1 for q(t), is used for transmission, along with an optimal receiver that minimizes the bit error probability.

Let $\psi_1(t)$, $\psi_2(t)$, form an orthogonal signal set.

If we choose $P(t) = \psi_1(t)$, and $q(t) = -\psi_1(t)$ we would obtain a certain bit-error probability P_b.

If we keep $P(t) = \psi_1(t)$ but take $q(t) = \sqrt{E}\ \psi_2(t)$, for what value of E would we obtain the same bit-error probability P_b

Options :

1. ✖ 1

2. ✖ 0

3. ✖ 2

4. ✔ 3

Question Number : 102 Question Id : 6364312862 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let (X_1 and X_2) be independent random variables. X_1 has mean 0 and variance 1, while X_2 has mean 1 and variance 4. The mutual information I (X_1; X_2) between $X_1$and X_2 in bits is

Options :

1. ✖ 1

2. ✖ 4

3. ✔ 0

4. ✖ 6

Question Number : 103 Question Id : 6364312863 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The channel capacity under the gaussian noise for a discrete memory less channel with bandwidth of 4 MHz and SNR of 31 is

Options :

1. ✖ 4 Kbps

2. ✖ 2Kbps

3. ✖ 4Mbps

4. ✔ 20Mbps

Question Number : 104 Question Id : 6364312864 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A binary random variable X takes the value +2 and -2. The probability P(X = +2) = a.

The value of a, for which the entropy of X is maximum

Options :

1. ✔ 0.5

2. ✖ 1

3. ✖ 2

4. ✖ 4

Question Number : 105 Question Id : 6364312865 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The bandwidth required in DPCM is less than that of PCM because

Options :

1. ✖ More quantization levels are needed

2. ✖ The difference signal is larger in amplitude than actual signal

3. ✔ The no. of bits per code is reduced resulting in a reduced bit rate

4. ✖ The successive samples of signal often differ in amplitude

Question Number : 106 Question Id : 6364312866 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An analog signal is sampled at 36 KHz and quantized in to 256 levels. The time duration of a bit of the binary coded signal is

Options :

1. ✖ 5.43ms

2. ✔ 3.47μs

3. ✖ 6.47 μs

4. ✖ 1.47ms

Question Number : 107 Question Id : 6364312867 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A source delivers symbols A, B, C, D with probabilities 1/2, 1/4, 1/8 and 1/8. Entropy of the system is

Options :

1. ✔ 1.75 bits per symbol

2. ✖ 1.75 bits per second

3. ✖ 1.25 symbols per bit

4. ✖ 1.75 symbols per second

Question Number : 108 Question Id : 6364312868 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The expression for an electric field in free space is $E = E_o = (x + y + j2z)e^{-j(\omega t - kx + ky)}$ where **x, y, z** represents the spatial coordinates, **t** represents time, and **ω, k** are constants. This electric field

Options :

1. ✖ Represents a linearly polarized plane wave

2. ✖ Does not represent a plane wave

3. ✔ Represents an elliptically polarized plane wave propagating along x-y plane

4. ✖ Represents a circular polarized plane wave propagating normal to the z-axis

Question Number : 109 Question Id : 6364312869 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Radiation resistance of a small dipole current element of length l at a frequency of 3 GHz is 3 ohms. If the length is changed by 1%, then the percentage change in the radiation resistance,

Options :

1. ✖ 3%

2. ✖ 4%

3. ✔ 2%

4. ✖ No change

Question Number : 110 Question Id : 6364312870 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

For a vector field A which one of the following is false

Options :

1. ✔ A is irrotational if $\nabla^2 \times A = 0$

2. ✖ $\nabla \times A$ in another vector field

3. ✖ A is sinusoidal if $\nabla . A = 0$

4. ✖ $\nabla \times (\nabla \times A) = \nabla (\nabla . A) - \nabla^2 A^2$

Question Number : 111 Question Id : 6364312871 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Solutions of Laplace's equation, which are continuous through the second derivative are called

Options :

1. ✖ Odd functions

2. ✖ Fundamental functions

3. ✖ Bessel functions

4. ✔ Harmonic functions

Question Number : 112 Question Id : 6364312872 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For electromagnetic wave proportion in free space, the free space is defined as

Options :

1. ✖ $\sigma = 0; \varepsilon = 1; \mu \neq 1; p = 0; J = 0$

2. ✖ $\sigma \neq 0; \varepsilon > 1; \mu < 1; p \neq 0; J = 0$

3. ✔ $\sigma = 0; \varepsilon = 1; \mu = 1; p = 0; J = 0$

4. ✖ $\sigma = 0; \varepsilon = 1; \mu = 1; p \neq 0; J \neq 0$

Question Number : 113 Question Id : 6364312873 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Which of the following statement is correct.

On a conducting surface boundary, electric field lines are

Options :

1. ✔ Always normal

2. ✖ Always tangential

3. ✖ At an angle depending on the field intensity

4. ✖ Neither normal nor tangential

Question Number : 114 Question Id : 6364312874 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

In a field of charge Q at the origin, the potentials at A(2,0,0) and B(1/2,0,0) are V_A=15 volt and V_B = 0 volt respectively. What will be the potential at C(1,0,0)

Options :

1. ✔ 20volt

2. ✖ 22volt

3. ✖ 17volt

4. ✖ 18volt

Question Number : 115 Question Id : 6364312875 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The value of $\nabla . A$, where $A=3XYa_x+Xa_y+XYa_z$ at a point (2, -2, 2) is

Options :

1. ✖ 4

2. ✖ 5

3. ✖ -6

4. ✔ -10

Question Number : 116 Question Id : 6364312876 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a uniform plane wave, the value of $|E|/|H|$ is

Options :

1. ✖ 1

2. ✔ $\sqrt{\frac{\mu}{\varepsilon}}$

3. ✖ $\sqrt{\mu\epsilon}$

4. ✖ $\sqrt{\frac{\varepsilon}{\mu}}$

Question Number : 117 Question Id : 6364312877 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Poynting vector is a measure of which of the following

Options :

1. ✔ Average power flow through the surface

2. ✖ Power dissipated by the surface

3. ✖ Maximum power flow through a surface surrounding the source

4. ✖ Instantaneous power flow through the surface

Question Number : 118 Question Id : 6364312878 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

A uniform transmission line of characteristics impedance 100 ohm and feeding a purely resistive load of 500 ohm uses single stub matching. The stub is placed at a distance d from the load. The VSWR on the length d will be

Options :

1. ✖ 1

2. ✖ 0

3. ✔ 5

4. ✖ 4

Question Number : 119 Question Id : 6364312879 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The cut off wavelength λ_c for TE_{20} mode for a standard rectangular waveguide is

Options :

1. ✖ 2a

2. ✖ 2/a

3. ✖ 3a

4. ✔ a

Question Number : 120 Question Id : 6364312880 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following antenna is obtained by modifying a wave guide'

Options :

1. ✖ Helical antenna

2. ✔ Horn antenna

3. ✖ Dipole antenna

4. Microstrip antenna