Question Paper Preview

Subject Name: Electronics and Communication Engineering

Display Number Panel: Yes
Group All Questions: No

Question Number : 1 Question Id : 7621613961 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The eigen values of the matrix $A = \begin{bmatrix} 1 & 3 & 4 \\ 0 & 2 & 5 \\ 0 & 0 & 7 \end{bmatrix}$ are

Options :

1. 1,3, 4
2. 3, 4, 5
3. 1,2 ,7
4. 1, 2 ,5

Question Number : 2 Question Id : 7621613962 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The value of $I = \int_0^{2\pi} cos^5 x \, dx$ is

Options :

1. π
2. 2π
3. $\frac{\pi}{2}$
4. 0 (zero)

Question Number : 3 Question Id : 7621613963 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

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

Options :

1. $y = \sec x$
2. $y = \cos x$
3. $y = \text{cosec } x + c$

4. $y = x \sec x + c$

Question Number : 4 Question Id : 7621613964 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The solution of $p = \log(px - y)$ where $p = \frac{dy}{dx}$ is

Options :

1. $y = x - c$
2. $y = cx - e^c$
3. $y = x + e^c$
4. $y = cx + e^c$

Question Number : 5 Question Id : 7621613965 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The particular integral of the equation $(D^2 - D - 2)\, y = \sin 2x$ is

Options :

1. $y = \cos 2x - \sin 2x$
2. $y = \frac{1}{20}\cos 2x + \sin 2x$
3. $y = \frac{1}{20}(\cos 2x - 3 \sin 2x)$
4. $y = \frac{1}{20}(\cos 2x + 3 \sin 2x)$

Question Number : 6 Question Id : 7621613966 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The divergence of $f(x, y, z) = 3x^2\, i + 5xy^2\, j + xyz^3 k$ at the point (1,2,3) is

Options :

1. 20
2. 30
3. 60
4. 80

Question Number : 7 Question Id : 7621613967 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The Fourier sine transform of $f(x) = \frac{1}{x}$, $x > 0$ is

Options :

1. $\sqrt{\frac{\pi}{2}}$
2. $\sqrt{\pi}$

3. $\sqrt{\frac{2}{\pi}}$

4. $2\sqrt{\pi}$

Question Number : 8 Question Id : 7621613968 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If $p = \frac{\partial z}{\partial x}$, $q = \frac{\partial z}{\partial y}$, the solution of $p^2+q^2 = 1$ is

Options :

1. $z = a\ x + b\sqrt{y}$

2. $z = a\,x + (\sqrt{1-a^2})\ y + c$

3. $z = a\,x + \sqrt{a^2-b^2}\ y + c$

4. $z = a\,x - (\sqrt{1-a^2})\ - cy$

Question Number : 9 Question Id : 7621613969 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If $u = x^2y + y^2z + z^2x$, then $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} =$

Options :

1. $(x+y+z)^2$

2. $(x+y+z)^{-2}$

3. $(x+y+z)$

4. $(x+y+z)^{-1}$

Question Number : 10 Question Id : 7621613970 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The invariant points (i.e. fixed points) of the transformation $\frac{1+z}{1-z}$ are $z =$

Options :

1. $\pm 3\,i$

2. $\pm i\sqrt{2}$

3. $\pm i$

4. $2 \pm i\sqrt{2}$

Display Number Panel: Yes
Group All Questions: No

Question Number : 11 Question Id : 7621613971 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The current gain always less than one in

Options :

1. CE amplifier only
2. CC amplifier only
3. CB amplifier only
4. both CE and CC amplifiers

Question Number : 12 Question Id : 7621613972 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The differential voltage gain and the common mode voltage gain of a differential amplifier are 40 dB and 4 dB respectively. The common mode rejection ratio is

Options :

1. 36 dB
2. 10 dB
3. 44 dB
4. 18 dB

Question Number : 13 Question Id : 7621613973 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The Region of Convergence (ROC)

Options :

1. does not contain zeros , but contain poles
2. does not contain poles , but contain zeros
3. does not contain both poles and zeros
4. contain both poles and zeros

Question Number : 14 Question Id : 7621613974 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Shot noise is generated by

Options :

1. resistor
2. capacitor
3. choke
4. transistor

Question Number : 15 Question Id : 7621613975 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

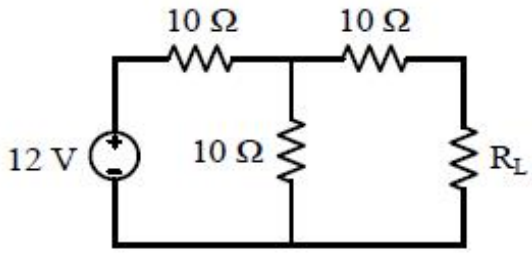
The equation $\nabla \times \overline{E} = \frac{\partial B}{\partial t}$ is the generalization of

Options :

1. Gauss's law
2. Ampere's law
3. Faraday's law
4. Biot-Savart's law

Question Number : 16 Question Id : 7621613976 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the circuit shown below, find the value of R_L such that maximum power is transferred to R_L

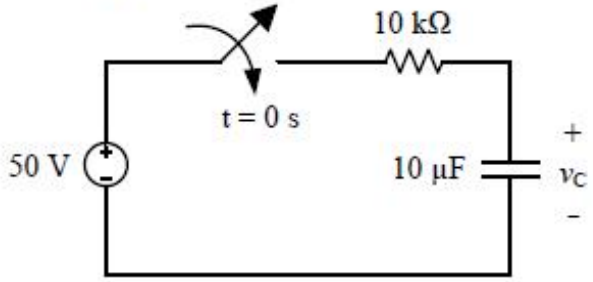


Options :

1. 5 Ω
2. 15 Ω
3. 10 Ω
4. 20 Ω

Question Number : 17 Question Id : 7621613977 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the circuit shown below, the switch is closed at $t = 0\ s$. The voltage across capacitor at $t = 0^-\ s$ is 25 V. Find the expression for i(t) when $t \geq 0\ s$.

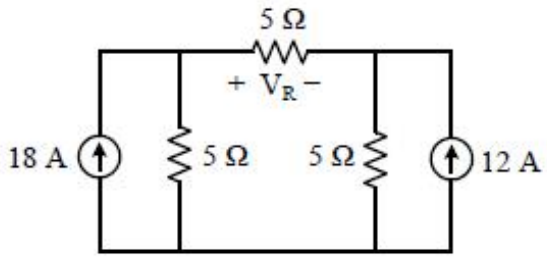


Options :

1. $\left(1 - 0.0025 \times e^{-t/10}\right)$ A
2. $(1 - 0.0025 \times e^{-10t})$ A
3. $\left(0.0025 \times e^{-t/10}\right)$ A
4. $(0.0025 \times e^{-10t})$ A

Question Number : 18 Question Id : 7621613978 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the circuit shown below, find the value of voltage V_R.

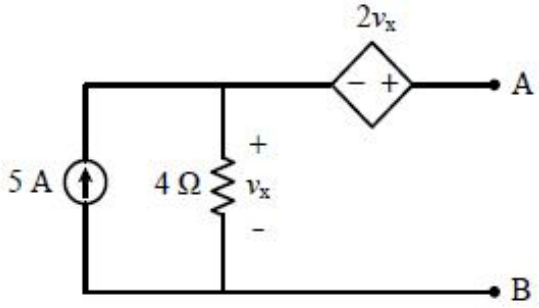


Options :

1. 30 V
2. 15 V
3. 10 V
4. 100 V

Question Number : 19 Question Id : 7621613979 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the circuit shown below, find the open circuit voltage seen from terminals 'A' and 'B'

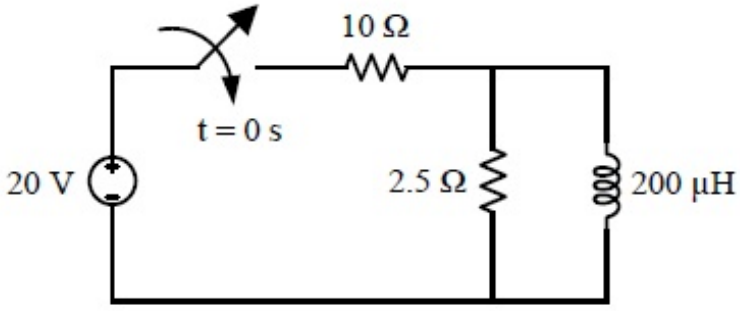


Options :

1. 60 V
2. 40 V
3. 20 V
4. - 20 V

Question Number : 20 Question Id : 7621613980 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the circuit shown below, the switch is closed at $t = 0\ s$. The inductor current at $t = 0$ s is 0 A. Find the time constant of the circuit for $t > 0\ s$.



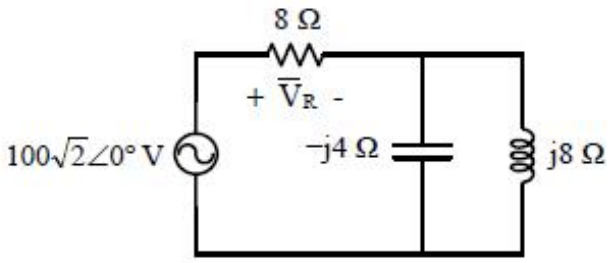
Options :

1. $100\ \mu s$

2. $0.01\ \mu s$
3. $400\ \mu s$
4. $80\ \mu s$

Question Number : 21 Question Id : 7621613981 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the circuit shown below, calculate the supply power factor.

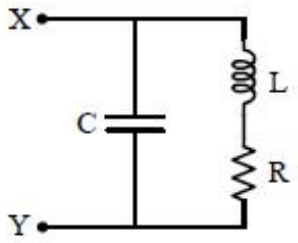


Options :

1. 0
2. 0.707 (lagging)
3. 1
4. 0.707 (leading)

Question Number : 22 Question Id : 7621613982 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For the circuit given below, find the resonant frequency of the network seen from terminals 'X' and 'Y'

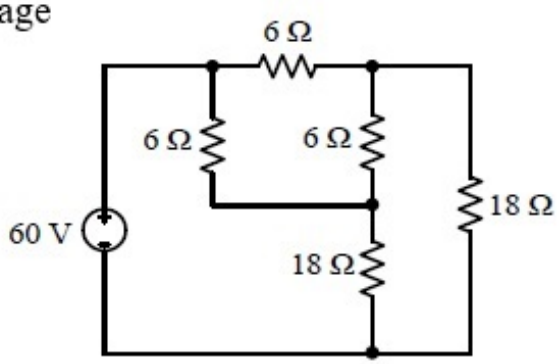


Options :

1. $R\sqrt{\frac{1}{LC}}$
2. $\sqrt{\frac{1}{LC}-\frac{R^2}{L^2}}$
3. $\sqrt{\frac{1}{LC}+\frac{R^2}{L^2}}$
4. $\sqrt{\frac{1}{LC}}$

Question Number : 23 Question Id : 7621613983 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Using delta-star conversion, find the equivalent resistance of the following network, viewed from source voltage

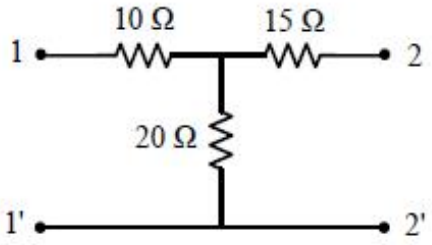


Options :

1. $10\ \Omega$
2. $20\ \Omega$
3. $12\ \Omega$
4. $22\ \Omega$

Question Number : 24 Question Id : 7621613984 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Find the open-circuit impedance parameter matrix, 'z' for the 2-port network given below.

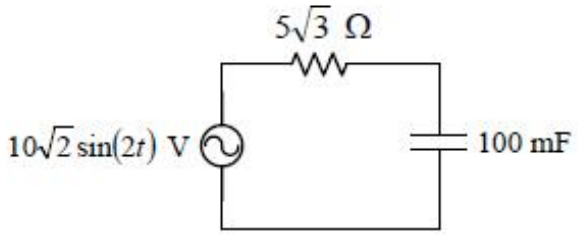


Options :

1. $\begin{bmatrix} 30 & 20 \\ 20 & 35 \end{bmatrix}$
2. $\begin{bmatrix} 30 & -20 \\ -20 & 35 \end{bmatrix}$
3. $\begin{bmatrix} \frac{1}{30} & \frac{1}{20} \\ \frac{1}{20} & \frac{1}{35} \end{bmatrix}$
4. $\begin{bmatrix} \frac{1}{30} & -\frac{1}{20} \\ -\frac{1}{20} & \frac{1}{35} \end{bmatrix}$

Question Number : 25 Question Id : 7621613985 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the circuit shown below, find the reactive power supplied by the voltage source

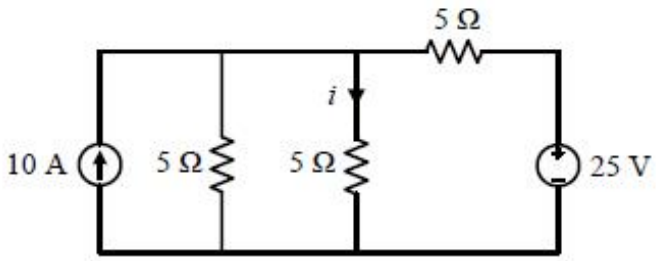


Options :

1. 50 VAR
2. 100 VAR
3. 5 VAR
4. 10 VAR

Question Number : 26 Question Id : 7621613986 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Find the current 'i ' in the circuit shown below

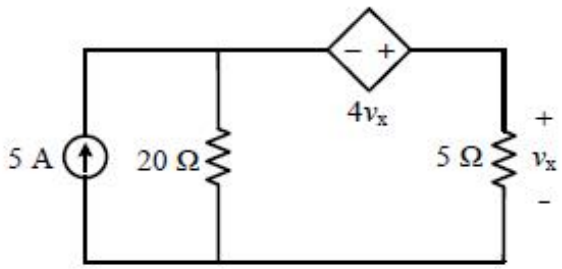


Options :

1. 15 A
2. 5 A
3. 35 A
4. 3 A

Question Number : 27 Question Id : 7621613987 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the circuit shown below, find the voltage across the 5 Ω resistor.



Options :

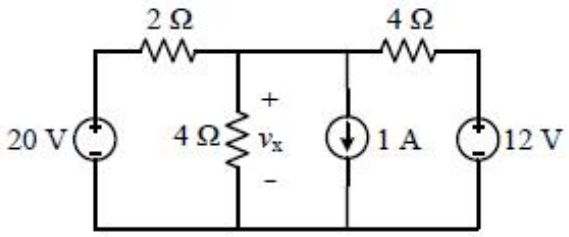
1. 20 V
2. 80 V

3. 100 V

4. 400 V

Question Number : 28 Question Id : 7621613988 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the circuit shown below, find the voltage 'v_x'



Options :

1. 12 V

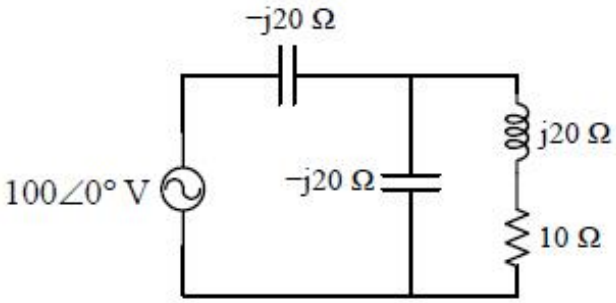
2. 20 V

3. −4 V

4. −8 V

Question Number : 29 Question Id : 7621613989 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the circuit shown below, find the impedance of the network



Options :

1. (20 + j20) Ω

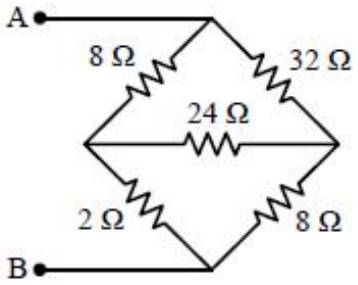
2. (40 + j40) Ω

3. (20 – j20) Ω

4. (40 – j40) Ω

Question Number : 30 Question Id : 7621613990 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the circuit shown below, find the equivalent resistance seen from terminals A and B, when 24 Ω resistor is short circuited.



Options :

1. $10\ \Omega$
2. $40\ \Omega$
3. $24\ \Omega$
4. $8\ \Omega$

Question Number : 31 Question Id : 7621613991 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Assuming the Fermi level to be at the mid-gap, what is the probability of occupancy of a state at the bottom of the conduction band in intrinsic Si at 200K? At room temperature, $kT = 0.026\ eV$.

Options :

1. 5×10^{-13}
2. 2×10^{-11}
3. 5×10^{-8}
4. 2×10^{-9}

Question Number : 32 Question Id : 7621613992 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The electron distribution function in conduction band is given by $n(E_K) = C\sqrt{E_K}e^{-E_K/kT}$ where E_K is the kinetic energy and C is a constant. The peak kinetic energy occurs, when

Options :

1. $E_K = kT/2$
2. $E_K = kT$
3. $E_K = \sqrt{kT}/2$
4. $E_K = \sqrt{kT/2}$

Question Number : 33 Question Id : 7621613993 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following statements is true for a typical Si *pn*-junction diode at room temperature?

Options :

1. The generation current is ~3-4 orders of magnitude higher than diffusion current under reverse bias
2. The generation current is ~3-4 orders of magnitude lower than diffusion current under reverse bias
3. The recombination rate is much lower than generation rate under forward bias
4. The recombination rate is highest at the edges of the depletion region under forward bias

Question Number : 34 Question Id : 7621613994 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The flat-band voltage for an MOS structure with *p*-Si semiconductor having a doping concentration of $10^{16}\ cm^{-3}$ will

Options :

1. be positive if the metal is aluminium
2. be lower in magnitude if the metal is aluminium than if it is p^+-Si
3. increase with *p*-Si doping if the metal is p^+-Si
4. increase with *p*-Si doping if the metal is aluminium

Question Number : 35 Question Id : 7621613995 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The effective surface mobility of a conventional planar Si MOSFET

Options :

1. Initially increases and then decreases, as the gate voltage is increased
2. Decreases as the gate voltage is increased
3. Increases as the doping is increased
4. Does not depend on substrate voltage

Question Number : 36 Question Id : 7621613996 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following statements is true for thermal oxidation of Si?

Options :

1. The oxide thickness shows a linear growth rate initially and a parabolic growth rate later
2. The oxide thickness shows a parabolic growth rate initially and a linear growth rate later
3. The linear rate constant is independent of crystal orientation
4. The parabolic rate constant is higher for (111) plane than for (100) plane

Question Number : 37 Question Id : 7621613997 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Consider the diffusion of phosphorous in Si. If the total number of phosphorous atoms per unit area is Q the duration of diffusion process is proportional to

Options :

1. $1/Q^2$
2. $1/Q$
3. Q
4. Q^2

Question Number : 38 Question Id : 7621613998 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The lifetime of electrons in the base of an *npn* transistor is $0.55\mu s$. If their transit time through the base is $12ns$, the value of β_F is

Options :

1. 45.833
2. 0.0218
3. 1.0218
4. 4.5833

Question Number : 39 Question Id : 7621613999 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Given that the intrinsic concentration in *Si* is $1.5 \times 10^{10}\ cm^{-3}$, the ratio of Debye lengths for intrinsic *Si* to that for *Si* doped with $4 \times 10^{15}\ cm^{-3}$ donor atoms will be equal to

Options :

1. 3.75×10^{-6}
2. 1.93×10^{-3}
3. 1
4. 516.4

Question Number : 40 Question Id : 7621614000 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For an *npn* BJT under forward active mode of operation, the base transport factor of will decrease if

Options :

1. Base width is decreased
2. Electron mobility is increased
3. Electron diffusion length is increased
4. Base width is increased

Question Number : 41 Question Id : 7621614001 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The transconductance of a MOSFET is equal to $0.5\ mA/V$. With the device operating in saturation, calculate its gate-to-drain capacitance given that its gate-to-source capacitance is $30\ fF$ and its unity gain frequency is $3\ GHz$. $(1\ fF = 10^{-15}\ F)$

Options :

1. $3.5\ fF$
2. $16.4\ fF$
3. $24.1\ fF$
4. $32.5\ fF$

Question Number : 42 Question Id : 7621614002 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

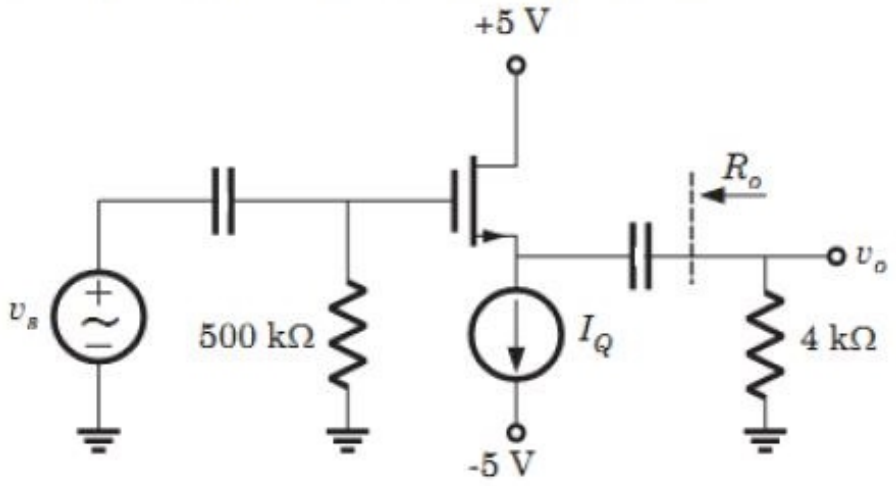
At an applied voltage of $1.8\ V$, a current of $15\ mA$ flows through an LED resulting in the output power of 8.64 mW. Calculate efficiency of the device.

Options :

1. 36.8%
2. 63.2%
3. 68%
4. 32%

Question Number : 43 Question Id : 7621614003 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The output Resistance R_0 of the following source follower circuit is shown below.
Assume the values of parameters as: $g_m = 2$ mS and $r_0 = 100$ kΩ

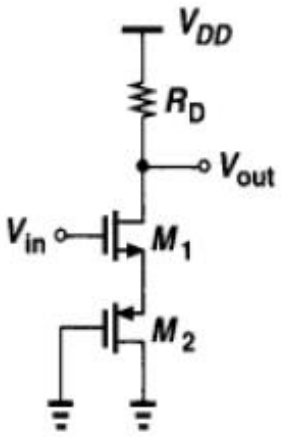


Options :

1. 100 kΩ
2. 0.498 kΩ
3. 1.33 kΩ
4. 10 kΩ

Question Number : 44 Question Id : 7621614004 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Assuming $\lambda = \Upsilon = 0$, and replacing M_2 with its equivalent conductance g_{m2}, calculate the small-signal gain of the circuit shown below. Assume conductance of M_1 be g_{m1}

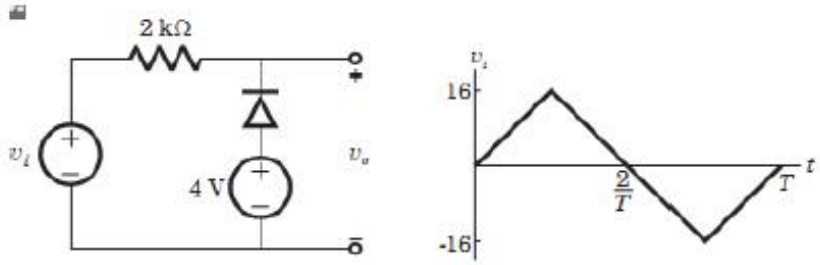


Options :

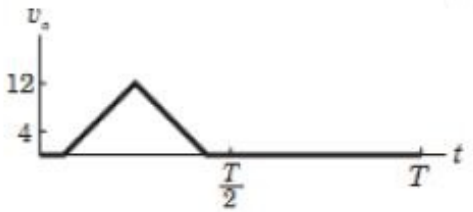
1. $\dfrac{R_D}{\frac{1}{g_{m1}} + \frac{1}{g_{m2}}}$
2. $-\dfrac{R_D}{\frac{1}{g_{m1}} + \frac{1}{g_{m2}}}$
3. $g_{m1}R_D$
4. $g_{m2}R_D$

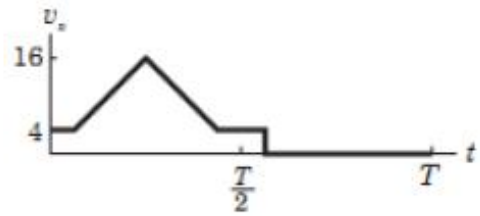
Question Number : 45 Question Id : 7621614005 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

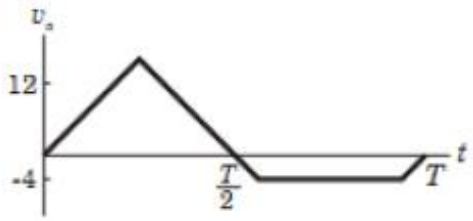
A circuit and a waveform for the input voltage is given below. The diode in circuit has cutin voltage $V_\Upsilon = 0$. Choose the option for the waveform of output voltage v_o.

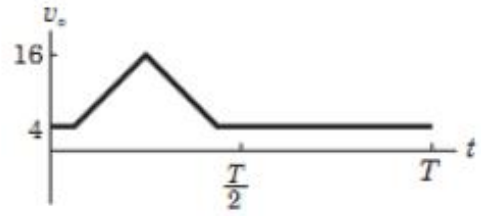


Options :

1. 

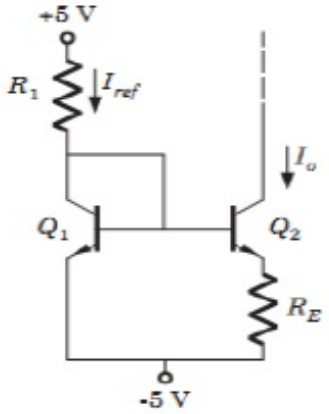
2. 

3. 

4. 

Question Number : 46 Question Id : 7621614006 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Consider the wilder current source of fig below. Both of transistor are identical and $\beta >> 1$ and $V_{BE1} = 0.7$ V. The value of resistance R_E to produce $I_{ref} = 1$ mA and $I_O = 12$ μA is

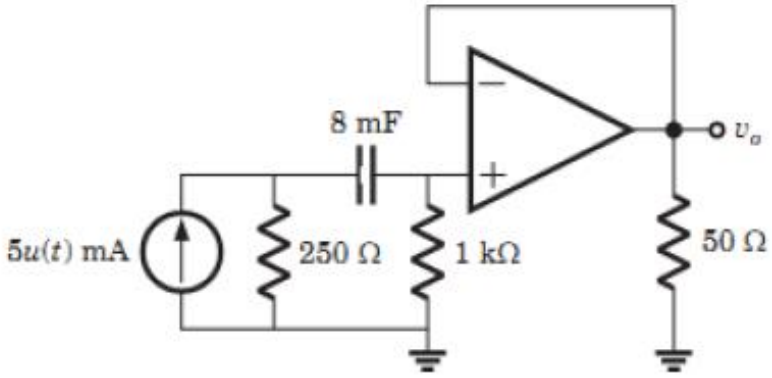


Options :

1. 9.3 kΩ
2. 9.58 kΩ
3. 15.4 kΩ
4. 16.2 kΩ

Question Number : 47 Question Id : 7621614007 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For the circuit shown below, *vo(t)* is



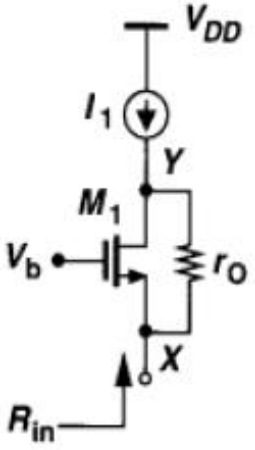
Options :

1. $e^{-\frac{t}{10}}u(t)V$

2. $-e^{-\frac{t}{10}}u(t)V$
3. $e^{-\frac{t}{1.6}}u(t)V$
4. $-e^{-\frac{t}{1.6}}u(t)V$

Question Number : 48 Question Id : 7621614008 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The input resistance of the circuit shown below is

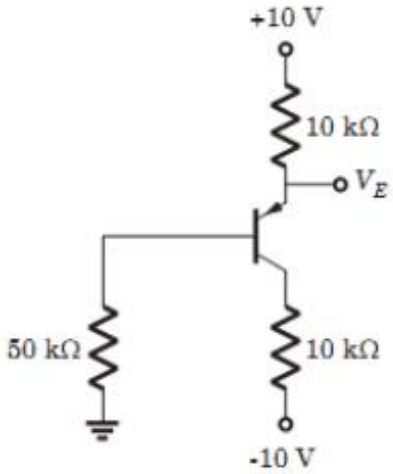


Options :

1. $\frac{1}{g_m} + \frac{1}{g_{mb}}$
2. $\frac{1}{g_m + g_{mb}}$
3. $zero$
4. ∞

Question Number : 49 Question Id : 7621614009 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For the circuit shown below the emitter voltage is $V_E = 2$ V. The value of β is



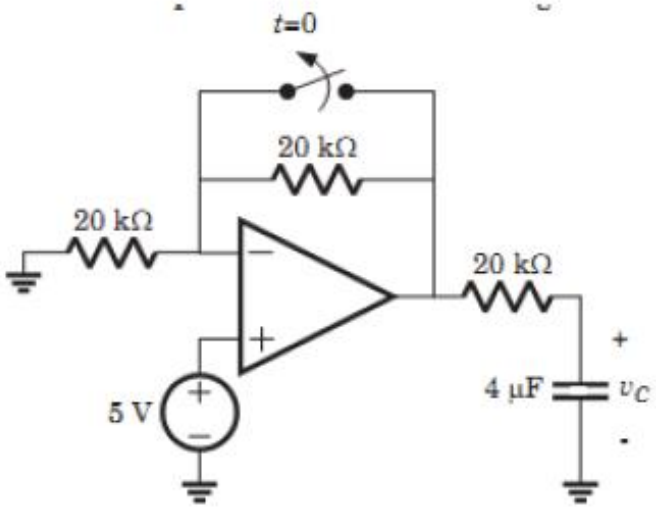
Options :

1. 26.00
2. 28.77
3. 29.77

4. 30.77

Question Number : 50 Question Id : 7621614010 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The circuit shown below is at steady state before the switch opens at t = 0. The steady state value of the voltage v_C is

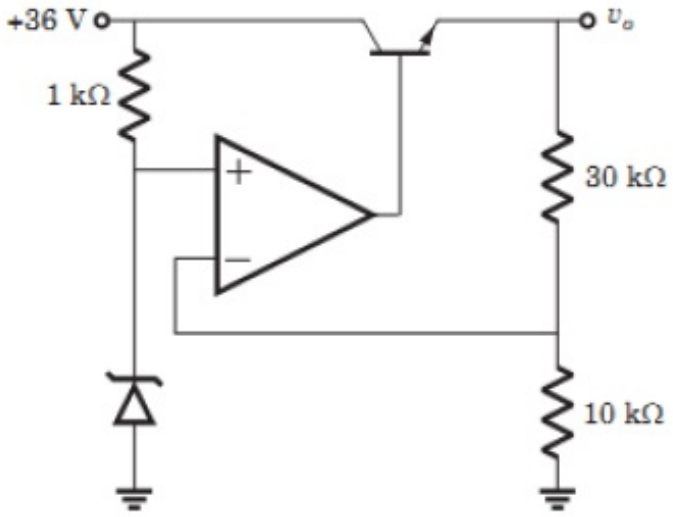


Options :

1. 10 V
2. 5 V
3. − 10 V
4. − 5 V

Question Number : 51 Question Id : 7621614011 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the regulator circuit shown below $V_z = 6.2$ V, $V_{BE} = 0.7$ V and $\beta = 60$. The output voltage v_o is

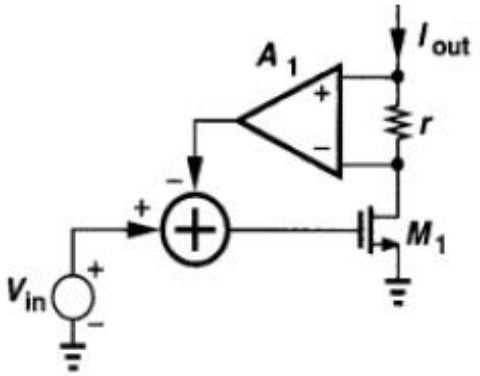


Options :

1. 35.8 V
2. 24.8 V
3. 29.8 V
4. 25.8 V

Question Number : 52 Question Id : 7621614012 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Suppose we need to increase the output impedance of a common source stage by current feedback. As shown below, we insert a small resistor r in the output current path, apply the voltage across r to an Amplifier with gain A_1, and subtract the output of A_1 from the input voltage. Then the loop gain is

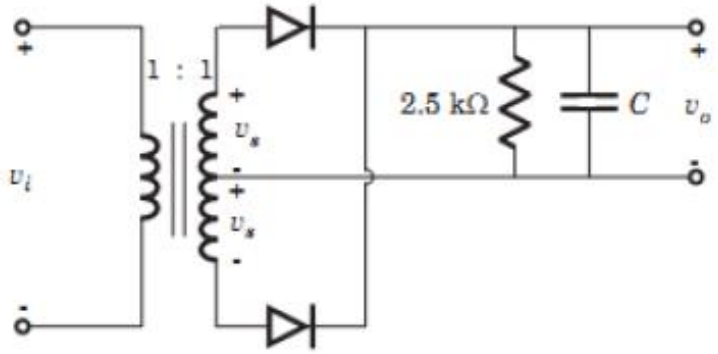


Options :

1. $(1 - g_m r A_1)$
2. $(1 + g_m A_1)$
3. $g_m r A_1$
4. $- g_m r A_1$

Question Number : 53 Question Id : 7621614013 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The input to full-wave rectifier is $v_i = 120 \sin 2\pi 60t$. The diode cutin voltage is 0.7 V. If the output voltage cannot drop below 100 V, the ripple voltage is



Options :

1. 20.0 V
2. 20.7 V
3. 19.3 V
4. 19.0 V

Question Number : 54 Question Id : 7621614014 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

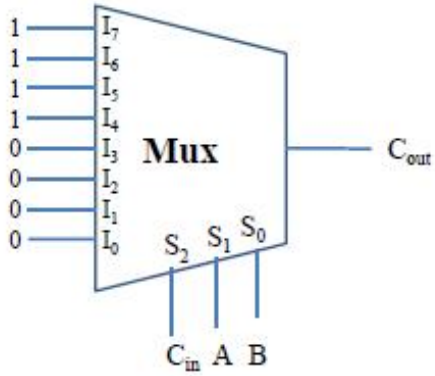
An amplifier without feedback has a voltage gain of 50, input resistance of 1 kΩ and output resistance of 2.5 kΩ. The input resistance of the current-shunt negative feedback amplifier using the above amplifier with a feedback factor of 0.2, is

Options :

1. 1/11 kΩ
2. 1/5 kΩ
3. 5 kΩ
4. 11 kΩ

Question Number : 55 Question Id : 7621614015 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following input(s) are *wrong* to implement the carry out of a full adder using a multiplexer?



Options :

1. I_3, I_4 are wrong
2. I_5, I_6 are wrong
3. I_7, I_2 are wrong
4. I_4, I_6 are wrong

Question Number : 56 Question Id : 7621614016 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

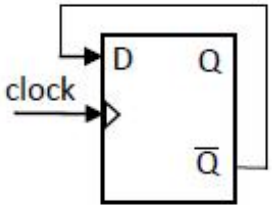
Which one of the following is the correct signed 2's complement representation of -12 to store in an 8-bit register?

Options :

1. 11110100
2. 00001100
3. 10001100
4. 11110011

Question Number : 57 Question Id : 7621614017 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the frequency of the clock signal applied to D flip-flop shown below is f, then the frequency of the signal at output Q will be

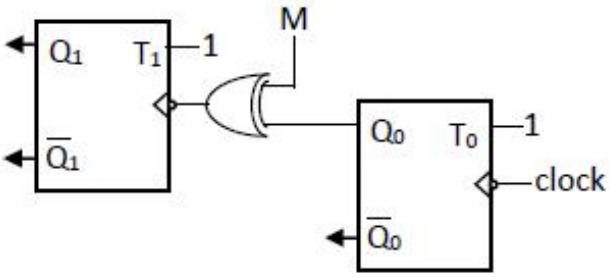


Options :

1. $f/4$
2. $f/2$
3. f
4. $2f$

Question Number : 58 Question Id : 7621614018 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Consider the following sequential circuit consists of two negative edge triggered T flip-flops with Q_0 as LSB output. This circuit acts as

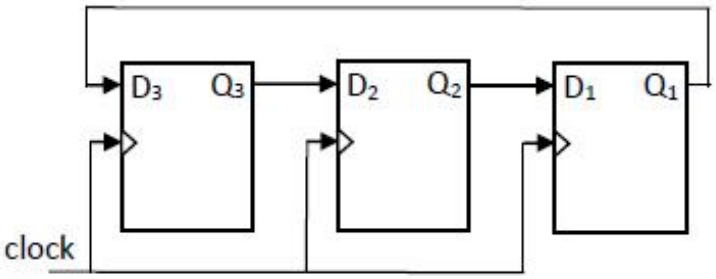


Options :

1. Mod-4 synchronous up counter for M = 0
2. Mod-4 synchronous up counter for M = 1
3. Mod-4 asynchronous up counter for M = 0
4. Mod-4 asynchronous up counter for M = 1

Question Number : 59 Question Id : 7621614019 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the initial state of the sequential circuit shown below is $Q_3Q_2Q_1 = 100$. The state of the shift register after 15 clock pulses will be



Options :

1. 100
2. 010
3. 001
4. 000

Question Number : 60 Question Id : 7621614020 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the initial state of a decade counter with counting sequence of 0000 to 1001 is 1000, the state of the counter after 999 clock cycles will be

Options :

1. 0110
2. 0111
3. 1000
4. 1001

Question Number : 61 Question Id : 7621614021 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

What is the fan-out of a logic family with the following specifications? Note, subscripts O, I, L, and H stand for *output, input, low,* and, *high* respectively. V_{OH} = 2.5 V, V_{OL} = 0.5 V, V_{IH} = 2 V, V_{IL} = 0.7 V, I_{OH} = 400 μA, I_{OL} = 16 mA, I_{IH} = 40 μA, and I_{IL} =1.6 mA.

Options :

1. 5
2. 10
3. 20
4. 25

Question Number : 62 Question Id : 7621614022 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The minimum size of ROM required to implement 2-bit by 2-bit binary multiplier is

Options :

1. 4×4
2. 8×4
3. 16×4
4. 32×4

Question Number : 63 Question Id : 7621614023 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A memory system of size 32 Kbytes is required to be designed using memory chips which have 10 address lines and 2 data lines each. The number of such chips required to design memory system is

Options :

1. 32
2. 64
3. 128
4. 256

Question Number : 64 Question Id : 7621614024 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which one of the following is the software interrupt of 8085?

Options :

1. RST 5

2. RST 5.5

3. RST 6.5

4. RST 7.5

Question Number : 65 Question Id : 7621614025 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Consider the following 8085 subroutine:

```
      LXI H, 0010H
UP:   DCX H
      JNZ UP
      RET
```

The number of times the loop in the above subroutine executed will be

Options :

1. 10

2. 15

3. 16

4. Infinite

Question Number : 66 Question Id : 7621614026 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

An N-bit parallel comparator analog to digital converter uses

Options :

1. N comparators

2. $(N-1)$ comparators

3. 2^N comparators

4. (2^N-1) comparators

Question Number : 67 Question Id : 7621614027 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Let logic 0 = 0 V and logic 1 = 5 V. The output of a 4-bit ladder digital to analog converter for an input of 1000 is

Options :

1. 1.25 V

2. 2.5 V

3. 3.75 V

4. 5 V

Question Number : 68 Question Id : 7621614028 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The number of T-states in the 8085 instruction SHLD 5000H are

Options :

1. 10
2. 13
3. 16
4. 19

Question Number : 69 Question Id : 7621614029 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In order to demultiplex the lower order address and data buses which of the following 8085 signal is used?

Options :

1. SID
2. SOD
3. INTR
4. ALE

Question Number : 70 Question Id : 7621614030 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following statements is absolutely true about the system:
$Y[n] = X[-n]$

Options :

1. System is non-causal and time-variant
2. System is causal and time-invariant
3. System is causal and time-variant
4. System is non-causal and time invariant

Question Number : 71 Question Id : 7621614031 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

When an unknown LTI system initially at REST and characterized by an impulse response $h[n]$ is subjected to an input, $X[n] = \delta[n] - \delta[n-1]$, the output obtained is, $Y[n] = \delta[n-2]$. Which of the following statements is absolutely true about this system?

Options :

1. System is BIBO stable
2. System is of FIR type
3. System is unstable
4. System has a spectral null at $\Omega = 0$, viz. $\left|H\left(e^{j\Omega}\right)\right|_{\Omega=0} = 0$

Question Number : 72 Question Id : 7621614032 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For the given signal, $X[n] = \cos\left(\frac{2\pi n}{N}\right) + \cos\left(\frac{4\pi n}{N} + \frac{\pi}{4}\right)$, which of the following statements is true about this signal?

Options :

1. Signal is even symmetric, viz. $X[-n] = X[n]$
2. Signal is periodic with fundamental period $N_p = N$ if N is an even or odd integer
3. Signal is periodic with fundamental period $N_p = N/2$ if N is an odd integer
4. Signal is aperiodic

Question Number : 73 Question Id : 7621614033 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Two real periodic signals $x(t)$ and $y(t)$ both having the same fundamental period $T_p = T$ satisfy all Dirichlets conditions. Which of the following statements could be true if the following constraint is satisfied:

$$\sum_{k=-\infty}^{+\infty} a_k b_k^* = 0$$

where the sets $\{a_k\}_{k\in\{0,\pm1,\pm2,\ldots\}}$ and $\{b_k\}_{k\in\{0,\pm1,\pm2,\ldots\}}$ are the Fourier series coefficients of signals $x(t)$ and $y(t)$ respectively.

Options :

1. $x(t)$ and $y(t)$ have the same power
2. $x(t)$ and $y(t)$ are odd symmetric functions
3. $x(t)$ and $y(t)$ are even symmetric functions
4. $x(t)$ is odd symmetric and $y(t)$ is even symmetric function and vice-versa

Question Number : 74 Question Id : 7621614034 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If $x(t)$ is an energy signal and $X(j\omega)$ is its continuous time Fourier transform, which of the following statements is true about $x(t)$, when it is given that,

$$\int_{\omega=-\infty}^{\infty} |X(j\omega)|^2 \, d\omega = 0 \; for \; |\omega| > \omega_0 > 0$$

Options :

1. $x(t)$ has theoretically infinite bandwidth
2. $x(t)$ is a one sided signal viz. $x(t) = 0$ for $t < 0$
3. $x(t)$ is time unlimited
4. $x(t)$ is time limited

Question Number : 75 Question Id : 7621614035 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Given two band-limited signals, $x(t)$ and $y(t)$ confined to frequencies, $\omega \in [-2\pi B, 2\pi B]$, two other signals $g_1(t)$ and $g_2(t)$ are derived from $x(t)$ and $y(t)$ as follows: $g_1(t) = x(t) + 2y(t)$ and $g_2(t) = x(t)y(t)$

Which of the following statements is true?

Options :

1. $G_1(j\omega) = X(j\omega) + 2Y(j\omega) \quad and \quad G_2(j\omega) = \frac{[X(j\omega) * Y(j\omega)]}{\pi}$
2. $G_1(j\omega) = X(j\omega) + 2Y(j\omega) \quad and \quad G_2(j\omega) = \frac{[X(j\omega) * Y(j\omega)]}{2\pi}$
3. $G_1(j\omega) = X(j\omega) - 2Y(j\omega) \quad and \quad G_2(j\omega) = \frac{[X(j\omega) * Y(j\omega)]}{\pi}$
4. $G_1(j\omega) = X(j\omega) - 2Y(j\omega) \quad and \quad G_2(j\omega) = \frac{[X(j\omega) * Y(j\omega)]}{2\pi}$

Question Number : 76 Question Id : 7621614036 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the bi-directional Laplace transform of a particular signal $x(t)$ is defined as,

$X(s) \equiv X(s = \sigma + j\omega) = \int_{t=-\infty}^{+\infty} x(t)e^{-st}dt$. The region of convergence (ROC) for $X(s)$, given that, $x(t) = e^{-\alpha t}$ for all t and $\alpha > 0$ is

Options :

1. non-existent as there is no common region of intersection
2. $\sigma > -\alpha$
3. $\sigma < -\alpha$
4. $\sigma \in (-\alpha, \alpha)$

Question Number : 77 Question Id : 7621614037 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Consider a signal $x(t) = 3e^{2t}u(t) + 4e^{3t}u(t)$. For which values of the σ does the Fourier transform of $x(t)e^{-\sigma t}$ converge?

Options :

1. 0
2. 1
3. 2.5
4. 3.5

Question Number : 78 Question Id : 7621614038 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The continuous time Fourier transform of Gaussian pulse is

Options :

1. Rectangular pulse
2. Triangular pulse
3. Sinc pulse
4. Gaussian pulse

Question Number : 79 Question Id : 7621614039 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The Nyquist rate for the signal $x(t) = 3\cos(50\pi t) + 10\sin(300\pi t)$ is

Options :

1. 50 Hz
2. 100 Hz
3. 300 Hz
4. 600 Hz

Question Number : 80 Question Id : 7621614040 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The region of convergence of the signal $x[n] = 5^n u[n] - 4^n u[-n-1]$, with $u[n]$ being unit step signal is

Options :

1. $|z| < 0.2$
2. $|z| > 4$
3. $0.2 < |z| < 4$
4. Null set

Question Number : 81 Question Id : 7621614041 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Let $X(e^{j\omega})$ be the discrete time Fourier transform of the sequence $x[n]$. Then $X(e^{j\omega})$ is

Options :

1. continuous and periodic
2. continuous and aperiodic
3. discrete and periodic
4. discrete and aperiodic

Question Number : 82 Question Id : 7621614042 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Let i, u and C be current, voltage and capacitance of electrical system respectively and x, f, v and M be displacement, force, velocity and mass of mechanical system respectively. Which of the following mechanical system relation is equivalent to the electrical system given by the relation $i = C\frac{du}{dt}$.

Options :

1. $x = M\frac{dv}{dt}$

2. $v = M\frac{dx}{dt}$

3. $f = M\frac{dv}{dt}$

4. $f = M\frac{dx}{dt}$

Question Number : 83 Question Id : 7621614043 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The transfer function of the PID controller is of the form _____

(where, K_P, K_I, K_D are proportional, integral and derivative constants respectively and T is some arbitrary constant.)

Options :

1. $G(s) = K_p + \frac{K_I}{s} + \frac{K_D s}{1+Ts}$

2. $G(s) = K_p + \frac{K_D}{s} + \frac{K_I s}{1+Ts}$

3. $G(s) = K_p + \frac{K_I}{1+Ts} + \frac{K_D}{s}$

4. $G(s) = K_p + sK_I + \frac{K_D s}{1+Ts}$

Question Number : 84 Question Id : 7621614044 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The transfer function of a control system is given by $H(s) = \frac{1}{2s^2 + 2s + 1}$. The damping frequency and damping ratio respectively are

Options :

1. $\frac{1}{\sqrt{2}}, \sqrt{2}$

2. $\sqrt{2}, \frac{1}{\sqrt{2}}$

3. $\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}$

4. $\sqrt{2}, \sqrt{2}$

Question Number : 85 Question Id : 7621614045 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The roots of the characteristic equation for a control systems are (-1 + j), (-1 - j), 3j and -3j. Then the system

Options :

1. is asymptotically stable

2. is marginally stable

3. is unstable

4. stability cannot be decided

Question Number : 86 Question Id : 7621614046 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The number of roots that lie in the right half of s-plane for the polynomial $s^5 + 4s^4 + 5s^3 + 28s^2 + 6s + 5$ are

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 87 Question Id : 7621614047 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For the unity feedback system having open-loop transfer function $H(s) = \frac{K(s+2)}{s^2(s^3+7s^2+12s)}$, the position, velocity and acceleration error constants respectively are

Options :

1. $\frac{K}{6}, \infty, \infty$

2. $\infty, \frac{K}{6}, \infty$

3. $\infty, \infty, \frac{K}{6}$

4. ∞, ∞, ∞

Question Number : 88 Question Id : 7621614048 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following statement is false with respect to root loci?

Options :

1. The number of branches of the locus is equal to the order of the characteristic equation
2. The open-loop zeros define the start of the root locus and the open-loop poles define the termination of the root locus
3. The open-loop poles define the start of the root locus and the open-loop zeros define the termination of the root locus
4. The root locus never crosses itself

Question Number : 89 Question Id : 7621614049 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Consider a closed-loop control system with open-loop transfer function $G(s)H(s)=\frac{(s+3)}{(s+1)(s+4)(s^2+2s+2)}$. The center of asymptotes in root locus occurs at

Options :

1. $-\frac{4}{3}$
2. -2
3. $\frac{4}{3}$
4. 2

Question Number : 90 Question Id : 7621614050 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Phase-lag controller is used to improve

Options :

1. System transient response only
2. Steady state errors only
3. Both transient response and steady state errors
4. Neither transient response nor steady state errors

Question Number : 91 Question Id : 7621614051 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Higher phase margin results in

Options :

1. Smaller damping ratio and smaller overshoot
2. Smaller damping ratio and larger overshoot

3. Larger damping ratio and smaller overshoot

4. Larger damping ratio and larger overshoot

Question Number : 92 Question Id : 7621614052 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following statement is false with respect to state transition matrix $\Phi(t)$?

Options :

1. $\Phi(0) = \mathbf{I}$

2. $\Phi^{-1}(t) = \Phi(t)$

3. $\Phi^{-1}(t) = \Phi(-t)$

4. $\Phi(t)^i = \Phi(it)$

Question Number : 93 Question Id : 7621614053 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Consider the system equation $\dot{\mathbf{x}} = \mathbf{Ax} + \mathbf{Bu}$, where $A = \begin{bmatrix} -2 & 1 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -3 \end{bmatrix}$, and $B = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$. The system is

Options :

1. Controllable

2. Not controllable

3. Observable

4. Not observable

Question Number : 94 Question Id : 7621614054 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a stable system

Options :

1. Both gain margin and phase margin should be negative

2. Gain margin should be positive and phase margin should be negative

3. Gain margin should be negative and phase margin should be positive

4. Both gain margin and phase margin should be positive

Question Number : 95 Question Id : 7621614055 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Gain margin is defined as the magnitude of reciprocal of the open-loop transfer function evaluated at the frequency at which the phase angle is

Options :

1. 90^0

2. -90^0

3. 180^0

4. -180^0

Question Number : 96 Question Id : 7621614056 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The Nyquist plot of sinusoidal transfer function $G(j\omega)$ is a plot of the

Options :

1. Magnitude of G(jω) versus ω, as ω varies from 0 to ∞

2. Phase angle of G(jω) versus ω, as ω varies from 0 to ∞

3. Magnitude of G(jω) versus phase angle of G(jω), as ω varies from 0 to ∞

4. Magnitude of G(jω) versus phase angle of G(jω), as ω varies from $-\infty$ to ∞

Question Number : 97 Question Id : 7621614057 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The frequency deviation of an angle-modulated signal $m(t) = 10\cos[\omega_c t + 0.1\sin(2000\pi t)]$ is

Options :

1. 50 Hz

2. 100 Hz

3. 200 Hz

4. 400 Hz

Question Number : 98 Question Id : 7621614058 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A TV signal (video and audio) has a bandwidth of 4.5 MHz. This signal is sampled, quantized and binary coded to obtain a pulse code modulated (PCM) signal. The minimum bit rate of the binary coded signal is

Options :

1. 9 Mbps

2. 10 Mbps

3. 10.8 Mbps

4. 36 Mbps

Question Number : 99 Question Id : 7621614059 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If $b_k, k \in \{0, \pm 1, \pm 2, \ldots\}$ is an IID equi-probable binary sequence, the approximate bandwidth (BW) of the following signal $X(t) = \sum_{k=-\infty}^{+\infty} b_k r(t - kT)$, is

(where, $r(t) = U(t) - U(t - T)$ with $U(t)$ being the unit step function, including the complete Main-lobe and one additional Side-lobe in the frequency domain):

Options :

1. $BW = \frac{4\pi}{T} radians$
2. $BW = \frac{2\pi}{T} radians$
3. $BW = \frac{\pi}{T} radians$
4. $BW = \frac{\pi}{2T} radians$

Question Number : 100 Question Id : 7621614060 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A particular zero mean wide sense stationary Gaussian stochastic process $X(t)$ has an auto-correlation of: $\rho_X(\tau) = E[X(t)X(t+\tau)] = Sinc\left(\frac{\tau}{T}\right)$. This process $X(t)$ is sampled at a rate $T_s = T$. What is the correlation between samples $X(kT_s): k \neq 0$?

Options :

1. -1
2. 0
3. 1
4. 0.5

Question Number : 101 Question Id : 7621614061 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A DSB-SC signal having carrier frequency f_c, bandwidth $2B\ Hz$ and power P_S, is sent over an AWGN channel having a spectral parameter of $N_0\ Watts/Hz$. The received signal is pre-filtered using a BPF having the same bandwidth as that of the signal, before being synchronously demodulated. The SNR at the output of the pre-filter is:

Options :

1. $SNR_{pre-filter} = \frac{P_S}{4N_0B}$
2. $SNR_{pre-filter} = \frac{4P_S}{N_0B}$
3. $SNR_{pre-filter} = \frac{P_S}{2N_0B}$
4. $SNR_{pre-filter} = \frac{P_S}{N_0B}$

Question Number : 102 Question Id : 7621614062 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

As per the design conceived, the role of differential coding when applied to a Pulse Amplitude Modulated (PAM) signal does not include:

Options :

1. Representing the same sequence in a fewer number of bits (viz. facilitate data compression).
2. Ensuring sequence recovery without deploying any significant number of training symbols.

3. Ensuring better synchronization at the receiver because of the increase in the number of symbol transitions.
4. Ensuring better noise immunity or enhance resilience to AWGN.

Question Number : 103 Question Id : 7621614063 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If f_c, is the carrier frequency and the modulating signal is a sinusoid with a single frequency f_m, the following signal, $x(t) = A_0 \cos(2\pi[f_c + f_m]t)$ represents what type of modulation process?

Options :

1. Double Side Band Suppressed Carrier
2. Lower Side Band Suppressed Carrier
3. Upper Side Band Suppressed Carrier
4. Conventional Amplitude Modulation

Question Number : 104 Question Id : 7621614064 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If $x(t)$ is a real valued energy signal and $y(t) = x(t) * \frac{1}{\pi t}$, the result of the following computation, $\int_{t=-\infty}^{+\infty} x(t)\, y(t)\, dt$ is

Options :

1. 1
2. 0
3. -1
4. 0.5

Question Number : 105 Question Id : 7621614065 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If $m(t)$ is a band limited signal confined to $\omega \in [-2\pi B, 2\pi B]$, and $\hat{m}(t)$, is its Hilbert transform, which of the following statements is false?

Options :

1. Bandwidth of $m(t)$ is the same as that of $\hat{m}(t)$
2. $m(t)$ can be fully recovered from $\hat{m}(t)$
3. $m(t)$ and $\hat{m}(t)$ are mutually orthogonal signals
4. $m(t)$has the same phase spectrum as $\hat{m}(t)$

Question Number : 106 Question Id : 7621614066 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For the given the following Phase Shift Keying Signal set:

$S_i(t) = A_0 Cos\left(2\pi f_0 t + \frac{2\pi(i-1)}{M}\right); i = 1,2,3, \ldots M$, where M is number of constellation points, which of the following statements is false?

Options :

1. The average probability of error is independent of M
2. The minimum distance between any two constellation points is proportional to A_0
3. The average probability of error is dependent on M
4. For a fixed signal power, as M increases, the average probability of error also increases.

Question Number : 107 Question Id : 7621614067 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The current distribution along the length of a half-wavelength dipole antenna is

Options :

1. uniform
2. triangular with maximum value at the mid-point and zero at the two ends
3. linear with maximum value at one end and zero at the other end
4. sinusoidal with maximum value at mid-point and zero at the two ends

Question Number : 108 Question Id : 7621614068 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

What is the equivalent circuit of a λ lossless transmission line terminated with a short circuit?

Options :

1. Inductor
2. Series LC resonator
3. Capacitor
4. Parallel LC resonator

Question Number : 109 Question Id : 7621614069 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

What is the input impedance (Z_{in}) of a λ/4 transmission line of characteristic impedance 50 Ω terminated with an open circuit?

Options :

1. $Z_{in} = 100\ \Omega$
2. $Z_{in} = 0\ \Omega$
3. $Z_{in} = 50\ \Omega$
4. $Z_{in} = 10\ \Omega$

Question Number : 110 Question Id : 7621614070 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

What is the polarization of an electromagnetic wave whose electric field is given by $\vec{E} = 10\left(\hat{x} + j\hat{y}\right)e^{-j300z}e^{j\omega t}$?

Options :

1. Left-hand elliptical polarization
2. Right-hand circular polarization
3. Left-hand circular polarization
4. Right-hand elliptical polarization

Question Number : 111 Question Id : 7621614071 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Find the dominant mode inside a X-band rectangular waveguide whose dimension is

a = 22.86 mm and b = 10.16 mm.

Options :

1. TE_{11}
2. TE_{22}
3. TE_{20}
4. TE_{10}

Question Number : 112 Question Id : 7621614072 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The reflection coefficient (Γ) of dielectric of relative permittivity $\varepsilon_r = 4.0$ for EM waves at normal incidence from air to the dielectric layer is

Options :

1. $\Gamma = -1/3$
2. $\Gamma = 1/3$
3. $\Gamma = -1$
4. $\Gamma = 1$

Question Number : 113 Question Id : 7621614073 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The far electric field radiation pattern of a vertically oriented Hertzian dipole (oriented along the z-axis) has the direction of maximum radiation for

Options :

1. $\theta = 90^0$
2. $\phi = 0^0$
3. $\theta = 0^0$
4. $\phi = 90^0$

Question Number : 114 Question Id : 7621614074 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The gain (G), directivity (D) and efficiency (e) of an antenna are related as

Options :

1. $D = eG$
2. $G = \frac{e}{D}$
3. $G = eD$
4. $D = e + G$

Question Number : 115 Question Id : 7621614075 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the frequency of operation of an ideal circular waveguide is above than the cut-off frequency, then the propagation constant is

Options :

1. zero
2. purely imaginary
3. real and positive
4. real and negative

Question Number : 116 Question Id : 7621614076 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Assume the amplitude of the magnetic field intensity of a plane wave on the surface of a good conductor is E_s. The amplitude of the field at the skin depth is approximately

Options :

1. zero
2. E_S / e
3. $E_S / 2e$
4. $e \times E_S$

Question Number : 117 Question Id : 7621614077 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a non-dispersive lossless media, the relation between phase velocity (v_p) and group velocity (v_g) of plane wave is

Options :

1. $v_p = v_g$
2. $v_p > v_g$
3. $v_p < v_g$
4. $v_p \neq v_g$

Question Number : 118 Question Id : 7621614078 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

An ideal two port device has scattering parameter matrix as: $[S] = \begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix}$. Based on the given scattering matrix, one may infer that

Options :

1. This device will allow bidirectional signal flow from port 2 to port 1.
2. Port 1 is not properly matched.
3. There is some wave reflection at port 2.
4. This device will allow unidirectional signal flow from port 1 to port 2.

Question Number : 119 Question Id : 7621614079 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The wave radiated from an antenna in the far field region is a

Options :

1. Transverse magnetic (TM) wave
2. Transverse electric (TE) wave
3. Transverse electromagnetic (TEM) wave
4. Hybrid TE-TM wave

Question Number : 120 Question Id : 7621614080 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

An antenna has a resistance of 100 Ω at its resonant frequency. We want to connect this antenna to a coaxial cable of characteristic impedance of 50 Ω. If we connect this coaxial cable to the antenna directly there is going to be reflection due to impedance mismatch. One can use a quarter-wave transformer of characteristic impedance Z_0 to match the antenna resistance and the coaxial cable. What is the suitable value of Z_0 for serving this purpose?

Options :

1. 50 Ω
2. 100 Ω
3. $\sqrt{2}\times 50$ Ω
4. $\sqrt{3}\times 50$ Ω