Andhra Pradesh State Council of Higher Education

Notations :

1.Options shown in green color and with ✔ icon are correct.

2.Options shown in red color and with ✖ icon are incorrect.

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Electronics and Communication Engineering

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Electronics and Communication Engineering

Section Id :	75207658
Section Number :	1
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Section Marks :	120
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Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 1 Question Id : 7520766841 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The number of nodes in a graph having 5 branches and 2 independent loops is

Options :

1. ✖ 3

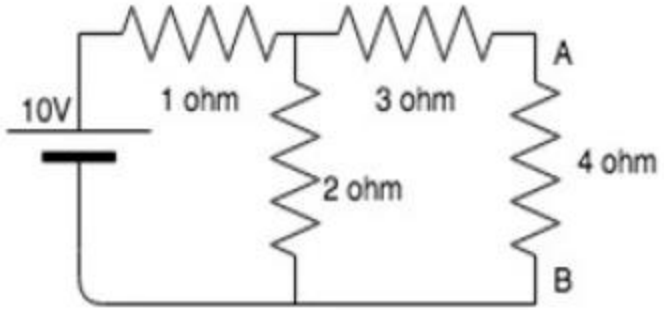
2. ✔ 4

3. ✖ 5

4. ✖ 6

Question Number : 2 Question Id : 7520766842 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

For the given circuit, the values of R_{th} across the terminal AB and V_{th} are ___ and ___, respectively.



Options :

1. ✖ 4.34 Ω, 5.54 V

2. ✖ 3.67 Ω, 3.33 V

3. ✖ 3.43 Ω, 6.67 V

4. ✔ 3.67 Ω, 6.67 V

Question Number : 3 Question Id : 7520766843 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If a Delta circuit has branches $R_{ab} = 10\ \Omega$, $R_{bc} = 20\ \Omega$, and $R_{ca} = 30\ \Omega$, what is the equivalent Wye resistor R_a connected to node?

Options :

1. ✖ $10\ \Omega$

2. ✖ $20\ \Omega$

3. ✖ $30\ \Omega$

4. ✔ $5\ \Omega$

Question Number : 4 Question Id : 7520766844 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In sinusoidal steady-state analysis, which of the following best describes the use of phasors?

Options :

1. ✔ Phasors are used to simplify time-domain analysis of RLC circuits by representing sinusoidal signals as complex numbers

2. ✖ Phasors are only used for DC analysis

3. ✖ Phasors convert differential equations into algebraic equations in the time domain

4. ✖ Phasors are used to compute the time derivative of voltage or current

Question Number : 5 Question Id : 7520766845 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What does the Laplace transform do the differential equation of an RLC circuit?

Options :

1. ✖ It simplifies the equation by transforming it from the frequency domain to the time domain

2. ✖ It retains the differential equation as it is

3. ✔ It converts the circuit parameters into phasor form

4. ✖ It converts a time-domain differential equation into an algebraic equation in the s-domain

Question Number : 6 Question Id : 7520766846 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

For a symmetrical two-port network, which of the following is NOT necessarily true?

Options :

1. ✖ $z_{11} = z_{22}$

2. ✖ $y_{11} = y_{22}$

3. ✖ $A = D$

4. ✔ $h_{12} = h_{21}$

Question Number : 7 Question Id : 7520766847 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following best describes the band structure of intrinsic silicon?

Options :

1. ✖ Single energy band

2. ✖ Completely overlapping conduction and valance bands

3. ✔ A wide band gap between the conduction and the valance bands

4. ✖ No conduction band

Question Number : 8 Question Id : 7520766848 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The primary characteristic of a tunnel diode is its ___.

Options :

1. ✖ very high forward resistance

2. ✔ negative resistance

3. ✖ low breakdown resistance

4. ✖ high capacitance

Question Number : 9 Question Id : 7520766849 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

At very high electric fields in silicon, the drift velocity of electrons becomes independent of the electric field. This phenomenon is known as:

Options :

1. ✔ Velocity Saturation

2. ✖ Avalanche Breakdown

3. ✖ Negative Differential Resistance

4. ✖ Mobility Enhancement

Question Number : 10 Question Id : 7520766850 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In an n-channel JFET, if the gate voltage is made more negative than the pinch-off voltage, what happens to the drain current?

Options :

1. ✖ Drain current increases linearly

2. ✖ Drain current saturates

3. ✔ Drain current drops to near zero

4. ✖ Drain current reverses direction

Question Number : 11 Question Id : 7520766851 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following is a characteristic of the MOS capacitor?

Options :

1. ✖ The capacitance is zero when there is no applied voltage

2. ✔ The capacitance increases with increasing voltage applied to the gate

3. ✖ The capacitance is independent of the gate voltage

4. ✖ The MOS capacitor can only store holes

Question Number : 12 Question Id : 7520766852 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What distinguishes the light emitted by a LASER diode from an LED?

Options :

1. ✖ LED light is monochromatic

2. ✔ LASER light is coherent

3. ✖ LED light is directional

4. ✖ LASER light results from spontaneous emission

Question Number : 13 Question Id : 7520766853 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In silicon IC fabrication, 'Dry Oxidation' is generally preferred over 'Wet Oxidation' for growing:

Options :

1. ✖ Thick field oxides

2. ✔ Gate oxides

3. ✖ Isolation layers

4. ✖ Passivation layers

Question Number : 14 Question Id : 7520766854 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

In a MOSFET small-signal model, if the drain current is doubled while maintaining the same device dimensions, the trans-conductance will:

Options :

1. ✖ Remain the same

2. ✖ Increase by a factor of 2

3. ✔ Increase by a factor of $\sqrt{2}$

4. ✖ Decrease by a factor of $\sqrt{2}$

Question Number : 15 Question Id : 7520766855 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A positive clamper circuit with a 10V DC source is fed with a 20V p-p sinusoidal input. What is the minimum DC voltage level at the output?

Options :

1. ✖ 0 V

2. ✔ 10 V

3. ✖ 20 V

4. ✖ -10 V

Question Number : 16 Question Id : 7520766856 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A negative feedback amplifier has an open-loop gain of 100 and a feedback factor $\beta = 0.09$. If the open-loop gain changes by 10% due to aging, what is the percentage change in the closed-loop gain of the amplifier?

Options :

1. ✔ 1 %

2. ✖ 10 %

3. ✖ 0.1 %

4. ✖ 0.9 %

Question Number : 17 Question Id : 7520766857 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In an op-amp, which of the following best describes the 'virtual short' concept?

Options :

1. ✖ The op-amp behaves like a short circuit in feedback configuration

2. ✖ The op-amp input terminals are shorted together for operation

3. ✖ The output voltage of the op-amp is always zero

4. ✔ The voltage difference between the inverting and non-inverting inputs is close to zero in an ideal op-amp

Question Number : 18 Question Id : 7520766858 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A two-stage RC-coupled amplifier has stage-1 lower cutoff frequency $f_{L1} = 100$ Hz and stage-2 lower cutoff frequency $f_{L2} = 1$ kHz. The overall lower cutoff frequency of the amplifier is approximately:

Options :

1. ✖ 50 Hz

2. ✖ 100 Hz

3. ✖ 500 Hz

4. ✔ 1 kHz

Question Number : 19 Question Id : 7520766859 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following is a common application of a 555 timer in monostable mode?

Options :

1. ✖ To generate a constant output signal

2. ✔ To generate a fixed pulse with output signal

3. ✖ To oscillate continuously

4. ✖ To provide a frequency response

Question Number : 20 Question Id : 7520766860 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A full-wave rectifier has a load resistor of 1 kΩ and a capacitor of 100 μF. Doubling the load resistor will _____.

Options :

1. ✖ double ripple voltage

2. ✔ halve ripple voltage

3. ✖ no change

4. ✖ quadruple ripple voltage

Question Number : 21 Question Id : 7520766861 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The minimal SOP expression for a 3-variable function having m in terms of $\sum m(1,3,5,7)$ is

Options :

1. ✔ C

2. ✖ $A+C$

3. ✖ B

4. ✖ $AB+C$

Question Number : 22 Question Id : 7520766862 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The logic family which is least affected by temperature variations, is

Options :

1. ✖ DTL

2. ✖ TTL

3. ✔ CMOS

4. ✖ ECL

Question Number : 23 Question Id : 7520766863 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a positive edge-triggered JK flip-flop, the J input is connected to $\bar{Q}$ (inverted output) and the K input is connected to Q (normal output). If the flip-flop is initially in the RESET state (Q=0, $\bar{Q}$=1) and is subjected to 4 consecutive positive clock pulses, what will be the final state of Q?

Options :

1. ✖ 1

2. ✖ 0101 (oscillates)

3. ✔ 0

4. ✖ Indeterminate

Question Number : 24 Question Id : 7520766864 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If a sample and hold circuit is not used with an ADC, the result may be _____.

Options :

1. ✖ more accurate

2. ✖ constant

3. ✖ digitalized faster

4. ✔ erroneous due to changing input

Question Number : 25 Question Id : 7520766865 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A ring counter (with 4 flip-flops) has how many unique states?

Options :

1. ✖ 2

2. ✔ 4

3. ✖ 8

4. ✖ 16

Question Number : 26 Question Id : 7520766866 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Signal distortionless transmission through an LTI system requires:

Options :

1. ✖ Constant magnitude response only

2. ✖ Linear phase only

3. ✔ Constant magnitude and linear phase

4. ✖ Zero group delay

Question Number : 27 Question Id : 7520766867 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The frequency response magnitude of a DT-LTI system tends to infinity when

Options :

1. ✖ Input is zero

2. ✔ Poles lie on the unit circle

3. ✖ Zeros lie on the unit circle

4. ✖ System is causal

Question Number : 28 Question Id : 7520766868 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the primary difference between CTFT and DTFT?

Options :

1. ✖ CTFT is periodic and DTFT is non-periodic

2. ✖ CTFT transforms a discrete-time signal and DTFT transforms a continuous-time signal

3. ✔ CTFT is non-periodic and DTFT is periodic

4. ✖ CTFT is defined for periodic signals and DTFT is for non-periodic signals

Question Number : 29 Question Id : 7520766869 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a causal and stable LTI system, the impulse response $h(t)$ must satisfy which condition ?

Options :

1. ✖ $h(t)$ is always positive

2. ✖ $h(t)$ is periodic

3. ✔ $h(t)$ must be absolutely integrable

4. ✖ $h(t)$ must be bounded

Question Number : 30 Question Id : 7520766870 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the Fourier Transform of a Gaussian function e^{-t^2} ?

Options :

1. ✖ A delta function

2. ✖ A sinc function

3. ✔ Another Gaussian function

4. ✖ An exponential function

Question Number : 31 Question Id : 7520766871 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In FFT computation, reducing complexity from $O(N^2)$ to $O(N \log N)$ relies fundamentally on _____.

Options :

1. ✖ periodicity of time-domain signal

2. ✔ symmetry and periodicity of twiddle factors

3. ✖ linearity of DFT

4. ✖ convolution theorem

Question Number : 32 Question Id : 7520766872 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If the impulse response of a discrete-time LTI system is finite in length, which property is always guaranteed?

Options :

1. ✖ Causality

2. ✔ Stability

3. ✖ Linearity

4. ✖ Time invariance

Question Number : 33 Question Id : 7520766873 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

For a discrete-time periodic signal with period N, how many distinct Fourier coefficients exist?

Options :

1. ✖ Infinite

2. ✖ $N/2$

3. ✔ N

4. ✖ $2N$

Question Number : 34 Question Id : 7520766874 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The open loop transfer function of a unity feedback system is $G(s) = \frac{10}{s(s+2)}$,

what is the steady state error for a unit step input?

Options :

1. ✖ Infinite

2. ✔ 0

3. ✖ 0.1

4. ✖ 0.2

Question Number : 35 Question Id : 7520766875 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A second order system has $\omega_n = 4$ rad/sec and $\zeta = 0.5$. What is the damped natural frequency ω_d ?

Options :

1. ✖ 4

2. ✖ 2

3. ✖ 1.73

4. ✔ 3.46

Question Number : 36 Question Id : 7520766876 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The characteristic equation of a system is $s^3 + 3s^2 + 3s + 1 = 0$. How many poles lie in the right half plane?

Options :

1. ✔ 0

2. ✖ 1

3. ✖ 2

4. ✖ 3

Question Number : 37 Question Id : 7520766877 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If the open-loop transfer function $G(s)H(s)$ has one pole in the right-half of the s-plane, for the closed-loop system to be stable, the Nyquist plot must encircle the $(-1, j0)$ point _____.

Options :

1. ✖ once in the clockwise direction

2. ✖ twice in the counter-clockwise direction

3. ✔ once in the counter-clockwise direction

4. ✖ zero times

Question Number : 38 Question Id : 7520766878 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A phase-lead compensator is primarily used to _____.

Options :

1. ✖ decrease the steady-state error

2. ✔ increase the damping and improve transient response

3. ✖ reduce the bandwidth of the system

4. ✖ increase the rise time

Question Number : 39 Question Id : 7520766879 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which part of a PID controller is specifically responsible for eliminating the steady-state error?

Options :

1. ✖ Proportional term

2. ✖ Feedforward term

3. ✖ Derivative term

4. ✔ Integral term

Question Number : 40 Question Id : 7520766880 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

For the state equation $\dot{x} = 3x$, the system is _____.

Options :

1. ✖ stable

2. ✖ marginally stable

3. ✔ unstable

4. ✖ oscillatory

Question Number : 41 Question Id : 7520766881 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Gain cross over frequency is the frequency at which ____.

Options :

1. ✖ Phase is zero

2. ✔ Magnitude is 0 dB

3. ✖ Phase is -180°

4. ✖ Gain is maximum

Question Number : 42 Question Id : 7520766882 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the primary advantage of using a super-heterodyne receiver?

Options :

1. ✖ Simplicity in construction

2. ✖ High frequency response

3. ✔ Improved signal selectivity and sensitivity

Direct conversion of the received signal

4. ✖

Question Number : 43 Question Id : 7520766883 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following digital modulation schemes has the lowest probability of error at a given SNR?

Options :

1. ASK ✖

2. FSK ✖

3. PSK ✔

4. DPSK ✖

Question Number : 44 Question Id : 7520766884 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following is a salient feature of GSM ____.

Options :

1. ✖ frequency modulation for voice transmission

2. ✔ digital communication with TDMA and FDMA

3. ✖ analog communication with digital encoding

4. ✖ use of Satellite communication for signal transmission

Question Number : 45 Question Id : 7520766885 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a coherent BPSK modulation scheme, if the input bit rate is doubled while keeping the symbol energy as constant, what is the effect on the transmission bandwidth (BW) and the probability of bit error (Pe)?

Options :

1. ✖ BW doubles, Pe increases

2. ✔ BW doubles, Pe remains same

3. ✖ BW remains same, Pe increases

4. ✖ BW doubles, Pe decreases

Question Number : 46 Question Id : 7520766886 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A Gaussian noise channel has a bandwidth of 4 kHz and a signal-to-noise power ratio (SNR) of 15. According to the Shannon-Hartley theorem, what is the maximum capacity of this channel?

Options :

1. ✖ 32 kbps

2. ✔ 16 kbps

3. ✖ 60 kbps

4. ✖ 64 kbps

Question Number : 47 Question Id : 7520766887 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The total average power of a signal equals:

Options :

1. ✖ Peak value of PSD

2. ✔ Integral of PSD over all frequencies

3. ✖ Fourier transform of PSD

4. ✖ Autocorrelation at infinity

Question Number : 48 Question Id : 7520766888 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

For a WSS random process, the autocorrelation $R_x(\tau)$ as $\tau \to \infty$ approaches:

Options :

1. ✖ Zero always

2. ✖ Mean square value

3. ✔ Square of the mean

4. ✖ Signal power

Question Number : 49 Question Id : 7520766889 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The skin depth in a conductor is:

Options :

1. ✖ Inversely proportional to conductivity

2. ✖ Directly proportional to square root of conductivity

3. ✔ Inversely proportional to square root of conductivity

4. ✖ Independent of material properties

Question Number : 50 Question Id : 7520766890 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following statements is NOT true about Maxwell's equations in differential form?

Options :

1. ✖ Gauss's Law states that the electric flux density is proportional to the charge density.

2. ✖ Faraday's Law implies that a time-varying magnetic field produces an electric field.

3. ✖ Ampère's Law with Maxwell's correction shows that a time-varying electric field produces a magnetic field.

4. ✔ Gauss's Law for magnetism states that the magnetic flux density has a net source.

Question Number : 51 Question Id : 7520766891 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The radiation pattern of a dipole antenna is characterized by,

Options :

1. ✖ A constant radiation intensity in all directions

2. ✔ A doughnut-shaped distribution with maximum radiation perpendicular to the axis

3. ✖ Maximum radiation along the axis of the dipole

A uniform radiation pattern in the far field

4. ✖

Question Number : 52 Question Id : 7520766892 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The Poynting vector in electromagnetic theory represents,

Options :

The electric field strength at a point

1. ✖

The rate at which energy is transported by the electromagnetic wave

2. ✔

The potential energy in the electric field

3. ✖

The time-averaged power dissipated in a resistor

4. ✖

Question Number : 53 Question Id : 7520766893 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following is the primary condition that must be satisfied at the boundary of a perfect electric conductor (PEC) for an electromagnetic wave?

Options :

1. ✖ The tangential component of the magnetic field is zero

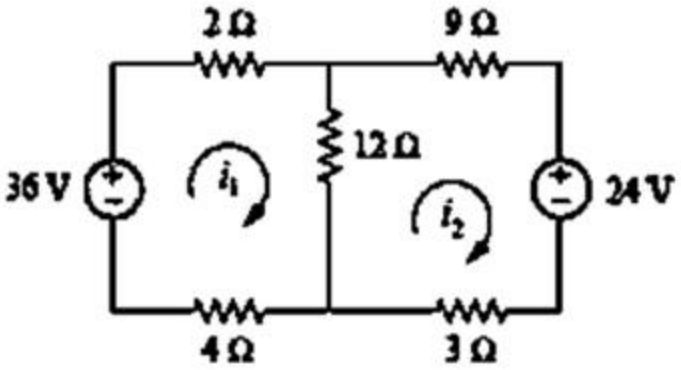
2. ✔ The tangential component of the electric field is zero

3. ✖ The normal component of the electric field is zero

4. ✖ The normal component of the magnetic field is zero

Question Number : 54 Question Id : 7520766894 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Find current i_2 in the shown network



Options :

1. ✔ 0A

2. ✖ 3A

3. ✖ 1A

4. ✖ 2A

Question Number : 55 Question Id : 7520766895 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

For every tree there will be _____ number of cut set matrices.

Options :

1. ✔ 1

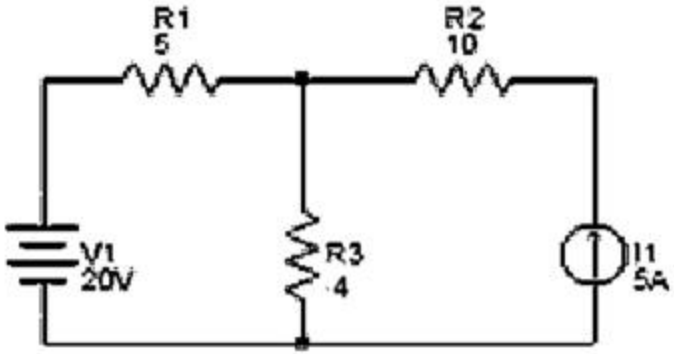
2. ✖ 2

3. ✖ 3

4. ✖ 4

Question Number : 56 Question Id : 7520766896 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In the circuit shown, find the current through 4Ω resistor using Superposition theorem.



Options :

1. ✖ 4

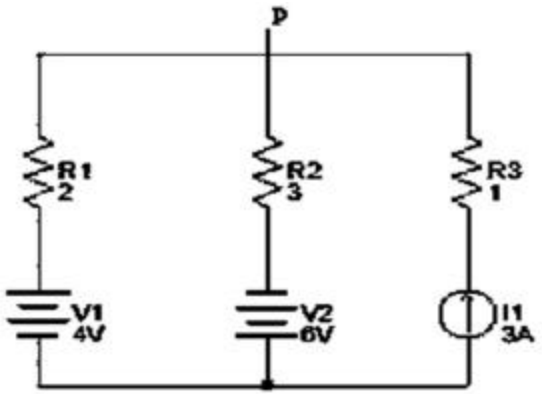
2. ✔ 5

3. ✖ 6

4. ✖ 7

Question Number : 57 Question Id : 7520766897 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Find the voltage at node P, shown in the figure.



Options :

1. ✖ 9V

2. ✔ 3.6 V

3. ✖ 10V

4. ✖ 4.3V

Question Number : 58 Question Id : 7520766898 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In an R-C circuit, when the switch is closed, the response _____.

Options :

1. ✖ do not vary with time

2. ✔ decays with time

3. ✖ rises with time

4. ✖ first increases and then decreases

Question Number : 59 Question Id : 7520766899 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What type of semiconductor is used in LED ?

Options :

1. ✖ Intrinsic semiconductor

2. ✔ Compound semiconductor

3. ✖ Degenerated semiconductor

4. ✖ Compensated semiconductor

Question Number : 60 Question Id : 7520766900 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The voltage equivalent of temperature (V_T) in a *p-n* junctions is given by

Options :

1. ✖ T/1000 volts

2. ✖ T/300 volts

3. ✖ T/1600 volts

4. ✔ T/11600 volts

Question Number : 61 Question Id : 7520766901 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The application of a CC configured transistor is_____.

Options :

1. ✖ voltage multiplier

2. ✖ level shifter

3. ✖ rectification

4. ✔ impedance matching

Question Number : 62 Question Id : 7520766902 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the behaviour of a PIN diode under reverse bias?

Options :

1. ✖ It conducts high current.

2. ✖ It acts as a variable resistor.

3. ✔ It acts as a variable capacitor.

4. ✖ It acts as a closed switch.

Question Number : 63 Question Id : 7520766903 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the role of input capacitance in the transistor amplifying circuit?

Options :

1. ✖ To prevent input variation from reaching output

2. ✔ To prevent DC content in the input from reaching transistor

3. ✖ There isn't any role for input capacitance

4. ✖ To increase input impedance

Question Number : 64 Question Id : 7520766904 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Given that R1=20kΩ, C1=2nF, R2=20kΩ, C2=2nF, find the approximate resonant frequency of a Wein bridge oscillator.

Options :

1. ✔ 4kHz

2. ✖ 3kHz

3. ✖ 25kHz

4. ✖ 15kHz

Question Number : 65 Question Id : 7520766905 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which among the following can be used to detect the missing heart beat?

Options :

1. ✔ Mono-stable multivibrator

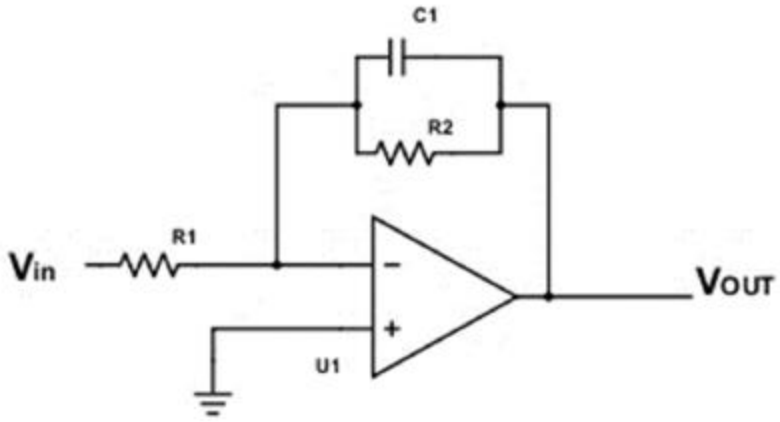
2. ✖ Astable multivibrator

3. ✖ Schmitt trigger

4. ✖ Filter

Question Number : 66 Question Id : 7520766906 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a low pass filter as below, find the cut-off frequency for the following circuit. Given that R1=20kΩ, R2=25kΩ, C1=10μF.



Options :

1. ✖ 640 kHz

2. ✔ 637 Hz

3. ✖ 5.5 kHz

4. ✖ 200 Hz

Question Number : 67 Question Id : 7520766907 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which component is used to reduce ripples in a DC power supply?

Options :

1. ✖ Resistor

2. ✔ Filter

3. ✖ Transformer

4. ✖ Diode

Question Number : 68 Question Id : 7520766908 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following options comes under the non-saturated logic family?

Options :

1. ✔ Emitter – coupled Logic

2. ✖ High-Threshold Logic

3. ✖ Integrated – injection Logic

4. ✖ Diode – Transistor Logic

Question Number : 69 Question Id : 7520766909 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The result "X + XY = X " follows which of these laws?

Options :

1. ✖ Consensus law

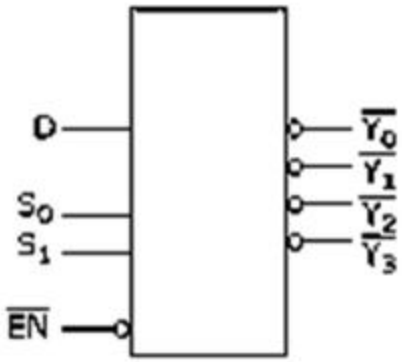
2. ✖ Distributive law

3. ✖ Duality law

4. ✔ Absorption law

Question Number : 70 Question Id : 7520766910 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The device shown here is most likely a _____.



Options :

1. ✖ Comparator

2. ✖ Multiplexer

3. ✖ Inverter

4. ✔ Demultiplexer

Question Number : 71 Question Id : 7520766911 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

How many select lines would be required for an 8-line-to-1-line multiplexer?

Options :

1. ✖ 2

2. ✖ 4

3. ✖ 8

4. ✔ 3

Question Number : 72 Question Id : 7520766912 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following is a register-indirect addressing mode instruction set?

Options :

1. ✖ LDA 2700H

2. ✖ ADI 36H

3. ✖ DAA

4. ✔ LDAX B

Question Number : 73 Question Id : 7520766913 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Find the ROC of $x(t) = e^{-2t}\,u(t) + e^{-3t}\,u(t)$.

Options :

1. ✖ $\sigma>2$

2. ✖ $\sigma>3$

3. ✔ $\sigma>-2$

4. ✖ $\sigma>-3$

Question Number : 74 Question Id : 7520766914 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following systems is memoryless?

Options :

1. ✖ $y(t) = x(2t) + x(t)$

2. ✔ $y(t) = x(t) + 2x(t)$

3. ✖ $y(t) = -x(t) + x(1-t)$

4. ✖ $y(t) = x(t) + 2x(t+2)$

Question Number : 75 Question Id : 7520766915 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Find the convolution sum of sequences x1[n] = (1, 2, 3) and x2[n] = (2, 1, 4).

Options :

1. ✔ {2, 5, 12, 11, 12}

2. ✖ {2, 12, 5, 11, 12}

3. ✖ {2, 11, 5, 12, 12}

4. ✖ {-2, 5,-12, 11, 12}

Question Number : 76 Question Id : 7520766916 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The total number of complex multiplications required to compute N point DFT by radix-2 FFT is?

Options :

1. ✔ $(N/2)\log_2 N$

2. ✖ $N\log_2 N$

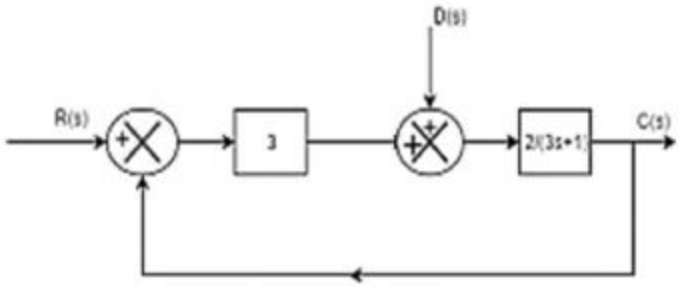
3. ✖ $(N/2)\log N$

4. ✖ $(N/2)\log N/2$

Question Number : 77 Question Id : 7520766917 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The transfer function from D(s) to C(s) is _____

Given $G(s) = \frac{2}{3s+1}$ and $H(s) = 3$



Options :

1. ✔ 2/3s+7

2. ✖ 2/3s+1

3. ✖ 6/3s+7

4. ✖ 6/3s+7

Question Number : 78 Question Id : 7520766918 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The greater the Gain Margin in the control system, the greater is its _____.

Options :

1. ✔ stability

2. ✖ response

3. ✖ profit

4. ✖ delay

Question Number : 79 Question Id : 7520766919 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The system with the open loop transfer function $\frac{1}{s(1+s)}$ is:

Options :

1. ✖ Type 2 and order 1

2. ✖ Type 1 and order 1

3. ✖ Type 0 and order 0

4. ✔ Type 1 and order 2

Question Number : 80 Question Id : 7520766920 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

PD controller:

Options :

1. ✖ Decreases steady state error and improves stability

2. ✔ Rise time decreases

3. ✖ Transient response becomes poorer

4. ✖ Increases steady state error

Question Number : 81 Question Id : 7520766921 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Calculate power in each sideband, if power of carrier wave is 176W and there is 60% modulation in amplitude modulated signal?

Options :

1. ✖ 13.36W

2. ✖ 52W

3. ✖ 67W

4. ✔ 15.84W

Question Number : 82 Question Id : 7520766922 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In flat top sampling scheme, _____ is kept constant after sampling.

Options :

1. ✔ amplitude

2. ✖ phase

3. ✖ frequency

4. ✖ time period

Question Number : 83 Question Id : 7520766923 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The matched filter is equivalent to which of the following?

Options :

1. ✔ A correlator

2. ✖ An envelope detector

3. ✖ A PLL

4. ✖ An equalizer

Question Number : 84 Question Id : 7520766924 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which access technique is primarily used in the Global System for Mobile communications (GSM)?

Options :

1. ✖ CDMA

2. ✔ TDMA

3. ✖ FDMA

4. ✖ WDMA

Question Number : 85 Question Id : 7520766925 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The cut off frequency of the dominant mode in a TE wave in the line having a and b as 2.5 cm and 1 cm respectively is,

Options :

1. ✖ 4.5 GHz

2. ✖ 5 GHz

3. ✖ 5.5 GHz

4. ✔ 6 GHz

Question Number : 86 Question Id : 7520766926 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Fresnel zone is also called as _____.

Options :

1. ✔ near Field

2. ✖ far Field

3. ✖ electrostatic Field

4. ✖ reactive Field

Question Number : 87 Question Id : 7520766927 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What does the parameter S_{11} represent in a two-port network?

Options :

1. ✖ Forward transmission coefficient

2. ✖ Reverse transmission coefficient.

3. ✔ Input reflection coefficient

4. ✖ Output reflection coefficient

Question Number : 88 Question Id : 7520766928 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

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

Options :

1. ✔ $\frac{1}{11} k\Omega$

2. ✖ $\frac{1}{5}k\Omega$

3. ✖ $5k\Omega$

4. ✖ $11k\Omega$

Question Number : 89 Question Id : 7520766929 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

To double the drain current of an N-channel enhancement mode MOSFET biased in saturation _____.

Options :

1. ✖ channel length should be doubled

2. ✖ channel width should be halved

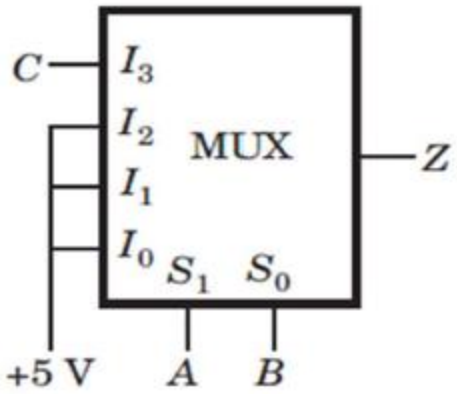
3. ✔ channel length should be halved

4. ✖ oxide thickness should be doubled

Question Number : 90 Question Id : 7520766930 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The MUX shown in fig is 4 × 1 multiplexer.

The output Z is



Options :

1. ✖ ABC

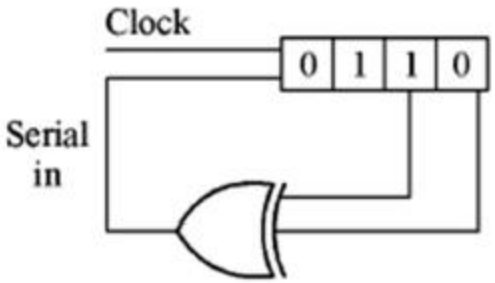
2. ✖ $A \oplus B \oplus C$

3. ✖ $A \cup B \cup C$

4. ✔ $A + B + C$

Question Number : 91 Question Id : 7520766931 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The initial contents of the 4-bit serial-in-parallel out right-shift register shown in figure is 0110.After three clock pulse applied, the contents of the shift register will be



Options :

1. ✖ 0000

2. ✖ 0101

3. ✔ 1010

4. ✖ 1111

Question Number : 92 Question Id : 7520766932 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The contents of accumulator after the execution of following instruction will be

```
MVI   A,B7H
ORA   A
RAL
```

Options :

1. ✔ $6EH$

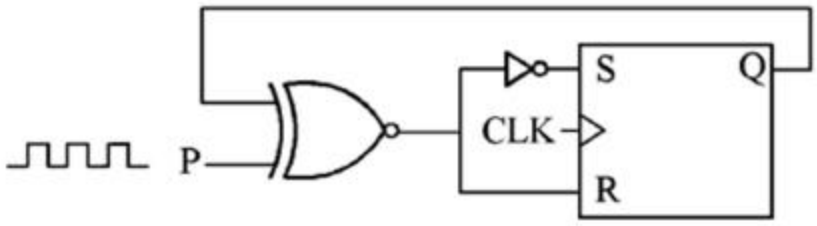
2. ✖ $6FH$

3. ✖ EEH

4. ✖ EFH

Question Number : 93 Question Id : 7520766933 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Consider the circuit, the next state Q^+ is



Options :

1. ✖ PQ

2. ✖ $P\bar{Q}$

3. ✔ $P \oplus Q$

4. ✖ $P \odot \bar{Q}$

Question Number : 94 Question Id : 7520766934 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A system is described by the differential equation $\frac{d^2y(t)}{dt^2} + 6\frac{dy(t)}{dt} + 5y(t) = x(t)$

Impulse response of the system is

Options :

1. ✖ $h(t) = \frac{1}{4}[e^{-2t} - e^{-3t}]u(t)$

2. ✖ $h(t) = [e^{-t} - e^{-5t}]u(t)$

3. ✔ $h(t) = \frac{1}{4}[e^{-t} - e^{-5t}]u(t)$

4. ✖ $h(t) = \frac{1}{4}[e^{-3t} - e^{2t}]u(t)$

Question Number : 95 Question Id : 7520766935 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The Fourier transform of a real valued time signal has _____.

Options :

1. ✖ odd symmetry

2. ✖ even symmetry

3. ✔ conjugate symmetry

4. ✖ no symmetry

Question Number : 96 Question Id : 7520766936 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Consider a causal LTI system with frequency response $H(jw) = \frac{1}{Jw+3}$. This system produces the output to an input *x(t)* as $y(t) = e^{-3t}u(t) - e^{-4t}u(t)$. The input *x(t)* is

Options :

1. ✖ $(2e^{-4t} - 3e^{-3t})u(t)$

2. ✔ $e^{-4t}u(t)$

3. ✖ $(3e^{-4t} - 2e^{-3t})u(t)$

4. ✖ $-e^{-4t}u(t)$

Question Number : 97 Question Id : 7520766937 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The convolution of two DT sequence is,

$x(n) = \{1 \uparrow, 2, 0, 1\}$

$h(n) = \{2, 2, 3\}$

Options :

1. ✖ $\{2 \uparrow, 4, 0, 2, 3, 6\}$

2. ✔ $\{2 \uparrow, 6, 7, 8, 2, 3\}$

3. ✖ $\{2, 6, 7, 8 \uparrow, 2, 3\}$

4. ✖ $\{2, 4, 0 \uparrow, 2, 3, 6\}$

Question Number : 98 Question Id : 7520766938 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The value of K for which the unity feedback system $G(s) = \frac{K}{S(S+2)(S+4)}$ crosses the imaginary axis is ,

Options :

1. ✖ 2

2. ✖ 4

3. ✖ 6

4. ✔ 48

Question Number : 99 Question Id : 7520766939 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A unity feedback second order system has $G(s) = \frac{100}{S^2+10S+100}$. The 2% settling time is in second.

Options :

1. ✖ 0.4

2. ✔ 0.8

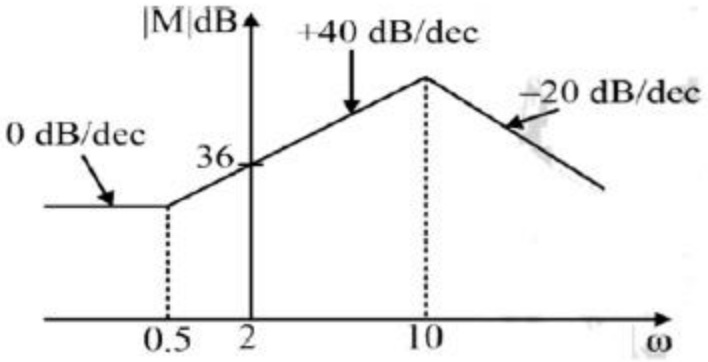
3. ✖ 1

4. ✖ 2

Question Number : 100 Question Id : 7520766940 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

What is the transfer function for given bode plot shown in the figure?



Options :

1. ✖ $\frac{4(S+0.5)^2}{(S+10)^3}$

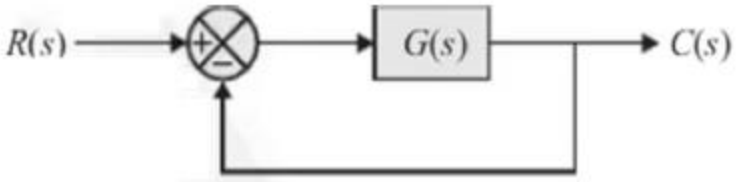
2. ✖ $\frac{4000(S+0.5)^2}{(S+10)^3}$

3. ✖ $\frac{160(S+0.5)^2}{(S+10)^3}$

4. ✔ $\frac{1600(S+0.5)^2}{(S+10)^3}$

Question Number : 101 Question Id : 7520766941 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Consider the unity feedback system with $G(S) = \frac{2}{S(S+1)(2S+1)}$.what is the phase margin?



Options :

1. ✖ $\frac{1}{\sqrt{3}}$

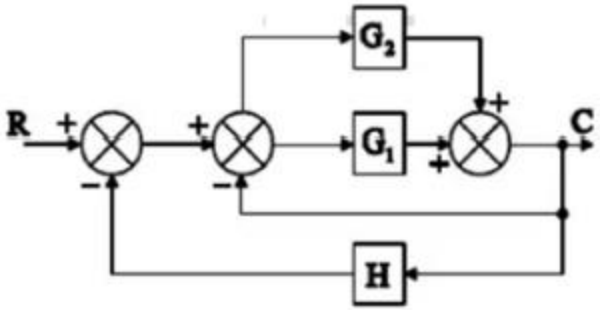
2. ✖ $\frac{\sqrt{3}}{2}$

3. ✔ $\frac{1}{\sqrt{2}}$

4. ✖ $\sqrt{3}$

Question Number : 102 Question Id : 7520766942 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Overall gain of the system shown in figure,



Options :

1. $\frac{G_1 + G_2}{1 + G_1G_2 + G_1H + G_2H}$ ✖

2. $\frac{G_1G_2}{1 + G_1 + G_2 + G_1H + G_2H}$ ✖

3. $\frac{G_1G_2}{1 + G_1G_2 + G_1H + G_2H}$ ✖

4. $\frac{G_1 + G_2}{1 + G_1 + G_1 + G_1H + G_2H}$ ✔

Question Number : 103 Question Id : 7520766943 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The carrier $c(t) = Acos2\pi \times 10^6 t$ is angle modulated (PM or FM) by the signal $m(t) = 2\cos(4000\pi t)$.The deviation constants are $k_p = 3\frac{rad}{V}$ & $k_f = 3000Hz/v$. The value of modulation indices β_f & β_p are

Options :

1. ✖ 6 & 3

2. ✖ 12 & 6

3. ✔ 3 & 6

4. ✖ 9 & 6

Question Number : 104 Question Id : 7520766944 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A binary channel with bit rate of 56kbps is available for uniform PCM voice transmission having signal bandwidth of 3.4khz,signal to noise ratio in decibel

Options :

1. ✔ 58.8

2. ✖ 76.9

3. ✖ 98.6

4. ✖ 108.5

Question Number : 105 Question Id : 7520766945 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A binary signal is transmitted at 10kbps using NRZ signaling .find the minimum channel bandwidth required in KHz

Options :

1. ✖ 2.5

2. ✔ 5

3. ✖ 1.5

4. ✖ 20

Question Number : 106 Question Id : 7520766946 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a DPSK system the input bit sequence is 1101, initial phase = 0. The transmitted phase sequence

Options :

1. ✔ $180^{\circ}, 0^{\circ}, 0^{\circ}, 180^{\circ}$

2. ✖ $0^{\circ}, 180^{\circ}, 180^{\circ}, 0^{\circ}$

3. ✖ $180^{\circ}, 180^{\circ}, 0^{\circ}, 0^{\circ}$

4. ✖ $180^{\circ}, 0^{\circ}, 0^{\circ}, 180^{\circ}$

Question Number : 107 Question Id : 7520766947 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

For electrostatic fields in charge free atmosphere, which one of the following is correct?

Options :

1. ✔ $\nabla \times E = 0 \; and \; \nabla . E = 0$

2. ✖ $\nabla \times E \neq 0 \; and \; \nabla . E = 0$

3. ✖ $\nabla \times E = 0 \; and \; \nabla . E \neq 0$

4. ✖ $\nabla \times E \neq 0 \; and \; \nabla . E \neq 0$

Question Number : 108 Question Id : 7520766948 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a non-magnetic medium electric field $E = E_0 cos\omega t$ is applied. If the permittivity of medium is ε and the conductivity is σ then the ratio of the amplitudes of the conduction current density and displacement current density will be

Options :

1. ✖ $\mu_0/_{\omega\epsilon}$

2. ✔ $\sigma/_{\omega\varepsilon}$

3. ✖ $\sigma\mu_0/_{\omega\epsilon}$

4. ✖ $\omega\varepsilon/_{\sigma}$

Question Number : 109 Question Id : 7520766949 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If maximum and minimum voltage on a transmission line are 2V and 5V respectively, VSWR is

Options :

1. ✖ 0.5

2. ✔ 2

3. ✖ 1

4. ✖ 8

Question Number : 110 Question Id : 7520766950 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If a transmission line of characteristic impedance 25 Ω is to be matched to a load of 100Ω, then the characteristic impedance of the λ/4 transmission line to be used is:

Options :

1. ✖ 70.71 Ω

2. ✔ 50 Ω

3. ✖ $100\ \Omega$

4. ✖ $75\ \Omega$

Question Number : 111 Question Id : 7520766951 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Let A be a 3×3 matrix with real entries such that $\det(A) = 6$ and $\text{trace}(A) = 0$. If $\det(A + I) = 0$, where I is the 3×3 identity matrix, then the eigenvalues of A are

Options :

1. ✖ $-1, 2, 3$

2. ✖ $-1, 2, -3$

3. ✖ $1, 2, -3$

4. ✔ $-1, -2, 3$

Question Number : 112 Question Id : 7520766952 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Consider the following system of equations

$$x - 2y + 3z = -1$$

$$x - 3y + 4z = 1$$

$$-2x + 4y - 6z = k$$

The value of k for which the system has infinitely many solutions is _____.

Options :

1. ✖ 0

2. ✖ 1

3. ✔ 2

4. ✖ -1

Question Number : 113 Question Id : 7520766953 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The value of the improper integral $\int_{-\infty}^{0} \frac{e^x}{e^{2x}+1} dx$ is equal to_____.

Options :

1. ✖ 0

2. ✖ $\frac{\pi}{2}$

3. ✔ $\frac{\pi}{4}$

4. ✖ $-\infty$

Question Number : 114 Question Id : 7520766954 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Suppose C is the closed curve defined as the circle $x^2 + y^2 = 1$ with C oriented anti-clockwise. The value of the line integral $\oint_C (xdy - ydx)$ is equal to _____.

Options :

1. ✖ 0

2. ✖ π

3. ✔ 2π

4. ✖ $\frac{\pi}{2}$

Question Number : 115 Question Id : 7520766955 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The general solution of the differential equation $x^2\frac{d^2y}{dx^2} - 5x\frac{dy}{dx} + 13y = 0$ is _____.

Options :

1. ✖ $y = e^{3x}(C_1 \cos 2x + C_2 \sin 2x)$

2. ✖ $y = e^{3x}(C_1 \cos x + C_2 \sin x)$

3. ✔ $y = x^3(C_1 \cos(2 \ln x) + C_2 \sin(2 \ln x))$

4. ✖ $y = x^3(C_1 \cos(\ln x) + C_2 \sin(\ln x))$

Question Number : 116 Question Id : 7520766956 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Let S be the surface of the cube bounded by $x = 0, x = 1, y = 0, y = 1, z = 0,$ $z = 1$. The value of the surface integral $\iint_S \vec{F} \cdot d\vec{s}$ of a vector field $\vec{F} = 4xz\hat{i} - y^2\hat{j} + yz\hat{k}$ over the entire surface S of the cube, is _____.

Options :

1. ✖ $\frac{5}{2}$

2. ✖ 1

3. ✖ $\frac{1}{2}$

4. ✔ $\frac{3}{2}$

Question Number : 117 Question Id : 7520766957 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The value of the integral $\int_C \frac{e^z}{z^3} dz$, where $C : |z| = 1$ is

Options :

1. ✖ 0

2. ✖ 1

3. ✔ πi

4. ✖ $2\pi i$

Question Number : 118 Question Id : 7520766958 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The coefficient of $\frac{1}{z}$ in the Laurent's series expansion of the function $f(z) = \frac{1}{z^2(1-z)}$ about $z = 0$, is _____.

Options :

1. ✖ -1

2. ✖ 0

3. ✔ 1

4. ✖ 2

Question Number : 119 Question Id : 7520766959 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Suppose that X has the density function $f(x) = cx^2$ for $0 \leq x \leq 1$ and $f(x) = 0$ otherwise. What is $P(0.1 \leq X \leq 0.5)$?

Options :

1. ✖ $\frac{1}{25}$

2. ✖ $\frac{6}{25}$

3. ✖ $\frac{4}{250}$

4. ✔ $\frac{31}{250}$

Question Number : 120 Question Id : 7520766960 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Consider the function $f(x) = x^3 - x - 1$ for finding the root of the equation $f(x) = 0$. If the initial approximation is $x_0 = 1$, then the next approximation x_1 using the Newton–Raphson method is

Options :

1. ✖ 1.25

2. ✖ 1.75

3. ✔ 1.5

4. ✖ 2