lmrcl

Lucknow Metro Rail Corporation Shift 2

Notations :

1. Options shown in green color and with ✔ icon are correct.
2. Options shown in red color and with ✖ icon are incorrect.

Question Paper Name:	Assistant Engineer Signalling and Telecommunication Actual Final Shift 2
Subject Name:	Assistant Engineer Signalling and Telecommunication
Duration:	90

	Group 1
Group Maximum Duration :	0
Group Minimum Duration :	90
Revisit allowed for view? :	No
Revisit allowed for edit? :	No

	Technical
Mandatory or Optional:	Mandatory

Question Number : 1 Question Type : MCQ
Correct : 1 Wrong : 0.33

In 8085, which of the following machine cycles are not used in CALL instruction?

Options :

1. ✔ I/O
2. ✖ Instruction fetch, Memory write
3. ✖ I/O, Memory Read, Memory Write
4. ✖ Memory Read/Write, Instruction fetch

Question Number : 2 Question Type : MCQ
Correct : 1 Wrong : 0.33

In 8085, if the clock frequency is 6 MHz, the time required to execute an instruction of 18T-states is:

Options :

1. ✖ 6 µs
2. ✔ 3 µs

3. ✖ 4 µs

4. ✖ 3.6 µs

Question Number : 3 Question Type : MCQ
Correct : 1 Wrong : 0.33
An n-bit A/D converter is required to convert analog input in range of 0-5V to an accuracy of 10 mV. The value of 'n' should be:

Options :

1. ✖ 8

2. ✖ 10

3. ✖ 16

4. ✔ 9

Question Number : 4 Question Type : MCQ
Correct : 1 Wrong : 0.33
If $CS=\bar{A}_{15}A_{14}A_{13}$ is used as chip select logic of 4K RAM in an 8085 system, then its memory range will be

Options :

1. ✖ 3000 H - 3FFF H

2. ✔ 6000 H - 6FFF H and 7000 H - 7FFF H

3. ✖ 7000 H - 7FFF H

4. ✖ 5000 H - 5FFF H and 6000 H - 6FFF H

Question Number : 5 Question Type : MCQ
Correct : 1 Wrong : 0.33
A modulo - 8 counter requires how many number of flip-flop?

Options :

1. ✔ 3

2. ✖ 4

3. ✖ 8

4. ✖ 5

Question Number : 6 Question Type : MCQ
Correct : 1 Wrong : 0.33
$F = v + \bar{v}w + \bar{v}\bar{w}x + \bar{v}\bar{w}\bar{x}y + \bar{v}\bar{w}\bar{x}\bar{y}z$, where minimized boolean function F is

Options :

1. ✖ $vwxyz$

2. ✔ $v+w+x+y+z$

3. ✖ 1

4. ✖ 0

Question Number : 7 Question Type : MCQ

Correct : 1 Wrong : 0.33

By using only 4 : 1 MUX, it is possible to realize:

Options :

1. ✖ any 3 variable function
2. ✖ only 2 variable function
3. ✖ any 2 and 3 variable function
4. ✔ few 3 variable functions

Question Number : 8 Question Type : MCQ
Correct : 1 Wrong : 0.33

Minimum number of NAND gates required to implement sum in half adder circuit is:

Options :

1. ✔ 4
2. ✖ 3
3. ✖ 2
4. ✖ 5

Question Number : 9 Question Type : MCQ
Correct : 1 Wrong : 0.33

For a 5 stage ring oscillator, if the propogation delay of each inverter is 100 pico seconds, then what is the fundamental frequency of the oscillator output?

Options :

1. ✖ 2 GHz
2. ✖ 100 MHz
3. ✔ 1 GHz
4. ✖ 10 MHz

Question Number : 10 Question Type : MCQ
Correct : 1 Wrong : 0.33

Assertion (A): Emitter coupled logic (ECL) provides high speed logic gates.

Reason (R): ECL does not operate in full saturated or cut off, so it prevents adverse effects of diffusion capacitance

Which of the following is correct?

Options :

1. ✔ Both A and R are true, and R is the correct explanation of A.
2. ✖ Both A and R are true, but R is not a correct explanation of A.
3. ✖ A is true but R is false.
4. ✖ A is false but R is true.

Question Number : 11 Question Type : MCQ
Correct : 1 Wrong : 0.33
For a distortionless LTI system:

Options :
1. ✔ group delay = Phase delay
2. ✖ group delay > Phase delay
3. ✖ group delay < Phase delay
4. ✖ group delay $= \frac{\text{Phase delay}}{2}$

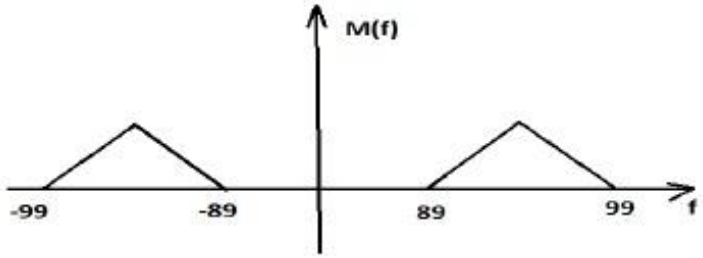
Question Number : 12 Question Type : MCQ
Correct : 1 Wrong : 0.33
The convulation of signal $y(t) = \exp(-t^2) * (2t^2)$ is equal to:

Options :
1. ✖ $\sqrt{\pi}\,(t^2+1)$
2. ✖ $\left(t^2\sqrt{\pi} + \frac{\sqrt{\pi}}{2}\right)$
3. ✖ $2\sqrt{\pi}\left(t+\frac{1}{2}\right)$
4. ✔ $2\sqrt{\pi}\left(t^2+\frac{1}{2}\right)$

Question Number : 13 Question Type : MCQ
Correct : 1 Wrong : 0.33
What do we call the relation between autocorrelation and power spectral density?

Options :
1. ✖ Einstein Theorem
2. ✖ Weiner Theorem
3. ✔ Weiner – Khintchin Theorem
4. ✖ no relation exist

Question Number : 14 Question Type : MCQ
Correct : 1 Wrong : 0.33
What is the nyquist rate and minimum sampling rate of the signal m(t), (m(t) $\rightleftharpoons$ M(f)) where spectrum of bandpass signal in KHz is as given below?



Options :

1. ✖ 20 KHz and 2 KHz
2. ✔ 198 KHz and 22 KHz
3. ✖ 198 KHz and 2 KHz
4. ✖ 178 KHz and 20 KHz

Question Number : 15 Question Type : MCQ
Correct : 1 Wrong : 0.33

For given x(n), $X(e^{j\omega})$ is the discrete time fourier transform. If $x(n) = \left(\frac{1}{2}\right)^n u(n)$ and $y(n) = x^2(n)$, then the value of $Y(e^{j0})$ is:

Options :

1. ✖ $\frac{1}{4}$
2. ✖ 2
3. ✖ 4
4. ✔ $\frac{4}{3}$

Question Number : 16 Question Type : MCQ
Correct : 1 Wrong : 0.33

The Laplace transform of $x(t) = -e^{2t}u(t) * tu(t)$ is:

Options :

1. ✔ $-\frac{1}{s^2(s-2)}$
2. ✖ $\frac{-1}{s(s-2)}$
3. ✖ $\frac{1}{s^2(s-2)}$
4. ✖ $-\frac{1}{s^2(s+2)}$

Question Number : 17 Question Type : MCQ
Correct : 1 Wrong : 0.33

It is given that $x(n) = \{1, -1, \underset{\uparrow}{2}, 0, 3, -2\}$.

What is the energy of signal y(n), where y(n) = x(2n)?

Options :

1. ✖ 19
2. ✔ 14

3. ✖ 10

4. ✖ 13

Question Number : 18 Question Type : MCQ
Correct : 1 Wrong : 0.33
If the fourier transform of f(t) is F(jω), then what is the fourier transform of f(−t)?

Options :

1. ✖ F(jω)

2. ✔ F(−jω)

3. ✖ −F(−jω)

4. ✖ F*(jω)

Question Number : 19 Question Type : MCQ
Correct : 1 Wrong : 0.33
Which of the following functions has unity as its Fourier transform, Laplace transform and Z – transform?

Options :

1. ✔ impulse

2. ✖ gaussian

3. ✖ Sinc

4. ✖ pulse

Question Number : 20 Question Type : MCQ
Correct : 1 Wrong : 0.33
A discrete LTI system is non causal if its impulse response is:

Options :

1. ✖ $a^{n+2}u(n)$

2. ✖ $a^{n}u(n-2)$

3. ✔ $a^{n}u(n+2)$

4. ✖ $a^{n-2}u(n)$

Question Number : 21 Question Type : MCQ
Correct : 1 Wrong : 0.33
Which dirichlet's condition(s) is/are related to fourier transform?

I. Function is absolutely integrable
II. Function must have finite extremas
III. Function has finite discontinuities

Options :

1. ✖ Only I
2. ✖ Only II
3. ✖ Only III
4. ✔ All three

Question Number : 22 Question Type : MCQ
Correct : 1 Wrong : 0.33

When impulse response of a system c(t) is given by $\frac{1}{2}e^{-t/2}$, the unit step response of the system is:

Options :

1. ✔ $1-e^{-t/2}$
2. ✖ $2-e^{-2t}$
3. ✖ $1-e^{-t}$
4. ✖ $1-e^{-2t}$

Question Number : 23 Question Type : MCQ
Correct : 1 Wrong : 0.33

If the magnitude of polar plot at phase crossover is 'a', the gain margin is:

Options :

1. ✖ $-a$
2. ✖ 0
3. ✖ a
4. ✔ $\frac{1}{a}$

Question Number : 24 Question Type : MCQ
Correct : 1 Wrong : 0.33

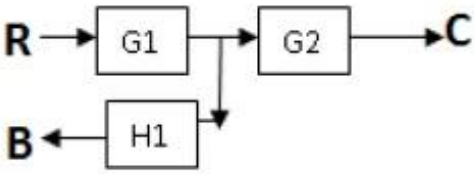
As compared to closed loop system, an open loop is

Options :

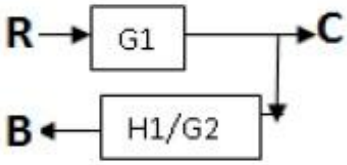
1. ✖ more stable as well as more accurate
2. ✖ less stable as well as less accurate
3. ✔ more stable but less accurate
4. ✖ less stable but more accurate

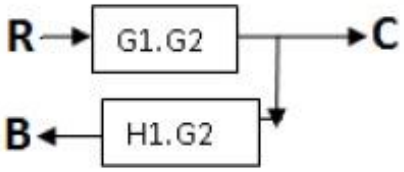
Question Number : 25 Question Type : MCQ
Correct : 1 Wrong : 0.33

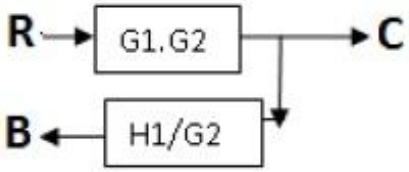
The equivalent of the block diagram in the given figure is (all notations have their usual meanings):

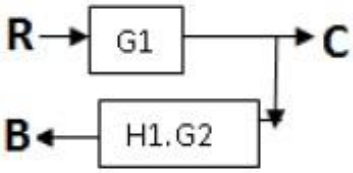


Options :

1. ✖


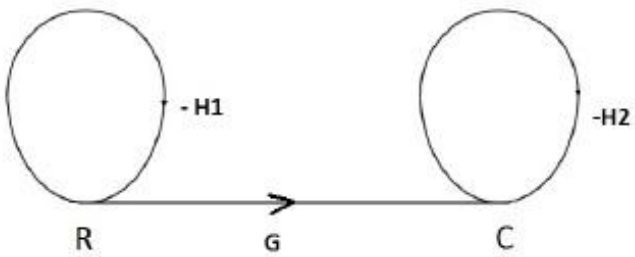
2. ✖


3. ✔


4. ✖


Question Number : 26 Question Type : MCQ
Correct : 1 Wrong : 0.33

Calculate the transfer function $\frac{C}{R}$ for the given signal flow graph shown below.



Options :

1. ✖ $\frac{G}{1+H1}$

2. ✔ $\frac{G}{1+H2}$

3. ✖ $\frac{G}{(1+H1)(1+H2)}$

4. ✖ $\frac{G}{1+H1+H2}$

Question Number : 27 Question Type : MCQ
Correct : 1 Wrong : 0.33
Find the range of K such that the system is stable when characteristic equation of system is $S^4 + S^3 + KS^2 + S + 1$.

Options :

1. ✖ $K > 1$
2. ✔ $K > 2$
3. ✖ $K > 3$
4. ✖ $K > 4$

Question Number : 28 Question Type : MCQ
Correct : 1 Wrong : 0.33
The transfer function is $\frac{1+0.5s}{1+s}$. It represents a:

Options :

1. ✖ Lag -lead network
2. ✔ Lag network
3. ✖ Lead network
4. ✖ Proportional network

Question Number : 29 Question Type : MCQ
Correct : 1 Wrong : 0.33
The Bode plot is valid for:

Options :

1. ✔ minimum phase network
2. ✖ all phase network
3. ✖ non minimum phase network
4. ✖ both all phase and non minimum phase network

Question Number : 30 Question Type : MCQ
Correct : 1 Wrong : 0.33
The steady state error of a stable type- zero unity- feedback system for unit step function is:

Options :

1. ✖ ∞
2. ✖ 0
3. ✖ $\frac{1}{Kp}$

4. ✔ $\frac{1}{1+Kp}$

Question Number : 31 Question Type : MCQ
Correct : 1 Wrong : 0.33
A coil of resistance 20 Ω and inductance 0.8 H is connected to 200V DC supply. The rate of change of current at $t = 0^+$ is:

Options :

1. ✖ 16 A/s
2. ✖ 160 A/s
3. ✔ 250 A/s
4. ✖ 4000 A/s

Question Number : 32 Question Type : MCQ
Correct : 1 Wrong : 0.33
What is the value of R_s required to self bias N- channel JFET with Vp = −10 V, I_{DSS} = 40 mA and V_{GSQ} = −5 V?

Options :

1. ✖ 250 Ω
2. ✔ 500 Ω
3. ✖ 750 Ω
4. ✖ 1500 Ω

Question Number : 33 Question Type : MCQ
Correct : 1 Wrong : 0.33
If each branch of a Delta circuit has resistance of $\sqrt{3}$ R, then each branch of equivalent Wye circuit has a resistance of:

Options :

1. ✖ $3\sqrt{3}$ R
2. ✖ $\frac{R}{3}$
3. ✖ 3R
4. ✔ $\frac{R}{\sqrt{3}}$

Question Number : 34 Question Type : MCQ
Correct : 1 Wrong : 0.33
Superposition theorem is applicable to a linear network in determining

Options :

1. ✔ current and voltage response

2. ✖ current and power response

3. ✖ voltage and power response

4. ✖ current, voltage and power response

Question Number : 35 Question Type : MCQ
Correct : 1 Wrong : 0.33

The maximum power transferred to load when voltage source of 240 V having an internal impedance of $(3 - 4j)$ is:

Options :

1. ✖ 2.4 KW

2. ✔ 4.8 KW

3. ✖ 3.6 KW

4. ✖ 6 KW

Question Number : 36 Question Type : MCQ
Correct : 1 Wrong : 0.33

What is Z_{11} of network, when $A = D = \frac{3}{2} B = \frac{4}{3} C$, where all notations are as per practice?

Options :

1. ✖ $\frac{5}{3}$

2. ✔ $\frac{4}{3}$

3. ✖ $\frac{2}{3}$

4. ✖ $\frac{1}{3}$

Question Number : 37 Question Type : MCQ
Correct : 1 Wrong : 0.33

When two identical first order low pass filters are cascaded non- interactively, the unit step response of composite filter will be:

Options :

1. ✖ Oscillatory

2. ✖ Overdamped

3. ✔ Critically damped

4. ✖ Underdamped

Question Number : 38 Question Type : MCQ
Correct : 1 Wrong : 0.33

The impedance of parallel RLC network is $Z(s) = \frac{5s}{s^2+0.5s+100}$.

The values of R, L and C are respectively:

Options :

1. ✖ $2\ \Omega, \frac{1}{20}\ \text{H}, \frac{1}{5}\ \text{F}$
2. ✖ $10\ \Omega, \frac{1}{20}\ \text{H}, \frac{1}{2}\ \text{F}$
3. ✖ $1\ \Omega, \frac{1}{2}\ \text{H}, \frac{1}{5}\ \text{F}$
4. ✔ $10\ \Omega, \frac{1}{20}\ \text{H}, \frac{1}{5}\ \text{F}$

Question Number : 39 Question Type : MCQ
Correct : 1 Wrong : 0.33

The impedance matrices of two, two-port networks are $\begin{bmatrix}3 & 2\\ 2 & 3\end{bmatrix}$ and $\begin{bmatrix}15 & 5\\ 5 & 25\end{bmatrix}$.

If these two networks are connected in series, the impedance matrix of the resulting 2 port network will be:

Options :

1. ✖ $\begin{bmatrix}3 & 5\\ 2 & 25\end{bmatrix}$
2. ✔ $\begin{bmatrix}18 & 7\\ 7 & 28\end{bmatrix}$
3. ✖ $\begin{bmatrix}15 & 2\\ 5 & 3\end{bmatrix}$
4. ✖ Indeterminate

Question Number : 40 Question Type : MCQ
Correct : 1 Wrong : 0.33

A network has 4 nodes and 3 independent loops. What is the number of branches in the network?

Options :

1. ✖ 5
2. ✖ 7
3. ✖ 8
4. ✔ 6

Question Number : 41 Question Type : MCQ

Correct : 1 Wrong : 0.33

Which one of the following is not Maxwell's equation?

Options :

1. ✖ $\nabla \times \vec{E} = -\frac{\overrightarrow{\partial B}}{\partial t}$
2. ✖ $\nabla \times \vec{H} = \vec{j} + \frac{\overrightarrow{\partial D}}{\partial t}$
3. ✔ $\nabla \times \overrightarrow{\vec{J}} = -\frac{\overrightarrow{\partial \rho}}{\partial t}$
4. ✖ $\nabla \cdot \vec{D} = \rho$

Question Number : 42 Question Type : MCQ
Correct : 1 Wrong : 0.33

Assuming that conductivity does not vary with frequency, the ratio of the group and phase velocities of an electromagnetic wave in a non dispersive medium:

Options :

1. ✖ is constant, equal to 2
2. ✖ depends linearly on frequency
3. ✖ is inversely proportional to frequency
4. ✔ is constant, equal to 1

Question Number : 43 Question Type : MCQ
Correct : 1 Wrong : 0.33

The characteristic impedance of a certain lossless transmission line is 72 Ω with inductance per unit length of 0.5 μH/m and load impedance of 60 Ω. Determine the capacitance per unit length (C), phase velocity (Vp) and SWR:

Options :

1. ✔ C = 96 pF/m, Vp = 1.4×10^{8} m/s, SWR = 1.2
2. ✖ C = 7.7 nF/m, Vp = 0.15×10^{8} m/s, SWR = 1.33
3. ✖ C = 2.9 pF/m, Vp = 8×10^{8} m/s, SWR = 0.84
4. ✖ C = 96 nF/m, Vp = 14×10^{8} m/s, SWR = 1.20

Question Number : 44 Question Type : MCQ
Correct : 1 Wrong : 0.33

Let $E_s = 400\, e^{-j2x}\, a_y$ V/m in free space. Find H_s and average value of poynting vector (where E_s, H_s are phasor form of electric and magnetic field vector).

Options :

1. ✖ $1.06e^{j2x}\ a_z$ A/m and $212a_x$ W/m^2

2. ✖ $-1.06e^{j2x}\ a_z$ A/m and $424a_x$ W/m^2

3. ✔ $1.06e^{-j2x}\ a_z$ A/m and $212a_x$ W/m^2

4. ✖ $-1.06e^{-j2x}\ a_z$ A/m and $0.26a_x$ W/m^2

Question Number : 45 Question Type : MCQ
Correct : 1 Wrong : 0.33

Let vector $\vec{A} = yz\ \hat{a}_x + xy\ \hat{a}_y + xz\ \hat{a}_z$. Evaluate $|\Delta \times \vec{A}|$ at point (5, 4, 5).

Options :

1. ✖ 0

2. ✔ $\sqrt{2}$

3. ✖ $\sqrt{3}$

4. ✖ $\sqrt{5}$

Question Number : 46 Question Type : MCQ
Correct : 1 Wrong : 0.33

A rectangular waveguide has a = 4 cm and b = 3 cm as its cross-sectional dimensions. The number of modes possible for f = 5000 MHz are:

Options :

1. ✖ 2

2. ✖ 3

3. ✔ 1

4. ✖ 4

Question Number : 47 Question Type : MCQ
Correct : 1 Wrong : 0.33

On a conduction surface, which of the following conditions is satisfied? Here E and H are electric and magnetic field vectors respectively.

Options :

1. ✔ E_{min} and H_{max}

2. ✖ E_{min} and H_{min}

3. ✖ H_{max} and E_{max}

4. ✖ E_{max} and H_{max}

Question Number : 48 Question Type : MCQ
Correct : 1 Wrong : 0.33

The characteristics admittance and load Y_L of a lossless transmission line is 20 mS and $(40 - j20)$. Y_{in} is calculated at length $L = 0.15\lambda$ with the help of smith chart.
Which of the following is correct?

Options :

1. ✔ Rotate 108° clockwise
2. ✖ Rotate 108° counter clockwise
3. ✖ Rotate 54° clockwise
4. ✖ Rotate 54° counter clockwise

Question Number : 49 Question Type : MCQ
Correct : 1 Wrong : 0.33

The directivity of hertzian dipole is:

Options :

1. ✖ 2
2. ✖ 1
3. ✔ 1.5
4. ✖ 2.5

Question Number : 50 Question Type : MCQ
Correct : 1 Wrong : 0.33

The velocity of EM wave in conductor, when skin depth in a good conductor is 4 μm at a frequency of 200 KHz, is:

Options :

1. ✖ 15 m/s
2. ✖ 10 m/s
3. ✖ 3×10^8 m/s
4. ✔ 5 m/s

Question Number : 51 Question Type : MCQ
Correct : 1 Wrong : 0.33

What is the maximum value of resistor when capacitor C = 0.1 μf and amplitude modulated wave $s(t) = 20[1 + 0.6 \cos(2\pi \times 10^3 t)]\cos 2\pi \times 10^3 t$ is to be detected by an envelope detector?

Options :

1. ✖ $R_{max} = 1\ K\Omega$
2. ✖ $R_{max} = 21\ K\Omega$
3. ✖ $R_{max} = 0.21\ K\Omega$
4. ✔ $R_{max} = 2.1\ K\Omega$

Question Number : 52 Question Type : MCQ
Correct : 1 Wrong : 0.33

An amplitude modulated signal is given by:
$S(t) = 10\cos(2\pi \times 10^6 t) + 5\cos(2\pi \times 10^6 t)\cos(2\pi \times 10^3 t) + 2\cos(2\pi \times 10^6 t)\cos(4\pi \times 10^3 t)$
The effective modulation index is:

Options :

1. ✔ 0.538
2. ✖ 0.5
3. ✖ 0.2
4. ✖ 0.7

Question Number : 53 Question Type : MCQ
Correct : 1 Wrong : 0.33

What is the output of Hilbert transform when the modulating signal is $m(t) = \sin \omega_o t$?

Options :

1. ✖ $-\sin \omega_o t$
2. ✖ $\cos \omega_o t$
3. ✔ $-\cos \omega_o t$
4. ✖ $-\sin \frac{\omega_o t}{2}$

Question Number : 54 Question Type : MCQ
Correct : 1 Wrong : 0.33

A superheterodyne receiver is tuned at frequency fs = 1000 KHz, quality factor $Q = 100$. Calculate image frequency and rejection ratio, if intermediate frequency is 455KHz.

Options :

1. ✖ 910 KHz, 138
2. ✔ 1910 KHz, 138
3. ✖ 90 KHz, 1.38
4. ✖ 1910 KHz, 1.38

Question Number : 55 Question Type : MCQ
Correct : 1 Wrong : 0.33

The figure of merit (F) and output of supressed carrier receiver contains:

Options :

1. ✖ F = 1, quadrature phase component of narrowband noise
2. ✖ F = 0.5, quadrature phase component of narrowband noise
3. ✖ F = 0.5, in-phase component of narrowband noise
4. ✔ F = 1, in-phase component of narrowband noise

Question Number : 56 Question Type : MCQ
Correct : 1 Wrong : 0.33

The statistically independent random variables 'X' and 'Y' have mean value $U_x = 2$ and $U_y = 4$. They have second order moments $E[X^2] = 8$ and $E[Y^2] = 25$.
What is $E[W^2]$ for the random variable $W = 3X - Y$?

Options :

1. ✔ 49

2. ✖ 40
3. ✖ 145
4. ✖ 0

Question Number : 57 Question Type : MCQ
Correct : 1 Wrong : 0.33
In a PCM, amplitude levels are transmitted in a 7 unit code. The sampling is done at a rate 20 KHz. The bandwidth should be:
Options :
1. ✖ 5 MHz
2. ✔ 70 KHz
3. ✖ 35 KHz
4. ✖ 5 KHz

Question Number : 58 Question Type : MCQ
Correct : 1 Wrong : 0.33
In a matched filter, probability of error depends on:
Options :
1. ✔ Signal energy
2. ✖ Signal wave shape
3. ✖ both signal energy and signal wave shape
4. ✖ independent of both signal energy and signal wave shape

Question Number : 59 Question Type : MCQ
Correct : 1 Wrong : 0.33
In a binary system, the symbols 0 and 1 occur with a probability of p_o and p_1 respectively. The maximum value for entropy occurs when:
Options :
1. ✖ $p_o > p_1$
2. ✖ $p_o < p_1$
3. ✖ p_o = zero
4. ✔ $p_o = p_1$

Question Number : 60 Question Type : MCQ
Correct : 1 Wrong : 0.33
Maximum probability of error occurs in:
Options :
1. ✖ PSK (Phase Shift Keying)
2. ✖ DPSK (Differential Phase Shift Keying)
3. ✔ ASK (Amplitude Shift Keying)
4. ✖ FSK (Frequency Shift Keying)

Question Number : 61 Question Type : MCQ

Correct : 1 Wrong : 0.33

For an intrinsic semiconductor, $n_i = 1 \times 10^{10}/cm^3$ and $q = 1.6 \times 10^{-19}$ C electron and holes drift mobilities at room temperature are 1350 and 450 cm^2/v-s,the intrinsic resistivity is:

Options :

1. ✖ $10^6\ \Omega$ - cm
2. ✖ $10^3\ \Omega$ - cm
3. ✔ $3.5 \times 10^5\ \Omega$ - cm
4. ✖ $3.5 \times 10^4\ \Omega$ - cm

Question Number : 62 Question Type : MCQ

Correct : 1 Wrong : 0.33

In a n-degenerate type semiconductor, the electron density in conduction band is:

Options :

1. ✔ $N_D > N_c > n_i$
2. ✖ $N_D < N_c < n_i$
3. ✖ $N_c > N_D < n_i$
4. ✖ $n_i > N_D > N_c$

Question Number : 63 Question Type : MCQ

Correct : 1 Wrong : 0.33

In BJT to avoid Punchthrough:

Options :

1. ✖ collector doping should be high and base doping should be low.
2. ✔ collector doping should be low and base doping should be high.
3. ✖ doping of both sides should be equal.
4. ✖ either "collector doping should be high and base doping should be low" or "collector doping should be low and base doping should be high".

Question Number : 64 Question Type : MCQ

Correct : 1 Wrong : 0.33

The reverse saturation current doubles when the junction temperature increases by:

Options :

1. ✖ 1°C
2. ✖ 2°C
3. ✖ 4°C
4. ✔ 10°C

Question Number : 65 Question Type : MCQ

Correct : 1 Wrong : 0.33

The threshold voltage (V_t) of a MOSFET is 1 V and $V_{GS} = V_{DS}$. If the drain cunent (I_D) is 1 mA for $V_{GS} = 2$ V, then for $V_{GS} = 3$ V, I_D is:

Options :

1. ✖ 2mA
2. ✖ 9 mA
3. ✔ 4 mA
4. ✖ 3 mA

Question Number : 66 Question Type : MCQ
Correct : 1 Wrong : 0.33

In a mosfet gate, voltage controls:

Options :

1. ✔ drain current
2. ✖ source voltage
3. ✖ drain voltage
4. ✖ threshold voltage

Question Number : 67 Question Type : MCQ
Correct : 1 Wrong : 0.33

A JFET has $I_{dss} = 5$ mA and $g_{mo} = 5000\mu S$. What is the value of $V_{GS(off)}$ and for $V_{GS} = -1$ V g_m is:

Options :

1. ✖ $V_{GS(off)} = -2$ V, $g_m = 7500$ µS
2. ✖ $V_{GS(off)} = -1$ V, $g_m = 7500$ µS
3. ✖ $V_{GS(off)} = -1$ V, $g_m = 2500$ µS
4. ✔ $V_{GS(off)} = -2$ V, $g_m = 2500$ µS

Question Number : 68 Question Type : MCQ
Correct : 1 Wrong : 0.33

For P-N junction diode, donor and acceptor doping concentrations are $N_D = 10^{17}/\text{cm}^3$ and $N_A = 10^{15}/\text{cm}^3$ respectively. If $\epsilon_{si} = 11.7 \times 8.85 \times 10^{-14}$ F/cm, $V_t = 0.0258$ V and $n_i = 1.5 \times 10^{10}/\text{cm}^3$, the open junction capacitance is:

Options :

1. ✔ 1.095×10^{-8} F/cm^2
2. ✖ 10.95×10^{-8} F/cm^2
3. ✖ 109.5×10^{-8} F/cm^2
4. ✖ 1095×10^{-8} F/cm^2

Question Number : 69 Question Type : MCQ
Correct : 1 Wrong : 0.33

A Photodiode is normally:

Options :

1. ✖ forward biased
2. ✖ emitting light
3. ✖ neither forward nor reverse biased
4. ✔ reverse biased

Question Number : 70 Question Type : MCQ
Correct : 1 Wrong : 0.33

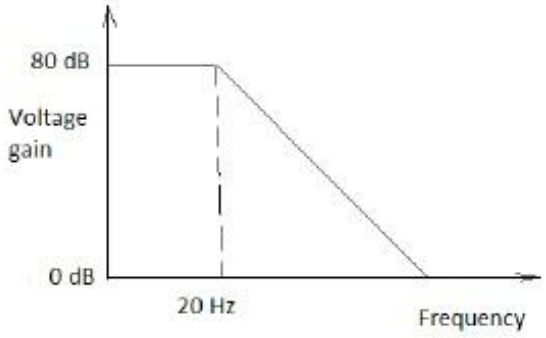
In a single stage differential amplifier, the output offset voltage is basically dependent on the mismatch of:

Options :

1. ✖ V_{BE} and β
2. ✖ V_{BE} and I_B
3. ✔ I_B and β
4. ✖ V_{BE}, I_B, β

Question Number : 71 Question Type : MCQ
Correct : 1 Wrong : 0.33

The voltage gain versus frequency curve of an op-amp is shown in the figure. The gain bandwidth product of op-amp is

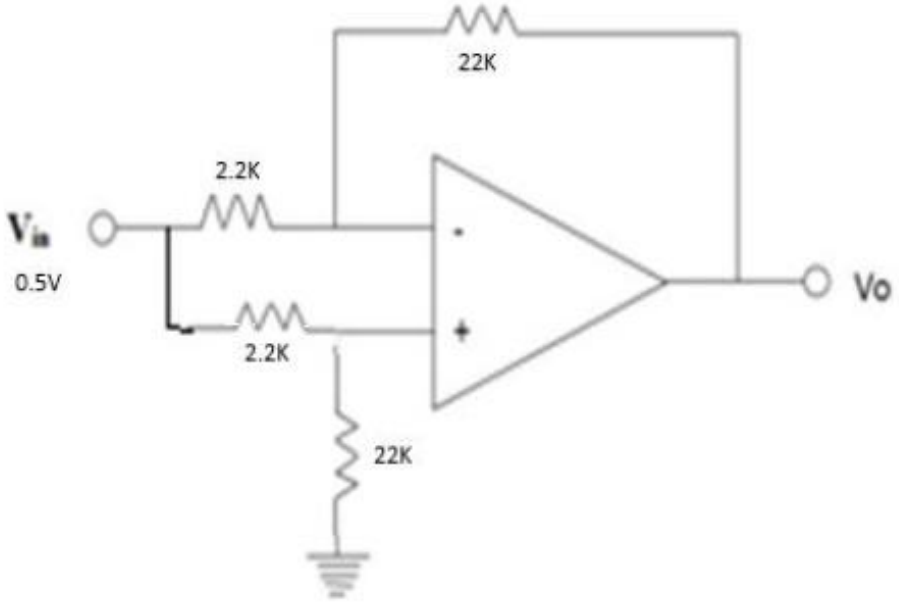


Options :

1. ✖ 200 Hz
2. ✖ 200 MHz
3. ✔ 200 KHz
4. ✖ 2 MHz

Question Number : 72 Question Type : MCQ
Correct : 1 Wrong : 0.33

In the op-amp circuit shown below (assuming ideal op-amp)



Options :

1. ✖ $V_o = -5$ V
2. ✔ $V_o = 0$ V
3. ✖ $V_o = +5$ V
4. ✖ $V_o = -2$ V

Question Number : 73 Question Type : MCQ
Correct : 1 Wrong : 0.33

An amplifier has two identical cascaded stages. Each stage has bandwidth of 20 KHz. The overall bandwidth shall approximately be equal to:

Options :

1. ✖ 10 KHz
2. ✔ 12.9 KHz
3. ✖ 20 KHz
4. ✖ 28.3 KHz

Question Number : 74 Question Type : MCQ
Correct : 1 Wrong : 0.33

With reference to BJT, f_T is the frequency at which the short circuit:

Options :

1. ✖ Common collector current gain has a magnitude of unity
2. ✖ Common base current gain has a magnitude of unity
3. ✔ Common emitter current gain has a magnitude of unity
4. ✖ Common emitter current gain has a magnitude of $\frac{1}{\sqrt{2}}$

Question Number : 75 Question Type : MCQ
Correct : 1 Wrong : 0.33

Consider the following statements.

1. A clamper clamps a signal to different DC level.
2. The shape of the signal does not change, only the DC level shifts.
3. The use of capacitor is essential in a clamper circuit.

Which of the given statements are correct?

Options :

1. ✖ 1 and 2
2. ✖ 1 and 3
3. ✖ 2 and 3
4. ✔ 1, 2 and 3

Numerical and logical Reasoning questions

Mandatory or Optional: Mandatory

Question Number : 76 Question Type : MCQ
Correct : 1 Wrong : 0.33

Find out the word-pair in which the two words hold the same relationship as the two words in the word-pair given below.

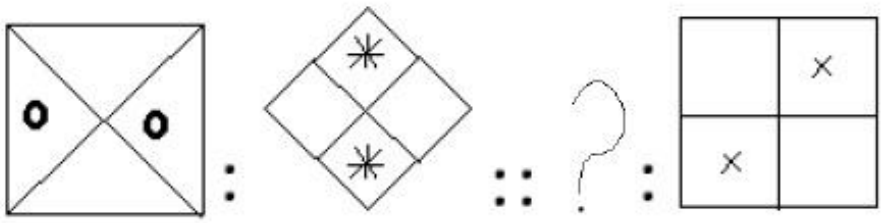
Orange : Apple

Options :

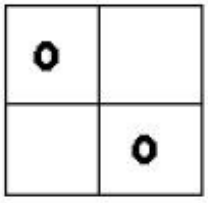
1. ✖ House : Family
2. ✖ Pen : Ink
3. ✖ Tree : Flower
4. ✔ Table : Chair

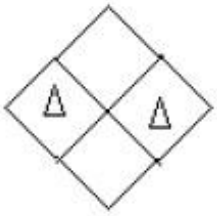
Question Number : 77 Question Type : MCQ
Correct : 1 Wrong : 0.33

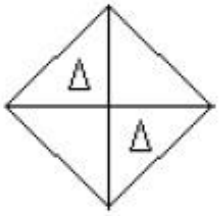
The first two figures on the left side of the sign '::' are related in a certain way. The same relationship holds for the second pair of figures on the right side of the sign '::', of which one is missing. Which of the following is the missing one?

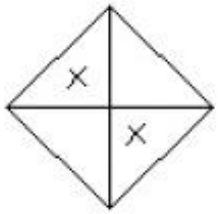


Options :

1. ✖ 

2. ✖ 

3. ✔ 

4. ✖ 

Question Number : 78 Question Type : MCQ
Correct : 1 Wrong : 0.33
Which number will replace the question mark in the number series below?

3, 4, 13, 38, ?, 168

Options :
1. ✖ 63
2. ✔ 87
3. ✖ 77
4. ✖ 102

Question Number : 79 Question Type : MCQ
Correct : 1 Wrong : 0.33
If 12% of 40% of X = 84, then what is the value of X?

Options :
1. ✖ 1600
2. ✖ 1680
3. ✔ 1750
4. ✖ 1860

Question Number : 80 Question Type : MCQ
Correct : 1 Wrong : 0.33
P is the brother of Q and son of R. V is the sister of T, who is the daughter of Q. If R is the husband of S, then which of the following is true?

Options :
1. ✔ V is the granddaughter of S

2. ✖ R is the grandfather of Q

3. ✖ S is the mother of T

4. ✖ V is the nephew of P

Question Number : 81 Question Type : MCQ

Correct : 1 Wrong : 0.33

Four months are given below out of which three are alike in some manner and one is different. Which of the given months is different from the other three?

Options :

1. ✖ October

2. ✖ January

3. ✔ June

4. ✖ December

Question Number : 82 Question Type : MCQ

Correct : 1 Wrong : 0.33

Four figures are given below out of which three are similar in a certain way and one is different. Which is of the given figures is different from the other three?

Options :

1. ✖ 

2. ✔ 

3. ✖ 

4. ✖ 

Question Number : 83 Question Type : MCQ

Correct : 1 Wrong : 0.33

If '+' means '÷', '÷' means '–','–' means '×' and '×' means '+', then

$$(12 + 4 \times 2) \times 6 - 4 \div 2 = ?$$

Options :

1. ✔ 27

2. ✖ 24

3. ✖ 17

4. ✖ 14

Question Number : 84 Question Type : MCQ

Correct : 1 Wrong : 0.33

If 'DAUGHTER' is coded as 'SFUIHVBE' in a certain language, then how would 'PROBLEM' be coded as in the same language?

Options :

1. ✖ LDKANQO
2. ✔ NFMCPSQ
3. ✖ QSPCMFN
4. ✖ NFMCSPQ

Question Number : 85 Question Type : MCQ

Correct : 1 Wrong : 0.33

Each of the following two rows contains 3 numbers. Some rules are given below to be used for getting the resultant for each row separately. Apply the rules for each row from left to right and answer the question.

Rules:

(i) If an even number is followed by an odd but not prime number, both are to be multiplied.

(ii) If an even number is followed by a prime number, both are to be added.

(iii) If an odd number is followed by a composite odd number, the first number is to be subtracted from the square of the second number.

(iv) If an odd number is followed by an even number, the odd one is to be subtracted from the even number.

Row I: 16, 9, 23
Row II: 13, 38, 25

What is the difference between the resultants of the first row and the second row?

Options :

1. ✖ 193
2. ✖ 26
3. ✖ 767
4. ✔ 433

Computer Applications

Mandatory or Optional: Mandatory

Question Number : 86 Question Type : MCQ

Correct : 1 Wrong : 0.33

The operating system for mobile phones developed by Google is:

Options :

1. ✖ Amoeba
2. ✖ Magellan
3. ✔ Android
4. ✖ Ubuntu

Question Number : 87 Question Type : MCQ
Correct : 1 Wrong : 0.33
The CPU of a computer consists of:

Options :

1. ✔ ALU, control unit and registers
2. ✖ ALU and control unit
3. ✖ ALU, control unit and hard disk
4. ✖ ALU, control unit and monitor

Question Number : 88 Question Type : MCQ
Correct : 1 Wrong : 0.33
Which of the following is both an input and an output device?

Options :

1. ✖ Touch screen
2. ✖ LCD projector panel
3. ✖ Audio cards
4. ✔ Modem

Question Number : 89 Question Type : MCQ
Correct : 1 Wrong : 0.33
A program in execution is called:

Options :

1. ✔ Process
2. ✖ Instruction
3. ✖ Procedure
4. ✖ Function

Question Number : 90 Question Type : MCQ
Correct : 1 Wrong : 0.33
Criterion used for judging appropriateness of tool software is:

Options :

1. ✖ Scalability
2. ✖ Compatibility
3. ✔ Functionality
4. ✖ Security

Question Number : 91 Question Type : MCQ
Correct : 1 Wrong : 0.33
Which one of the following decimal number is equivalent to $(10000010)_2$?

Options :

1. ✔ 130_{10}
2. ✖ 200_{10}
3. ✖ 1010_{10}
4. ✖ 304_{10}

Question Number : 92 Question Type : MCQ
Correct : 1 Wrong : 0.33
In a spreadsheet, one function inside another is called:

Options :

1. ✖ Text
2. ✔ Nested
3. ✖ Sum
4. ✖ Round

Question Number : 93 Question Type : MCQ
Correct : 1 Wrong : 0.33
Which of the following is not a part of the Office Suite?

Options :

1. ✖ Database
2. ✖ Image editor
3. ✔ File manager
4. ✖ Word processor

Question Number : 94 Question Type : MCQ
Correct : 1 Wrong : 0.33
Which of the following is not a Search Engine?

Options :

1. ✖ Yahoo
2. ✖ Alta Vista
3. ✖ Google
4. ✔ Facebook

Question Number : 95 Question Type : MCQ
Correct : 1 Wrong : 0.33
A shared network within an organisation to provide connectivity to the staff is called:

Options :

1. ✖ Internet
2. ✔ Intranet
3. ✖ Delnet
4. ✖ Extranet

GK / Awareness

Mandatory or Optional: Mandatory

Question Number : 96 Question Type : MCQ
Correct : 1 Wrong : 0.33
Which Mughal ruler was on the throne of India when East India company was permitted to establish a factory at Surat?

Options :

1. ✖ Aurangzeb
2. ✖ Humayun
3. ✔ Jehangir
4. ✖ Shahjahan

Question Number : 97 Question Type : MCQ
Correct : 1 Wrong : 0.33
Who advises the centre on legal matters?
Options :
1. ✖ Advocate General of india
2. ✖ President of India
3. ✔ Attorney General of India
4. ✖ Chief Justice of India

Question Number : 98 Question Type : MCQ
Correct : 1 Wrong : 0.33
Which of the following payment instruments is known as plastic money?
Options :
1. ✖ Bearer Cheques
2. ✖ Gift Cheques
3. ✖ Demand Drafts
4. ✔ Credit Cards

Question Number : 99 Question Type : MCQ
Correct : 1 Wrong : 0.33
EEG is taken out for diagnosing ailments of which of the following?
Options :
1. ✔ Brain
2. ✖ Heart
3. ✖ Lungs
4. ✖ Stomach

Question Number : 100 Question Type : MCQ
Correct : 1 Wrong : 0.33
Prime Minister Narender Modi has recently launched the "Give It Up" Campaign for voluntarily giving up which of the following?
Options :
1. ✖ Drugs
2. ✖ Plastics
3. ✖ Ration
4. ✔ LPG Subsidy