

SECTION 1 - SECTION 1

Question No.1

The point (0,0) in the domain of $f(x, y) = \sin(xy)$ is a point of

- Maxima
- Constant
- Minima
- Saddle

Question No.2

If a normal GSM time slot consists of 6 trailing bits, 8.25 guard bits, 26 training bits and 2 traffic bursts of 58 bits of data, then the frame efficiency of TDMA is given by

- 62.32%
- 74.24%
- 80.56%
- 52.12%

Question No.3



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- 138_S1_Q38_A.JPG
- 138_S1_Q38_D.JPG
- 138_S1_Q38_B.JPG

Question No.4

The operating frequency spectrum of IEEE 802.16 standard is

- 10-66 GHz
- 0.5-1 GHz
- 0.2-0.8 GHz
- 60-100 GHz

Question No.5



- 10dB
- 20dB
- 30dB
- 40dB

Question No.6



- a good magnetic material
- neither a good conductor nor a good dielectric
- a good conductor
- a good dielectric

Question No.7

A linear time invariant system has an impulse response e^{2t} , $t > 0$. If the initial conditions are zero and the input is e^{3t} , then output for $t > 0$ is

- $e^{3t} - e^{2t}$
- e^{5t}
- $e^{3t} + e^{2t}$
- None of these

Question No.8

A rectangular waveguide has dimensions 1 cm x 0.5 cm. Its cut – off frequency is

- 5 GHz
- 15 GHz
- 10 GHz
- 20 GHz

Question No.9

Which of the following is not a sinusoidal oscillator?

- Crystal oscillator
- LC oscillator
- Relaxation oscillator
- RC phase shift oscillator

Question No.10

Find the power in each sideband of a DSBSC signal with the carrier signal at 1 MHz and of a peak signal voltage of 100 V modulated simultaneously by three different signals. The frequencies of the modulating signals are 2kHz, 3KHz and 5KHz, respectively and peak modulating voltages are 10V, 20V and 30V, respectively. Assume a load resistance of 100Ω.

- 3.75W
- 1.75W
- 2.75W
- 4.5W

Question No.11

A Silicon p-n junction biased with a constant current at room temperature. When the temperature is increased by 10° C, the forward bias voltage across the PN junction

- Decreases by 60 mV
- Decreases by 25 mV
- Increases by 25 mV
- Increases by 60 mV

Question No.12

Which interrupt controller is present in Cortex-A15 processor?

- GIC-390
- GIC-400
- Integrated GIC
- GIC-500

Question No.13

The length of bus cycle in 8086/8088 is four clock cycles, T1, T2, T3, T4 and an indeterminate number of wait state clock cycles denoted by Tw. The wait states are always inserted between

- T4 & T1
- T3 & T4
- T2 & T3
- T1 & T2

Question No.14

The received power at the receiver in terms of electric field is given by

- $(E^2 / 120\pi) A_e$

- $(A_e/120\pi) E^2$
- $(120\pi / E^2)A_e$
- None of the above

Question No.15

The signal to quantization noise ratio in an n-bit PCM system

- Increasing with increasing value of 'n'.
- Depends upon the sampling frequency.
- Decreases with the increasing value of 'n'.
- Is independent of the value of 'n'.

Question No.16



- 10π
- 16π
- $5 + j10 \pi$
- 5

Question No.17



- ∞
- 1
- 0
- 1/6

Question No.18

The band gap of Silicon at 300 K is

- 0.67 eV
- 0.80 eV
- 1.10 eV
- 1.36 eV

Question No.19

An antenna in free space receives $2\mu\text{W}$ of power when the incident electric field is 20mV/m (rms). The effective aperture of the antenna is

- 3.77 m²
- 0.005 m²
- 1.885 m²
- 0.06 m²

Question No.20

The intrinsic impedance of a lossy dielectric medium is given by

- 
- 
- 
- 

Question No.21

A electric field on a plane is described by its potential $V = 20(r^{-1} + r^{-2})$, where r is the distance from the source. The field is due to

- both a monopole and a dipole
- a dipole
- a monopole
- a quadrupole

Question No.22

The cut off frequency for waveguide operation is

- 2 MHz
- 6 MHz
- 4 MHz
- 6 GHz

Question No.23



- Mixed
- Parabolic
- Elliptic
- Hyperbolic

Question No.24

An analog signal is band-limited to 4 KHz. Sampled at the Nyquist rate and the samples are quantized into 4 levels. . The quantized levels are assumed to be independent and equally probable, bit rate is

- 1 bit/sec
- 3 bits/sec
- 4 bits/sec
- 2 bits/sec

Question No.25

An SCR is made up of silicon because

- silicon has large leakage current than germanium
- silicon has small leakage voltage than germanium
- silicon has small leakage current than germanium
- silicon has large leakage voltage than germanium

Question No.26

A solenoid of radius R, and having N turns per unit length carries a time dependent current $I(t) = I_0 \cos(\omega t)$. The magnitude of induced electric field at a distance R/2 radially from the axis of the solenoid is

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- 138_S1_Q56_C.JPG
- 138_S1_Q56_B.JPG
- 138_S1_Q56_A.JPG

Question No.27

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

- 6mA
- 4mA
- 3mA
- 2mA

Question No.28

What will be the conversion time of a successive approximation A/D converter which uses 2MHz clock and 5 bit binary ladder containing 8V reference?

- 25μ sec
- 2.5 μsec
- 4 μ sec

- 3 μ sec

Question No.29



If the unit step response of a network is $(1 - e^{-\alpha t})$, then its unit impulse response is

- $\alpha^{-1} e^{-\alpha t}$
 $(1 - \alpha^{-1}) e^{-\alpha t}$
 $\alpha e^{-\alpha t}$
 $(1 - \alpha) e^{-\alpha t}$

Question No.30



A transmission line of 50 Ω characteristic impedance is terminated with a 100 Ω resistance. The minimum impedance measured on the line is equal to

- 0 Ω
 50 Ω
 25 Ω
 100 Ω

Question No.31



A transmission line of 50 Ω characteristic impedance is terminated with a 100 Ω resistance. The minimum impedance measured on the line is equal to

- 50 Ω
 0 Ω
 100 Ω
 25 Ω

Question No.32



The 4-point Discrete Fourier Transform of a discrete time sequence [1,0,2,3] is

- [0, -2+2j, 2, -2-2j]
 [6, 1-3j, 2, 1+3j]
 [2, 2+2j, 6, 2-2j]
 [6, -1+3j, 0, -1-3j]

Question No.33



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

- 5

- 3
- 4
- 2

Question No.34



- 1.76
- 4.33
- 3.42
- 2.15

Question No.35

If E_b , the energy per bit of a binary digital signal, is 10^{-5} watt – sec and the one – sided power spectral density of the white noise, $N_0 = 10^{-6}$ W/Hz, then the output SNR of the matched filter is

- 20 dB
- 13 dB
- 26 dB
- 10 dB

Question No.36

The number of accidents occurring in a plant in a month follows Poisson distribution with mean as 5.2. The probability of occurrence of less than 2 accidents in the plant during a randomly selected month is

- 0.029
- 0.044
- 0.057
- 0.034

Question No.37

In an SR latch built from NOR gates, which condition is not allowed

- S=1, R=1
- S=0, R=1
- S=0, R=0
- S=1, R=0

Question No.38

If the coherence time is lesser than the symbol period , then the type of fading is

- Flat fading
- Frequency selective fading
- Slow fading
- Fast Fading

Question No.39

The peak to peak input to an 8-bit PCM coder is 2 volts. The signal power-to-quantisation noise power ratio (in db)for an input of $0.5\cos(\omega_m t)$ is:

- 47.8
- 49.8
- 99.6
- 95.6

Question No.40

An Amplifier without feedback has a voltage gain of 50, input resistance of $1\text{k}\Omega$ and output resistance of $2.5\text{ k}\Omega$. The input resistance of the current – shunt negative feedback amplifier using the above amplifier with a feedback factor of 0.2 is

- $1/5\text{ k}\Omega$
- $5\text{ k}\Omega$
- $1/11\text{ k}\Omega$
- $11\text{ k}\Omega$

Question No.41

The impulse response $h[n]$ of a linear time invariant system is given by $h[n] = u[n+3] + u[n-2] - 2u[n-7]$ where $u[n]$ is the unit step sequence. The above system is

- Causal but unstable
- Stable but not causal
- Unstable and not causal
- Stable and causal

Question No.42

A transmitting antenna radiates 251 W isotropically. A receiving antenna located 100 m away from the transmitting antenna has an effective aperture of 500 cm^2 . The total power received by an antenna is

- $100\text{ }\mu\text{W}$

- 20 μW
- 1 μW
- 10 nW

Question No.43

Refractive index of glass is 1.5 and velocity of light is 3×10^8 m/s in vacuum. Find the wavelength of a beam of light with a frequency of 10^{14} in glass.

- 5 μm
- 4 μm
- 2 μm
- 3 μm

Question No.44

Which of the following is not associated with a P N junction?

- Depletion capacitance
- Junction Capacitance
- Channel length Modulation
- Charge storage capacitance

Question No.45

The z transform of the function $f(nT) = a^{nT}$ is

- 
- 
- 
- 

Question No.46

Negative feedback in a closed loop control system DOES NOT

- Improve disturbance rejection
- Reduce bandwidth
- Reduce sensitivity to parameter variation
- Reduce the overall gain

Question No.47

In differential amplifier, CMRR can be improved by using an increased

- Source resistance

- Emitter resistance
- Collector resistance
- Power supply voltage

Question No.48



-
-
-
-

Question No.49

In a bipolar transistor at room temperature , if the emitter current is doubled the voltage across its base – emitter junction

- Halves
- Increases by about 20 mV
- Decreases by about 20 mV
- Doubles

Question No.50

Assume free space propagation, a receiver is located 10Km away from a 50W transmitter. The carrier frequency is 900MHz; antenna gain at transmitter is 1 and 2, respectively. The power flux density is

- $0.046 \mu\text{W}/\text{m}^2$
- $0.023 \mu\text{W}/\text{m}^2$
- $0.015 \mu\text{W}/\text{m}^2$
- $0.039 \mu\text{W}/\text{m}^2$

Question No.51

For the distortion to be minimum in a transmission line at audio frequencies, the condition is

- $LG = R$
- $LR = G$
- $L = CR / G$
- $L = GR / C$

Question No.52

An R-S latch is

- Combinational circuit
- One bit memory element
- Synchronous sequential circuit
- One clock delay element

Question No.53

The first six points of the 8 – point DFT of a real valued sequence are 5, $1 - j3$, 0, $3 - j4$, 0 and $3 + j4$. The last two points of the DFT are respectively

- $1 - j3$, 5
- $1 + j3$, 5
- 0, $1 - j3$
- 0, $1 + j3$

Question No.54

Determine the information carrying capacity of a communication channel if the bandwidth of the channel is 100Mhz and signal to noise ratio is 30dB

- 996Mbps
- 8666Mbps
- 1000Mbps
- 900Mbps

Question No.55

Norton's theorem states that a complex network connected to a load can be replaced with an equivalent impedance

- in parallel with a current source
- in series with current source
- in parallel with a voltage source
- in series with a voltage source

Question No.56

Consider a characteristic equation by $s^4 + 3s^3 + 5s^2 + 6s + K + 10 = 0$. The condition for stability is

- $-10 < K < -4$
- $-10 < K$
- $K > -4$
- $K > 5$

Question No.57

The inverter 74AL S04 has the following specifications:

$$I_{OH \max} = -0.4 \text{ mA}, I_{OL \max} = 8 \text{ mA},$$

$$I_{IH \max} = 20 \mu\text{A}, I_{IL \max} = -0.1 \text{ mA}.$$

The fan out based on the above will be

- 10
- 20
- 100
- 60

Question No.58

A modulated signal is given by, $S(t) = m_1(t) \cos(2\pi f_c t) + m_2(t) \sin(2\pi f_c t)$ Where the base band signal $m_1(t)$ and $m_2(t)$ have bandwidths of 10 kHz and 15 kHz, respectively. The bandwidth of the modulated signal, in kHz, is

- 10 kHz
- 25 KHz
- 15 kHz
- 30 KHz

Question No.59

An exchange serves 2000 subscribers. If the average BHCA is 10,000 and Call completion rate is 60%. Calculate the busy hour calling rate

- 4
- 6
- 3
- 5

Question No.60

A signal has a bandwidth of 1 MHz. It is sampled at a rate 50% higher than the Nyquist rate and quantized into 256 level using a μ -law quantizer with $\mu = 225$. It was found that a sampling rate 20% above the rate would be adequate. So the maximum SNR, that can be realized without increasing the transmission bandwidth, would be

- 50.1 dB
- 70.3 dB
- 60.4 dB
- 40.5 dB

Question No.61

The probability density function of the envelope of narrow band Gaussian noise is

- Rayleigh
- Rician
- Gaussian
- Poisson

Question No.62

For an electronic device operating at a temperature of 17°C with a bandwidth of 10KHz, Determine thermal noise power in dBm

- 400 dBm
- 134dBm
- 100dBm
- 34dBm

Question No.63

The Early – Effect in a bipolar junction transistor is caused by

- Fast – turn – off
- Large collector – base reverse bias
- Fast – turn – on
- Large emitter – base forward bias

Question No.64

In VLSI design, which process deals with the determination of resistance & capacitance of interconnections?

- Floor planning
- Extraction
- Placement & Routing
- Testing

Question No.65

In a good conductor , the phase relation between the tangential components of electric field E_t and the magnetic field H_t

- H_t leads E_t by 90 degree
- E_t and H_t are in phase
- E_t leads H_t by 45 degree
- E_t and H_t are out of phase

Question No.66



The threshold voltage (V_{th}) of MESFET is given by

- $V_{th} = V_{bi} * V_p$
- $V_{th} = V_{bi} / V_p$
- $V_{th} = V_{bi} - V_p$
- $V_{th} = V_{bi} + V_p$

Question No.67



- 82
- 40
- 22
- 60

Question No.68



The resolution of a n bit DAC with a maximum input of 5V is 5mV. The value of n is

- 9
- 11
- 10
- 8

Question No.69



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Question No.70



One input to a conventional AM modulator is a 500-KHz carrier with an amplitude of $20V_p$ is a 10-kHz modulating signal that is of sufficient amplitude to cause a change in the output wave of $\pm 7.5V_p$ Determine the Modulation Coefficient.

- 2.3

- 1.3
- 0.475
- 0.375

Question No.71



The gate delay of an NMOS inverter is dominated by charge time rather than discharge time because

- The driver transistor has a larger threshold voltage than the load transistor.
- The driver transistor has a larger leakage current compared to the load transistor.
- The load transistor has a smaller W/L ratio compared to the driver transistor.
- None of these

Question No.72



In a population of N families, 50% of the families have three children, 30% of the families have two children and the remaining families have one child. What is the probability that a randomly picked child belongs to a family with two children?

- 3/10
- 3/23
- 6/10
- 6/23

Question No.73



For an AM commercial broad cast-band receiver (5.35kHz to 1605 KHz) with an input filter Q-factor of 54, determine the band width of the RF spectrum.

- 20KHz
- 30KHz
- 40 KHz
- 10KHz

Question No.74



If the signal $f(t)$ has energy E, the energy of the signal $f(2t)$ is equal to

- E
- 4E
- E/2
- 2E

Question No.75

A switch – tail ring counter is made by using A single D flip-flop. The resulting circuit is a

- JK flip-flop
- T flip-flop
- SR flip-flop
- D flip-flop

Question No.76

The characteristic impedance of the line having primary constants L and C as 35 milli henry and 70 micro farad respectively is

- 22.36
- 125
- 500
- 50

Question No.77

A sinusoidal signal with peak – to – peak amplitude of 1.536 V is quantized into 128 levels using a mid – rise uniform quantizer. The quantization – noise power is

- 0.768
- 3.072 V
- $12 \times 10^{-6} \text{ V}^2$
- $48 \times 10^{-6} \text{ V}^2$

Question No.78

A metal sphere with 1m radius and a surface charge density of 10 Coulomb/m² is enclosed in a cube of 10m side. The total outward electric displacement normal to the surface of the cube is

- 5π Coulombs
- 40π Coulombs
- 2π Coulombs
- 10π Coulombs

Question No.79

For a standard telephone circuit with a signal-to noise power ratio of 1000(30dB) and a Bandwidth of 2.7Khz, Determine the Shannon limit for information capacity.

- 46.9 kbps
- 26.9kbps
- 36.9kbps
- 56.9kbps

Question No.80



Lifetime of an electric bulb is a random variable with density $f(x) = kx^2$ where x is measured in years. If the minimum and maximum lifetimes of bulb are 1 and 2 years respectively, then the value of k is

- 0.519
- 0.357
- 0.428
- 0.231

Question No.81



- 2, 0
- 0, 2/7
- 2/7, 0
- 0, 2

Question No.82



In Spartan-3 family architecture, which programmable functional element accepts two 18-bit binary numbers as inputs and computes the product?

- Input output Blocks
- Configurable Logic Blocks
- Multiplier Blocks
- Block RAM

Question No.83



According to maximum power transfer theorem, the maximum power is absorbed by one network from another network when

- the impedance of one of the networks is half that of the other
- the impedance of one is the complex conjugate of the other
- the impedance of one is equal to that of the other
- none of the these

Question No.84



- 8V
- 9V
- 1V
- 6V

Question No.85



- $g(t)=f(t/2-3/2)$
- $g(t)=f(t/2-3)$
- $g(t)=f(2t-3)$
- $g(t)=f(2t-3/2)$

Question No.86

A transmitting antenna having an effective height of 125 m take a current of 50 Amp (rms) at a wavelength of 1250m. The antenna efficiency for a total antenna loss resistance of 5 ohms is

- 92%
- 82%
- 72%
- 62%

Question No.87

An FH binary orthogonal FSK system employs an $m=15$ stage linear feedback shift register that generates an ML sequence. Each state of the shift register selects one of L non-overlapping frequency bands in the hopping pattern. The bit rate is 100 bits/s. The demodulator employs non-coherent detection. Suppose the hop rate is increased to 2 hps/bit and the receiver uses square law combining the signal over two hops. The hopping bandwidth for this channel is dB

- 26.2136 MHz
- 1.6384 MHz
- 3.2767 MHz
- 13.1068 MHz

Question No.88

In an FM system, a carrier of 100 MHz is modulated by a sinusoidal signal of 5 kHz. The bandwidth by Carson's approximation is 1 MHz. If $y(t) = (\text{modulated waveform})^3$, then by using Carson's approximation, the bandwidth of $y(t)$ around 300 MHz and the spacing of spectral components are, respectively

- 1 MHz, 5 KHz
- 3 MHz, 15 KHz
- 3 MHz, 5 KHz
- 1 MHz, 15 KHz

Question No.89



The output Y of a 2-bit comparator is logic 1 whenever the 2-bit input A is greater than the 2-bit input B. The number of combinations for which the output is logic 1, is.

- 6
- 4
- 10
- 8

Question No.90



For audio frequency applications, the popular oscillator used is

- Phase shift oscillator
- Wien bridge oscillator
- Crystal oscillator
- Hartley oscillator

Question No.91



- $x(t - 2)$
- $x(t + 2)$
- $x(t - 12)$
- $x(t + 12)$

Question No.92



A 4 bit ripple counter and a 4 bit synchronous counter are made using flip-flops having a propagation delay of 10 ns each. If the worst case delay in the ripple counter and the synchronous counter be R and S respectively, Then

- $R=40 \text{ ns}, S = 10 \text{ ns}$
- $R= 30 \text{ ns}, S = 10 \text{ ns}$

- R=10 ns, S = 40 ns
- R=10 ns, S = 30 ns

Question No.93



The intrinsic carrier concentration of silicon sample at 300° K is $1.5 \times 10^{16} /m^3$. If after doping, the number of majority carriers is $5 \times 10^{20} /m^3$, the minority carrier density is

- $4.50 \times 10^{11} /m^3$
- $5.00 \times 10^{20} /m^3$
- $3.00 \times 10^{-5}/m^3$
- $3.33 \times 10^4 /m^3$

Question No.94



For an amplifier with an output signal voltage of 4V, an Output noise voltage of 0.005V, with an input and output resistance of 50Ω , Determine the signal to noise power ratio.

- 60dB
- 70dB
- 58.06dB
- 80dB

Question No.95



For an n-channel enhancement type MOSFET if the source is connected at a higher potential than that of the bulk (i.e. $V_{SB} > 0$), the threshold voltage V_T of the MOSFET will

- Increase
- Change polarity
- Remain unchanged
- Decreases

Question No.96



A bulb in a staircase has two switches, one switch being at the ground floor and the other one at the first floor. The bulb can be turned ON and also can be turned OFF by any one of the switches irrespective of the state of the other switch. The logic of the switching of the bulb resembles

- an AND gate
- an XOR gate
- an OR gate
- a NAND gate

Question No.97

During transmission over a communication channel, bit errors occur independently with probability P . If a block of n bits is transmitted, the probability of at most one bit error is equal to

- $(1 - P)^n + nP(1 - P)^{(n-1)}$
- $nP(1 - P)^{(n-1)}$
- $1 - (1 - P)^n$
- $P + (n - 1)(1 - P)$

Question No.98

- 0 A
- 2 A
- $(1/2)$ A
- 1 A

Question No.99

Which of the following is most difficult to fabricate in an IC?

- Capacitor
- Diode
- Transistor
- FET

Question No.100

If the standard deviation of the speed of vehicles in a highway is 8.8kmph and the mean speed of the vehicles is 33kmph. The coefficient of variation in speed is

- 0.3646
- 0.1517
- 0.2666
- 0.1867