

## TG PGECET 2025

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|--------------------|-------------------------------------------|
| Hall Ticket Number |                                           |
| Candidate Name     |                                           |
| Test Center Name   | iON Digital Zone iDZ 2 Moula Ali          |
| Test Date          | 17/06/2025                                |
| Test Time          | 10:00 AM - 12:00 PM                       |
| Subject            | Electronics and Communication Engineering |

Section : Mathematics

Q.1

By reversing the order of integration,  $\int_0^2 \int_{x^2}^{2x} f(x, y) dy dx$  becomes

Ans

✓ 1.  $\int_0^4 \int_{y/2}^{\sqrt{y}} f(x, y) dx dy$

✗ 2.  $\int_0^8 \int_{y/2}^{\sqrt{y}} f(x, y) dx dy$

✗ 3.  $\int_0^2 \int_{2y}^{y^2} f(y, x) dx dy$

✗ 4.  $\int_{x^2}^2 \int_0^2 f(x, y) dx dy$

Question ID : 3084111083  
Chosen Option : 3

Q.2 For a binomial distribution, if mean is 'a' and standard deviation is 'b', then

Ans

✗ 1.  $b < a^2$

✗ 2.  $b = a$

✗ 3.  $b > a^2$

✓ 4.  $b^2 < a$

Question ID : 3084111088  
Chosen Option : 1

Q.3 Let  $f(z)$  be an analytic function except at a simple pole  $z=0$ . Also  $g(z)$  is an analytic

function. Then  $\frac{\text{Res}(f(z)g(z)) \text{ at } z=0}{\text{Res}(f(z)) \text{ at } z=0} =$

Ans

✗ 1.  $g'(0)[zf'(z)]_{z=0}$

✓ 2.  $g(0)$

✗ 3.  $\lim_{z \rightarrow 0} z \frac{g(z)}{f(z)}$

✗ 4.  $\lim_{z \rightarrow 0} z \frac{f(z)}{g(z)}$

Question ID : 3084111087

Chosen Option : 3

Q.4 If it is known that the birth month of two persons is same, then the probability that both of them born in the month of September is

Ans

✗ 1.  $\frac{9}{12}$

✗ 2.  $\frac{1}{144}$

✓ 3.  $\frac{1}{12}$

✗ 4.  $\frac{11}{12}$

Question ID : 3084111089

Chosen Option : 3

Q.5 Starting from initial approximate solution  $x_0 = 1$ , the next approximate solution of

$x^3 + 3x - 7 = 0$  by using Newton-Raphson method is

Ans

✗ 1. 1.406

✗ 2. 2

✓ 3. 1.5

✗ 4. 0.5

Question ID : 3084111090

Chosen Option : 1

Q.6

If  $A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ , then  $A^{49} =$

Ans

✗ 1.  $\begin{bmatrix} 1 & 0 & 0 \\ 25 & 0 & 1 \\ 25 & 1 & 0 \end{bmatrix}$

✗ 2.  $\begin{bmatrix} 1 & 0 & 0 \\ 24 & 0 & 1 \\ 24 & 1 & 0 \end{bmatrix}$

✓ 3.  $\begin{bmatrix} 1 & 0 & 0 \\ 25 & 0 & 1 \\ 24 & 1 & 0 \end{bmatrix}$

✗ 4.  $\begin{bmatrix} 1 & 0 & 0 \\ 49 & 0 & 1 \\ 48 & 1 & 0 \end{bmatrix}$

Question ID : 3084111082

Chosen Option : 3

Q.7 Let  $y_1$  and  $y_2$  be two linearly independent solutions of  $y'' + Q(x)y' + R(x)y = 0$ . Let

$W(y_1, y_2)$  be Wronskian of  $y_1$  and  $y_2$ . Then  $Q(x)W(y_1, y_2) =$

Ans

✗ 1.  $y_1 y_2' - y_2 y_1'$

✓ 2.  $y_2 y_1'' - y_1 y_2''$

✗ 3.  $y_1' y_2' - y_1'' y_2''$

✗ 4.  $y_1' y_2'' - y_2' y_1''$

Question ID : 3084111086

Chosen Option : 2

Q.8 If 1, -1, 2 are all the eigen values of the matrix of a linear transformation  $Y = AX$ , then  $A^{-1} =$

Ans

✗ 1.  $\frac{1}{2}[A^3 - 2A^2 + A]$

✗ 2.  $\frac{1}{2}[I + A + A^2]$

✗ 3.  $\frac{1}{2}[I - 2A - A^2]$

✓ 4.  $\frac{1}{2}[I + 2A - A^2]$

Question ID : 3084111081  
Chosen Option : 3

Q.9 If the auxiliary equation of a homogeneous linear differential equation with constant coefficients has all complex roots with negative real parts, then general solution  $u(t)$  of the differential equation tends to

Ans

✓ 1. Zero as  $t \rightarrow \infty$

✗ 2. Zero as  $t \rightarrow 0$

✗ 3. Infinity as  $t \rightarrow 0$

✗ 4. Infinity as  $t \rightarrow \infty$

Question ID : 3084111085  
Chosen Option : 1

Q.10 The equivalent double integral to the line integral  $\oint_C xydy - y^2dx$  where C is the square

formed by  $x=0$ ,  $y=0$ ,  $x=1$ ,  $y=1$  in the first quadrant is

Ans

✗ 1.  $\int_0^1 \int_0^1 (y-x) dx dy$

✗ 2.  $\int_0^1 \int_0^1 (-3x) dx dy$

✗ 3.  $\int_0^1 \int_0^1 (2y-x) dx dy$

✓ 4.  $\int_0^1 \int_0^1 (3y) dx dy$

Question ID : 3084111084  
Chosen Option : 1

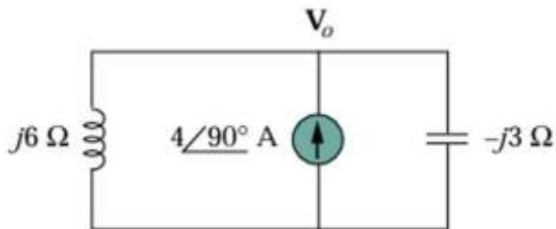
Q.11 A tabulation specifying inputs required for a flip-flop to change from a present state to specified next state is known as

- Ans
- ☒ 1. Truth table
  - ☒ 2. State table
  - ☒ 3. Transition table
  - ☒ 4. Excitation table

Question ID : 3084111147

Chosen Option : 4

Q.12 The value of  $V_o$  in the circuit



- Ans
- ☒ 1. -8 V
  - ☒ 2. 24 V
  - ☒ 3. -24 V
  - ☒ 4. 8 V

Question ID : 3084111099

Chosen Option : 3

Q.13 In a 4-stage ripple counter, the propagation delay of a flip-flop is 50 ns. If the pulse width of the strobe is 30 ns, find the maximum frequency at which the counter operates reliably?

- Ans
- ☒ 1. 3.33 MHz
  - ☒ 2. 5 MHz
  - ☒ 3. 1.25 MHz
  - ☒ 4. 4.35 MHz

Question ID : 3084111148

Chosen Option : 1

Q.14 The concept of displacement current was a major contribution attributed to

- Ans
- ☒ 1. Lenz's law
  - ☒ 2. Maxwell's equation
  - ☒ 3. Lorentz's condition
  - ☒ 4. Faraday's law

Question ID : 3084111191

Chosen Option : 1

Q.15 The following filter is often referred as phase-lead controller

- Ans
- ☐ 1. Low pass filter
  - ☒ 2. High pass filter
  - ☐ 3. All pass filter
  - ☐ 4. Band pass filter

Question ID : 3084111169  
Chosen Option : 2

Q.16 The bandwidth efficiency of 32-ary PSK signals is

- Ans
- ☐ 1. 0.5 bits/sec/Hz
  - ☒ 2. 2.5 bits/sec/Hz
  - ☐ 3. 3.0 bits/sec/Hz
  - ☐ 4. 2.0 bits/sec/Hz

Question ID : 3084111180  
Chosen Option : 2

Q.17 The figure of merit of single tone AM modulation with 100% modulation is

- Ans
- ☐ 1.  $\frac{1}{4}$
  - ☐ 2.  $\frac{1}{2}$
  - ☐ 3. 1
  - ☒ 4.  $\frac{1}{3}$

Question ID : 3084111174  
Chosen Option : 2

Q.18 The pre-emphasis and de-emphasis are used to

- Ans
- ☐ 1. Detect the envelop of the transmitted signal
  - ☒ 2. Improves the signal to noise ratio
  - ☐ 3. Increase the bandwidth of transmission
  - ☐ 4. Reduces the amplitude of low frequency components

Question ID : 3084111175  
Chosen Option : 1

Q.19 The group delay function  $\tau_g(w)$  is related to phase function  $\phi(w)$  as

Ans

✗ 1.  $\tau_g(w) = \frac{d\phi(w)}{w}$

✓ 2.  $\tau_g(w) = -\frac{d\phi(w)}{dw}$

✗ 3.  $\tau_g(w) = -\frac{2d\phi(w)}{dw}$

✗ 4.  $\tau_g(w) = \frac{d^2\phi(w)}{d^2w^2}$

Question ID : 3084111107

Chosen Option : 2

Q.20 The values of  $h_{ib}$  and  $h_{fb}$  for the given h-parameters  $h_{ie} = 1100 \Omega$ ,  $h_{fe} = 50$  are

Ans

✗ 1.  $1100 \Omega$  and  $-51$

✓ 2.  $21.568 \Omega$  and  $-0.98$

✗ 3.  $22.01 \Omega$  and  $51$

✗ 4.  $1100 \Omega$  and  $0.98$

Question ID : 3084111129

Chosen Option : 2

Q.21 One of the following is an indirect way of generating FM.

Ans

✗ 1. Reactance FET modulator

✗ 2. Varactor diode modulator

✗ 3. Reactance bipolar transistor modulator

✓ 4. Armstrong modulator

Question ID : 3084111189

Chosen Option : 4

Q.22 There exists a value of  $V_{GS}$  for which  $I_D = I_Q$  does not change with temperature. It is therefore possible to bias a FET for

Ans

✓ 1. Zero drain current drift

✗ 2. High voltage gain

✗ 3. Unity source current

✗ 4. High input impedance

Question ID : 3084111122

Chosen Option : 3



Q.23 The coherent M-ary QAM, when  $M = 4$  is called

- Ans
- ☐ 1. QAM
  - ☐ 2. PSK
  - ☐ 3. BPSK
  - ☒ 4. QPSK

Question ID : 3084111182

Chosen Option : 2

Q.24 Inverse Fourier transform of unit step  $U(W)$  is

- Ans
- ☒ 1.  $\frac{1}{2\delta(t)} + \frac{j}{2\pi t}$
  - ☐ 2.  $\delta(t) + \frac{j}{\pi t}$
  - ☐ 3.  $\frac{1}{\delta(t)} + \frac{j}{\pi t}$
  - ☐ 4.  $\delta(t) + \frac{j}{2t}$

Question ID : 3084111104

Chosen Option : 2

Q.25 Darlington circuit consists of two cascaded

- Ans
- ☐ 1. Common emitter amplifiers with infinite emitter resistance in the first stage
  - ☐ 2. Common base amplifiers with infinite base resistance in the first stage
  - ☒ 3. Emitter followers with infinite emitter resistance in the first stage
  - ☐ 4. Common emitter and common base amplifier with infinite resistance in the second stage

Question ID : 3084111131

Chosen Option : 4

Q.26 Photo diode works on the principle of

- Ans
- ☐ 1. Impact ionization
  - ☐ 2. Avalanche breakdown
  - ☐ 3. Photo voltaic effect
  - ☒ 4. Photo conductivity

Question ID : 3084111124

Chosen Option : 3



Q.27 The sequence of following techniques in epitaxial-diffusion method of fabricating ICs is

- Epitaxy
- Silicon dioxide growth
- Photoetching
- Diffusion
- Vacuum evaporation of aluminium

- Ans
- ☒ 1. e, b, a, d, c
  - ☒ 2. a, b, c, d, e
  - ☒ 3. d, c, a, e, b
  - ☒ 4. b, c, a, e, d

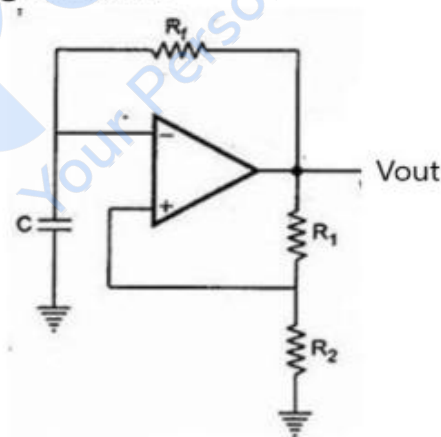
Question ID : 3084111123  
Chosen Option : 3

Q.28 The impedance of a 10 F capacitor is

- Ans
- ☒ 1.  $\frac{1}{10s}$
  - ☒ 2.  $\frac{s}{10}$
  - ☒ 3.  $\frac{10}{s}$
  - ☒ 4.  $10s$

Question ID : 3084111096  
Chosen Option : 4

Q.29 The output of the following circuit is



- Ans
- ☒ 1. Square wave
  - ☒ 2. Trapezoidal wave
  - ☒ 3. Sinusoidal wave
  - ☒ 4. Triangular wave

Question ID : 3084111137  
Chosen Option : 2

Q.30 Find the autocorrelation function whose spectral density is given by

$$S(w) = \begin{cases} \pi, & |w| \leq 1 \\ 0, & \text{otherwise} \end{cases}$$

Ans

✓ 1.  $\frac{\sin \tau}{\tau}$

✗ 2.  $\frac{j}{\tau}$

✗ 3.  $\frac{\cos \tau}{\tau}$

✗ 4.  $\frac{1}{\tau}$

Question ID : 3084111171  
Chosen Option : 3

Q.31 In series RLC circuit, setting  $R = 0$  will produce

Ans

✓ 1. An undamped response

✗ 2. An underdamped response

✗ 3. A critically damped response

✗ 4. An overdamped response

Question ID : 3084111097  
Chosen Option : 1

Q.32 A thin silicon dioxide layer was used in the fabrication of transistor because of the following property

Ans

✗ 1. Provides high contact for diffusion of impurities

✓ 2. Preventing the diffusion of impurities through it

✗ 3. Provides metal connectivity on the layer

✗ 4. Strengthen the connectivity between metals

Question ID : 3084111125  
Chosen Option : 2

Q.33 In order to nullify the effect of emitter junction resistance on the thermal instability, the  $R_e$  and  $R_c$  of self biased transistor circuit must be

Ans

- ✓ 1.  $R_e = \frac{0.4V_{CC}}{I_{CQ}}$  &  $R_c = \frac{0.1V_{CC}}{I_{CQ}}$
- ✗ 2.  $R_e = \frac{0.4V_{CE}}{I_{EQ}}$  &  $R_c = \frac{0.1V_{CE}}{I_{CQ}}$
- ✗ 3.  $R_e = \frac{0.4V_{CE}}{I_{EQ}}$  &  $R_c = \frac{0.4V_{CE}}{I_{CQ}}$
- ✗ 4.  $R_e = \frac{0.1V_{CC}}{I_{CQ}}$  &  $R_c = \frac{0.4V_{CC}}{I_{CQ}}$

Question ID : 3084111128  
Chosen Option : 2

Q.34 Determine the z transform of the anti causal signal  $x(n) = -a^n u(-n-1)$ ?

Ans

- ✓ 1.  $\frac{z}{z-a}, |z| < a$
- ✗ 2.  $\frac{a}{z-a}, |z| < a$
- ✗ 3.  $\frac{z}{z+a}, |z| > a$
- ✗ 4.  $\frac{1}{z-a}, |z| > a$

Question ID : 3084111113  
Chosen Option : 1

Q.35 In the 16-QAM constellation, the encoding of the message points represents

Ans ✓ 1.

First two bits are the quadrants and remaining two bits are symbols

- ✗ 2. First two bits are the symbols and remaining two bits are quadrants
- ✗ 3. The four bits are symbols
- ✗ 4. First bit is sign and remaining three bits are symbols

Question ID : 3084111181  
Chosen Option : 2

Q.36 When the response of a linear time-invariant system is analysed in the frequency domain

- Ans
- ☐ 1. A sinusoidal input with fixed frequency is used
  - ☐ 2. A square wave with fixed duration is used
  - ☐ 3. A square wave with variable duration is used
  - ☒ 4. A sinusoidal input with variable frequency is used

Question ID : 3084111163

Chosen Option : 4

Q.37 The simplified formula of the Boolean equation  $A'BC + AB'C + ABC' + ABC$  is

- Ans
- ☐ 1.  $A' + B$
  - ☐ 2.  $A + B$
  - ☒ 3.  $AB + BC + CA$
  - ☐ 4.  $A'B + B'C$

Question ID : 3084111143

Chosen Option : 3

Q.38 The direction flag of 8086 microprocessor is used for

- Ans
- ☐ 1. Stack instruction
  - ☒ 2. String instruction
  - ☐ 3. Store sign
  - ☐ 4. Jump instruction

Question ID : 3084111154

Chosen Option : 3

Q.39 Which of the following is not correct with respect to the value of the Shannon limit for an AWGN channel, assuming a code rate of zero?

- Ans
- ☐ 1. 0.693
  - ☐ 2. -1.6 dB
  - ☐ 3.  $\log 2$
  - ☒ 4. Zero

Question ID : 3084111186

Chosen Option : 2

Q.40 An analog voltage in the range 0 to 8 V is divided in 16 equal intervals for conversion to 4-bit digital output. The maximum quantization error (in V) is

- Ans
- ☐ 1. 0
  - ☐ 2. 0.5
  - ☐ 3. 1
  - ☒ 4. 0.25

Question ID : 3084111185

Chosen Option : 4

Q.41 The steady state error due to parabolic function input for unity feedback type 2 system is

- Ans
- ☒ 1. Zero
  - ☒ 2. Infinity
  - ☒ 3. Cannot be defined
  - ☒ 4. Constant

Question ID : 3084111164

Chosen Option : 4

Q.42 A certain transmitter radiates 9 kW with the carrier unmodulated and 10.125 kW when the carrier is sinusoidally modulated. Calculate the modulation index?

- Ans
- ☒ 1. 0.5
  - ☒ 2. 0.125
  - ☒ 3. 1.0
  - ☒ 4. 0.25

Question ID : 3084111188

Chosen Option : 2

Q.43 If  $x_1(t) = 2 \sin \pi t + \cos 4\pi t$  and  $x_2(t) = \sin 5\pi t + 3 \sin 13\pi t$ , then

- Ans
- ☒ 1.  $x_1$  and  $x_2$  both are periodic
  - ☒ 2.  $x_1$  is not periodic, but  $x_2$  is periodic
  - ☒ 3.  $x_1$  is periodic, but  $x_2$  is not periodic
  - ☒ 4.  $x_1$  and  $x_2$  both are not periodic

Question ID : 3084111106

Chosen Option : 1

Q.44 A receiving antenna in an airport has a maximum dimension of 3 m and operates at 100 MHz. An aircraft approaching the airport 0.5 km from the antenna. Then the aircraft is in the \_\_\_\_\_ of the antenna

- Ans
- ☒ 1. Far field region
  - ☒ 2. Near field region
  - ☒ 3. Oscillating region
  - ☒ 4. Out off coverage area

Question ID : 3084111195

Chosen Option : 2

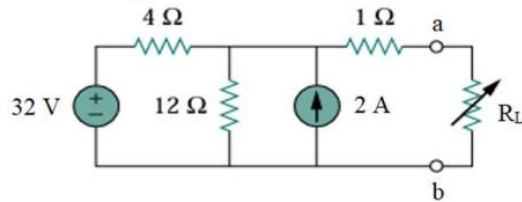
**Q.45** In a single error correcting Hamming code, the number of message bits in a block is 26. The number of check bits in the block would be

- Ans ☒ 1. 4  
☒ 2. 7  
☒ 3. 5  
☒ 4. 3

Question ID : 3084111190

Chosen Option : 4

**Q.46** Find the Thevenin resistance, Thevenin voltage across ab and current through  $R_L = 6 \Omega$  for the following circuit?



- Ans ☒ 1.  $12 \Omega$ , 32 V, 2 A  
☒ 2.  $4 \Omega$ , 30 V, 3 A  
☒ 3.  $13 \Omega$ , 27 V, 8 A  
☒ 4.  $16 \Omega$ , 56 V, 24 A

Question ID : 3084111093

Chosen Option : 3

**Q.47** Match the following:

|   |      |     |                   |
|---|------|-----|-------------------|
| A | FDMA | I   | Frequency hopping |
| B | TDMA | II  | Multibeam antenna |
| C | CDMA | III | Guard bands       |
| D | SDMA | IV  | Time slots        |

- Ans ☒ 1. A- II, B- III, C- I, D- IV  
☒ 2. A- I, B- II, C- IV, D- III  
☒ 3. A- II, B- IV, C- III, D- I  
☒ 4. A- III, B- IV, C- I, D- II

Question ID : 3084111183

Chosen Option : 3



Q.48 A two-port circuit is described by the following equations

$$V_1 = 50I_1 + 10I_2$$

$$V_2 = 30I_1 + 20I_2$$

Which of the following is not true?

- Ans
- ☒ 1.  $h_{12} = 0.5$
  - ☒ 2.  $B = 50$
  - ☒ 3.  $z_{12} = 10$
  - ☒ 4.  $y_{12} = -0.0143$

Question ID : 3084111100  
Chosen Option : 4

Q.49 Which of the following statement is true?

- Ans
- ☒ 1.  $I_{E0}$  doubles approximately every  $10^\circ\text{C}$  and  $|V_{BE}|$  decreases by approximately  $10\text{ mV}/^\circ\text{C}$
  - ☒ 2.  $I_{C0}$  doubles approximately every  $10^\circ\text{C}$  and  $|V_{BE}|$  decreases by approximately  $2.5\text{ mV}/^\circ\text{C}$
  - ☒ 3.  $I_{E0}$  decreases approximately every  $10\text{ mA}/^\circ\text{C}$  and  $|V_{CE}|$  decreases by approximately  $2.5\text{ mV}/^\circ\text{C}$
  - ☒ 4.  $I_{C0}$  decreases approximately every  $10\text{ mA}/^\circ\text{C}$  and  $|V_{CE}|$  decreases by approximately  $10\text{ mV}/^\circ\text{C}$

Question ID : 3084111127  
Chosen Option : 3

Q.50 Given the signal  $x(t) = 10 \cos(2000\pi t) \cos(8000\pi t)$ . What is the sampling rate based on the low pass uniform sampling theorem?

- Ans
- ☒ 1. 2 kHz
  - ☒ 2. 4 kHz
  - ☒ 3. 10 kHz
  - ☒ 4. 16 kHz

Question ID : 3084111109  
Chosen Option : 2

Q.51 Which of the following expression is NOT Maxwell's equation for time-varying field?

- Ans
- ☒ 1.  $\oint \mathbf{B} \cdot d\mathbf{s} = 0$
  - ☒ 2.  $\nabla \cdot \mathbf{E} = -\frac{\partial B}{\partial t}$
  - ☒ 3.  $\nabla \cdot \mathbf{J} = -\frac{\partial \rho_v}{\partial t} = 0$
  - ☒ 4.  $\nabla \cdot \mathbf{D} = \rho_v$

Question ID : 3084111198  
Chosen Option : 1



Q.52 If a periodic function  $f(t)$  of period  $T$  satisfies  $f(t) = -f\left(t + \frac{T}{2}\right)$ , then in its Fourier series expansion, there will be no

- Ans
- ☐ 1. Constant term
  - ☐ 2. Sine terms
  - ☐ 3. Cosine terms
  - ☒ 4. Even harmonics

Question ID : 3084111101  
Chosen Option : 4

Q.53 Consider a Zener regulator circuit, where  $V_s = 45$  V,  $R_s = 1$  k $\Omega$ ,  $V_z = 10$  V and  $I_{zmax} = 30$  mA. Find the minimum load current?

- Ans
- ☐ 1. 30 mA
  - ☐ 2. 35 mA
  - ☒ 3. 5 mA
  - ☐ 4. 3 mA

Question ID : 3084111119  
Chosen Option : 3

Q.54 The PD controller

- Ans
- ☐ 1. Increases rise time and settling time
  - ☐ 2. Increases rise time and decreases settling time
  - ☒ 3. Decreases rise time and settling time
  - ☐ 4. Decreases rise time and increase settling time

Question ID : 3084111165  
Chosen Option : 4

Q.55 Adding a pole to  $G(s)H(s)$  has the effect of pushing the root loci toward the

- Ans
- ☒ 1. Right-half s-plane
  - ☐ 2. Origin
  - ☐ 3. Left-half s-plane
  - ☐ 4. Infinity

Question ID : 3084111166  
Chosen Option : 3

Q.56 Which property of Fourier transform states that the compression in time domain is equivalent to expansion in the frequency domain?

- Ans
- ☐ 1. Frequency shifting
  - ☐ 2. Duality
  - ☒ 3. Time scaling
  - ☐ 4. Time shifting

Question ID : 3084111103  
Chosen Option : 1

Q.57 If  $v_1 = 30\sin(\omega t + 10^\circ)$  and  $v_2 = 20\sin(\omega t + 50^\circ)$  which of these statements are true?

- Ans
- ☐ 1.  $v_1$  leads  $v_2$
  - ☐ 2.  $v_1$  and  $v_2$  are in phase
  - ☐ 3.  $v_2$  lags  $v_1$
  - ☒ 4.  $v_2$  leads  $v_1$

Question ID : 3084111098  
Chosen Option : 3

Q.58 Which of the following theorem states that for a circuit having multiple independent sources, the current through an element is equal to the algebraic sum of all the individual currents due to each independent source acting one at a time?

- Ans
- ☐ 1. Reciprocity
  - ☐ 2. Thevenin's
  - ☒ 3. Superposition
  - ☐ 4. Nortons's

Question ID : 3084111094  
Chosen Option : 3

Q.59 The current through a branch in a linear network is 2A when the input source voltage is 10V. If the voltage is reduced to 1V and the polarity is reversed, the current through the branch is

- Ans
- ☐ 1. -2.0 A
  - ☐ 2. 5.0 A
  - ☐ 3. 0.2 A
  - ☒ 4. -0.2 A

Question ID : 3084111092  
Chosen Option : 2

Q.60 The number of comparators required for an 8-bit parallel comparator A/D converter is

- Ans ☒ 1. 255  
☐ 2. 8  
☐ 3. 3  
☐ 4. 16

Question ID : 3084111152  
Chosen Option : 1

Q.61 Which of the following modulation scheme is useful for high-speed and large bandwidth signals?

- Ans ☐ 1. DSB-SC  
☒ 2. VSB  
☐ 3. DSB  
☐ 4. SSB-SC

Question ID : 3084111176  
Chosen Option : 1

Q.62 For distortion less transmission through an LTI system phase of  $H(\omega)$  is

- Ans ☐ 1. Constant  
☒ 2. Linearly with ' $\omega$ '  
☐ 3. Zero  
☐ 4. One

Question ID : 3084111105  
Chosen Option : 2

Q.63 The data rate of a synchronous SRAM operating at 200 MHz is

- Ans ☐ 1. 500 MHz  
☐ 2. 200 MHz  
☐ 3. 100 MHz  
☒ 4. 400 MHz

Question ID : 3084111153  
Chosen Option : 2

Q.64 The ideal value of effective density of states in the valence band of germanium is

- Ans ☒ 1.  $6.0 \times 10^{19}$   
☐ 2.  $1.69 \times 10^{21}$   
☐ 3.  $1.04 \times 10^{19}$   
☐ 4.  $5.39 \times 10^{21}$

Question ID : 3084111116  
Chosen Option : 2

Q.65 Match the following

|   |                   |     |                                                   |
|---|-------------------|-----|---------------------------------------------------|
| A | Shot noise        | I   | Gaussian distributed with zero mean               |
| B | Narrow band noise | II  | Independent of the operating frequency            |
| C | Thermal noise     | III | Contains in phase and quadrature phase components |
| D | White noise       | IV  | Discrete nature of current flow in transistors    |

- Ans
- ☒ 1. A - I, B - II, C - III, D - IV
  - ☒ 2. A - II, B - I, C - IV, D - III
  - ☒ 3. A - IV, B - III, C - I, D - II
  - ☒ 4. A - III, B - II, C - I, D - IV

Question ID : 3084111172

Chosen Option : 4

Q.66 Which instruction is used to load the address of operand into the provided register?

- Ans
- ☒ 1. LDS
  - ☒ 2. LEA
  - ☒ 3. LAHF
  - ☒ 4. LES

Question ID : 3084111155

Chosen Option : 2

Q.67 Which of the following is incorrect with respect to root locus?

- Ans
- ☒ 1. The number of branches of the root locus equals the number of closed loop poles
  - ☒ 2. The root locus is symmetrical with respect to the real axis
  - ☒ 3. The root locus approaches straight lines as asymptotes as the root locus approaches zeros
  - ☒ 4. The root locus begins at the finite and infinite 4 poles of  $G(S)H(s)$  and ends at the finite and infinite zeros of  $G(S)H(s)$

Question ID : 3084111160

Chosen Option : 4

Q.68 A solution to the blind speed problem in radar is to change the

- Ans
- ☒ 1. Doppler frequency
  - ☒ 2. Intermediate frequency
  - ☒ 3. Antenna direction
  - ☒ 4. PRF

Question ID : 3084111200

Chosen Option : 1

Q.69 Find the POS logic function for the expression?

$$f(A, B, C, D) = \prod M(4, 6, 10, 12, 13, 15)$$

Ans ☒ 1.  $(A' + B + C' + D')(A' + B' + C')(A + B' + D)$

☒ 2.

$$(A' + B + C' + D)(A' + B' + C)(A' + B' + D')(A + B' + D)$$

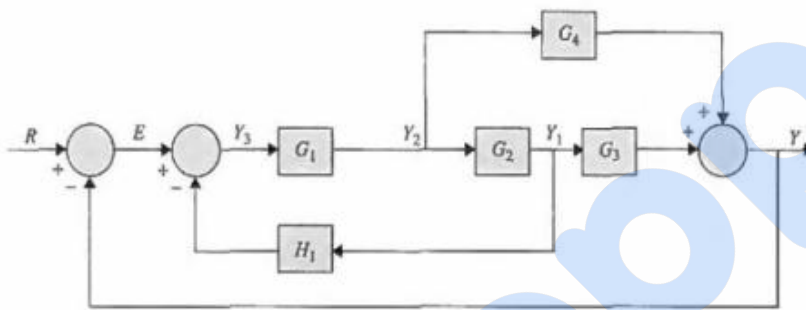
☒ 3.

$$(A' + B' + C' + D)(A' + B + D')(A + B' + D)(A' + B' + D')$$

☒ 4.  $(A' + B + C' + D')(A' + B' + C)(A' + B' + D')$

Question ID : 3084111146  
Chosen Option : 2

Q.70 Find the transfer function of the following system



Ans

☒ 1.  $\frac{G_1 G_2 + G_1 G_4}{1 + G_2 G_3 H_1 + G_1 G_2 + G_1 G_4}$

☒ 2.  $\frac{G_1 G_2 G_3}{1 + G_1 G_2 H_1 + G_1 G_2 G_3}$

☒ 3.  $\frac{G_1 G_2 G_3 + G_1 G_4}{1 + G_2 G_2 H_1 + G_1 G_2 G_3 + G_1 G_4}$

☒ 4.  $\frac{G_1 G_4}{1 + G_2 G_3 H_1 + G_1 G_2 + G_1 G_4}$

Question ID : 3084111156  
Chosen Option : 3

Q.71 TTL gate with \_\_\_\_\_ output can be used for wired-logic operation

Ans ☒ 1. Short collector

☒ 2. Passive pullup

☒ 3. Open emitter

☒ 4. Open base

Question ID : 3084111145  
Chosen Option : 2

Q.72 The limitation of Half wave rectifier with capacitor filter is

- Ans
- ☒ 1. Maximum transformer voltage at no loads
  - ☒ 2. High ripple at large loads
  - ☒ 3. High voltage at light loads
  - ☒ 4. Small ripple at light loads

Question ID : 3084111126  
Chosen Option : 2

Q.73 The cascade of divide by  $-5$  counter followed by divide by 2 counter is in state 0000. If negative edge trigger is assumed, what is the state when a clock pulse is applied?

- Ans
- ☒ 1. 0100
  - ☒ 2. 0010
  - ☒ 3. 1000
  - ☒ 4. 0011

Question ID : 3084111150  
Chosen Option : 2

Q.74 The characteristic equation of the system is  $s^5 + 4s^4 + 8s^3 + 8s^2 + 7s + 4 = 0$  then the system is

- Ans
- ☒ 1. Marginally stable
  - ☒ 2. Conditionally stable
  - ☒ 3. Unstable
  - ☒ 4. Stable

Question ID : 3084111162  
Chosen Option : 3

Q.75 From the Bode plot, the system is stable when the

- Ans
- ☒ 1. Gain and phase margin both are positive
  - ☒ 2. Gain margin is negative and phase margin is positive
  - ☒ 3. Gain and phase margin both are negative
  - ☒ 4. Gain margin is positive and phase margin is negative

Question ID : 3084111168  
Chosen Option : 4



Q.76 Convert  $(231.13)_4$  to base 7

- Ans
- ☒ 1. 45.7575....
  - ☒ 2. 73.1515...
  - ☒ 3. 63.5151....
  - ☒ 4. 84.2323....

Question ID : 3084111141

Chosen Option : 3

Q.77 Aperture effect occurs in communication due to

- Ans
- ☒ 1. Finite bandwidth of transmission channel
  - ☒ 2. Short duration of samples
  - ☒ 3. Flat-top sampling
  - ☒ 4. Sampling rate less than Nyquist rate

Question ID : 3084111110

Chosen Option : 4

Q.78 If the Fourier series coefficients of a signal are periodic, then the signal must be

- Ans
- ☒ 1. Continuous-time, periodic
  - ☒ 2. Discrete-time, periodic
  - ☒ 3. Discrete-time, non-periodic
  - ☒ 4. Continuous-time, non-periodic

Question ID : 3084111102

Chosen Option : 1

Q.79 Divide 110101 by 1001

- Ans
- ☒ 1. 1010
  - ☒ 2. 1001
  - ☒ 3. 1110
  - ☒ 4. 1101

Question ID : 3084111144

Chosen Option : 3

Q.80 The number of roots in the right half of the s-plane for the following equation are

$$2s^4 + s^3 + 3s^2 + 5s + 10 = 0$$

- Ans
- ☒ 1. Two
  - ☒ 2. Five
  - ☒ 3. Three
  - ☒ 4. Four

Question ID : 3084111161

Chosen Option : 3



Q.81 The resolution of a 12bit D/A converter is \_\_\_\_\_ of the full-scale output

Ans

- ✓ 1.  $\frac{1}{4095}$
- ✗ 2.  $\frac{1}{4096}$
- ✗ 3.  $\frac{1}{4}$
- ✗ 4.  $\frac{1}{12}$

Question ID : 3084111151  
Chosen Option : 2

Q.82 The samples of the message signals which are used to vary the duration of the individual pulses in the carrier is called

Ans

- ✗ 1. PAM
- ✓ 2. PWM
- ✗ 3. PCM
- ✗ 4. PPM

Question ID : 3084111178  
Chosen Option : 4

Q.83 Consider common source amplifier with parameters:

$g_m = 1.5 \text{ mA/V}$ ,  $r_d = 150 \text{ K}$ ,  $C_{gs} = 5 \text{ pF}$ ,  $C_{gd} = 2 \text{ pF}$ ,  $C_{ds} = 0.8 \text{ pF}$  and  $R_L = 50 \text{ K}$ , compute the voltage gain when the  $V_i$  is a sinusoidal signal of frequency 1kHz?

Ans

- ✗ 1. 4.50
- ✗ 2. 261.25
- ✓ 3. 56.25
- ✗ 4. 113.50

Question ID : 3084111134  
Chosen Option : 3

Q.84 The MOSFET is also called an insulated-gate field effect transistor because of

Ans

- ✗ 1. High input impedance
- ✗ 2. Lightly doped p-type substrate
- ✗ 3. Two highly doped  $n^+$ -regions
- ✓ 4. Insulating layer of silicon dioxide

Question ID : 3084111121  
Chosen Option : 3

Q.85 The damping ratio of second order system is  $\geq 1$ , then the roots are

- Ans
- ☐ 1. Real and equal
  - ☐ 2. Imaginary and not equal
  - ☐ 3. Imaginary and equal
  - ☒ 4. Real and not equal

Question ID : 3084111170  
Chosen Option : 4

Q.86 Which of the following process represents an analog signal in discrete form in both amplitude and time?

- Ans
- ☐ 1. Low pass filtering with sampling
  - ☒ 2. Quantizing with sampling
  - ☐ 3. Amplifying with sampling
  - ☐ 4. Low pass filtering with quantizing

Question ID : 3084111177  
Chosen Option : 3

Q.87 For a closed-loop system to be stable, the Nyquist plot  $L(s)$  must encircle the  $(-1, j0)$  point as many times as the number of

- Ans
- ☐ 1. Zeros of  $L(s)$  that are in the left-half s-plane
  - ☐ 2. Poles of  $L(s)$  that are in the left-half s-plane
  - ☐ 3. Zeros of  $L(s)$  that are in the right-half s-plane
  - ☒ 4. Poles of  $L(s)$  that are in the right-half s-plane

Question ID : 3084111167  
Chosen Option : 4

Q.88 Which of the following is not correct with respect to Signal Flow Graphs (SFG)?

- Ans
- ☐ 1. Signals travel along branches only in the direction described by the arrows of the branches
  - ☐ 2. The equations for which an SFG is drawn must be algebraic equations in the form of cause-and-effect
  - ☐ 3. SFG applies only to linear systems
  - ☒ 4. The branch directing from node  $y_k$  to  $y_j$  represents the dependence of  $y_k$  upon  $y_j$  but not the reverse

Question ID : 3084111157  
Chosen Option : 3

Q.89 In a rectangular waveguide if  $a = 2b$ , the cutoff frequency for  $TE_{02}$  mode is 12 GHz, the cutoff frequency for  $TM_{11}$  mode is

- Ans ☒ 1. 3 GHz  
☒ 2.  $3\sqrt{5}$  GHz  
☒ 3.  $6\sqrt{5}$  GHz  
☒ 4. 12 GHz

Question ID : 3084111194  
Chosen Option : 3

Q.90 Which characteristics of cascade transistor pair makes this circuit particularly useful in tuned amplifier design?

- Ans ☒ 1. Low value of  $h_i$   
☒ 2. High value of  $h_o$   
☒ 3. High value of  $h_f$   
☒ 4. Low value of  $h_r$

Question ID : 3084111132  
Chosen Option : 3

Q.91 The number of branches of root locus of the following transfer function is

$$G(s) = \frac{(s+2)}{s(s+5)(s^4+1)}$$

- Ans ☒ 1. Eight  
☒ 2. Four  
☒ 3. Six  
☒ 4. Three

Question ID : 3084111159  
Chosen Option : 3

Q.92 Match the following:

|   |                     |     |                             |
|---|---------------------|-----|-----------------------------|
| A | Free space          | I   | $\sigma \ll \omega\epsilon$ |
| B | Lossless dielectric | II  | $\sigma \gg \omega\epsilon$ |
| C | Lossy dielectric    | III | $\sigma \neq 0$             |
| D | Good conductors     | IV  | $\sigma = 0$                |

- Ans ☒ 1. A – IV, B – I, C – III, D – II  
☒ 2. A – I, B – III, C – II, D – IV  
☒ 3. A – III, B – II, C – I, D – IV  
☒ 4. A – I, B – II, C – III, D – IV

Question ID : 3084111196  
Chosen Option : 3

Q.93 The frequency response of a system with  $h(n) = \delta(n) - \delta(n - 1)$  is given by

- Ans
- ☒ 1.  $u(w) - u(w - 1)$
  - ☒ 2.  $\sin(w) - \sin(w - 1)$
  - ☒ 3.  $\delta(w) - \delta(w - 1)$
  - ☒ 4.  $1 - e^{-jw}$

Question ID : 3084111108

Chosen Option : 4

Q.94 When a non-linear system is linearized at an operating point, the linear model contain

- Ans
- ☒ 1. Time invariant elements
  - ☒ 2. All the elements are open circuit
  - ☒ 3. Time varying elements
  - ☒ 4. All the elements are short circuit

Question ID : 3084111158

Chosen Option : 2

Q.95 A piece of RG-59B/U coaxial cable has a  $75 \Omega$  characteristic impedance and a nominal capacitance of 69 pF/m. What is its inductance per meter?

- Ans
- ☒ 1. 10.87 pH/m
  - ☒ 2. 3.88  $\mu$ H/m
  - ☒ 3. 0.388  $\mu$ H/m
  - ☒ 4. 108.7 pH/m

Question ID : 3084111197

Chosen Option : 2

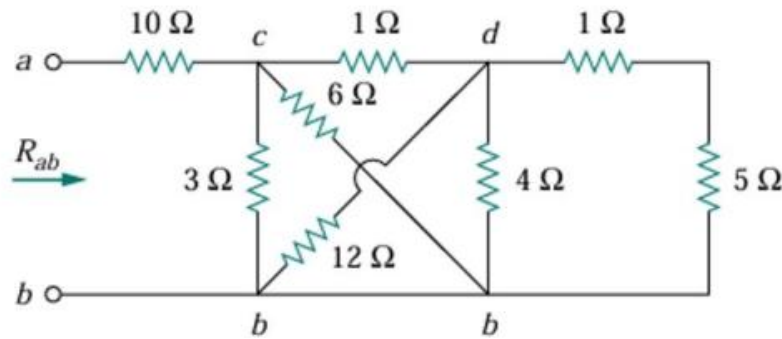
Q.96 In a broadcast superheterodyne receiver having no RF loaded Q of the antenna coupling circuit is 100. If the intermediate frequency is 455 kHz, calculate the image frequency at 1 MHz?

- Ans
- ☒ 1. 1910 kHz
  - ☒ 2. 2000 kHz
  - ☒ 3. 465 kHz
  - ☒ 4. 910 kHz

Question ID : 3084111187

Chosen Option : 4

Q.97 Calculate the equivalent resistance  $R_{ab}$  in the following circuit?



- Ans
- ☒ 1. 30.3  $\Omega$
  - ☒ 2. 10  $\Omega$
  - ☒ 3. 20.2  $\Omega$
  - ☒ 4. 11.2  $\Omega$

Question ID : 3084111091  
Chosen Option : 1

Q.98 Which of the following gate has output low if and only if all inputs are high?

- Ans
- ☒ 1. NOR
  - ☒ 2. OR
  - ☒ 3. NAND
  - ☒ 4. AND

Question ID : 3084111142  
Chosen Option : 4

Q.99 In an air transmission line, adjacent maxima are found at 12.5 cm and 37.5 cm. The operating frequency is

- Ans
- ☒ 1. 600 MHz
  - ☒ 2. 300 MHz
  - ☒ 3. 1.2 GHz
  - ☒ 4. 1.5 GHz

Question ID : 3084111193  
Chosen Option : 2

Q.10 The midband voltage gain of voltage series feedback amplifier is  $-1000$ , feedback factor is  $0.1$  and supply voltage is  $0.1$  V. Then the voltage at the input terminals of the amplifier is

- Ans
- ☒ 1.  $-0.99$  V
  - ☒ 2.  $0.0019$  V
  - ☒ 3.  $0.0999$  V
  - ☒ 4.  $-9.9$  V

Question ID : 3084111135  
Chosen Option : 3

Q.10 Given a germanium pnp transistor whose base width is  $5 \times 10^{-4}$  cm and diffusion constant  
1 for the minority carrier hole in the base region is  $47 \text{ cm}^2/\text{sec}$ . At room temperature for a dc emitter current of 2 mA, find the alpha cutoff frequency?

- Ans
- ☒ 1. 47 MHz
  - ☒ 2. 94 MHz
  - ☒ 3. 60 MHz
  - ☒ 4. 10 Hz

Question ID : 3084111133  
Chosen Option : 2

Q.10 In FM, the frequency deviation is fixed at 75 kHz and maximum audio frequency is 15 kHz,  
2 then the transmission bandwidth is

- Ans
- ☒ 1. 150 kHz
  - ☒ 2. 90 kHz
  - ☒ 3. 30 kHz
  - ☒ 4. 180 kHz

Question ID : 3084111173  
Chosen Option : 2

Q.10 The rate of change of injected charge with applied forward bias pn junction is  
3

- Ans
- ☒ 1. Dynamic resistance
  - ☒ 2. Barrier capacitance
  - ☒ 3. Storage capacitance
  - ☒ 4. Transition capacitance

Question ID : 3084111117  
Chosen Option : 2

Q.10 The modulo of 4-stage twisted ring counter is  
4

- Ans
- ☒ 1. Four
  - ☒ 2. Five
  - ☒ 3. Six
  - ☒ 4. Eight

Question ID : 3084111149  
Chosen Option : 1



Q.10 Find the final value of the signal corresponding to the following z-transform:

5

$$X(z) = \frac{1+z^{-1}}{1-0.25z^{-1}}$$

- Ans
- ☒ 1. 1
  - ☒ 2.  $\infty$
  - ☒ 3. 0
  - ☒ 4. 0.25

Question ID : 3084111115  
Chosen Option : 1

Q.10 If the probability  $p_k = 1$ , for some k and the remaining probabilities in the set are all zero then the entropy is

6

- Ans
- ☒ 1. Infinity
  - ☒ 2. One
  - ☒ 3.  $\log_2 k$
  - ☒ 4. Zero

Question ID : 3084111184  
Chosen Option : 4

Q.10 Which of the following occurs, when the step size is too large relative to the local slope characteristics of the input waveform?

7

- Ans
- ☒ 1. Envelope distortion
  - ☒ 2. Linear distortion
  - ☒ 3. Granular noise
  - ☒ 4. Slope overload distortion

Question ID : 3084111179  
Chosen Option : 4

Q.10 Which of the following characteristics of ideal op-amp are infinite?

8

- Ans
- ☒ 1. Input resistance, output resistance, open circuit voltage gain
  - ☒ 2. Input resistance, output resistance, open circuit voltage gain, band width
  - ☒ 3. Input resistance, open circuit voltage gain, band width
  - ☒ 4. Input resistance, output resistance, bandwidth

Question ID : 3084111136  
Chosen Option : 2

Q.10 Top loading is sometimes used with an antenna in order to increase its

- Ans
- ✓ 1. Effective height
  - ✗ 2. Input capacitance
  - ✗ 3. Beamwidth
  - ✗ 4. Bandwidth

Question ID : 3084111199  
Chosen Option : 4

Q.11 The RC phase shift oscillator with FET must have an open loop gain of at least

- Ans
- ✗ 1. 44.52
  - ✗ 2. 1
  - ✓ 3. 29
  - ✗ 4. 3

Question ID : 3084111138  
Chosen Option : 2

Q.11 If a power supply has poor regulation, it possesses a

- Ans
- ✗ 1. High internal impedance, it is avoided by using common emitter circuit
  - ✗ 2. Low internal impedance, it is avoided by using common emitter circuit
  - ✗ 3. Low internal impedance, it is avoided by using emitter follower circuit
  - ✓ 4. High internal impedance, it is avoided by using emitter follower circuit

Question ID : 3084111140  
Chosen Option : 3

Q.11 In the tunnel diode, the p-side of the junction is negative with respect to the n-side then it

- 2 behaves like
- Ans
- ✗ 1. A good inductor
  - ✓ 2. An excellent conductor
  - ✗ 3. A good capacitor
  - ✗ 4. A leaky inductor

Question ID : 3084111118  
Chosen Option : 3

Q.11 Match the following:

3

|   |                                                 |     |                                 |
|---|-------------------------------------------------|-----|---------------------------------|
| A | Emitter efficiency                              | I   | $\frac{I_C - I_{C_0}}{I_E}$     |
| B | Large signal current gain                       | II  | $\frac{I_{PC}}{I_{PE}}$         |
| C | Transport factor                                | III | $\frac{\Delta I_C}{\Delta I_E}$ |
| D | Small signal forward short circuit current gain | IV  | $\frac{I_{pE}}{I_E}$            |

- Ans
- ✗ 1. A-III, B-IV, C-II, D-I
  - ✗ 2. A-I, B-II, C-III, D-IV
  - ✗ 3. A-II, B-III, C-IV, D-I
  - ✓ 4. A-IV, B-I, C-II, D-III

Question ID : 3084111120

Chosen Option : 2

Q.11 A LTI discrete-time system is given by the difference equation  $y(n) - ay(n-1) = x(n)$ 

4

Where  $|a| < 1$ , if all the initial conditions are zero then the system is

- Ans
- ✗ 1. Undamped and oscillatory
  - ✗ 2. Critically stable
  - ✗ 3. Unstable
  - ✓ 4. Stable

Question ID : 3084111112

Chosen Option : 1

Q.11 A load is connected to a network. At the terminals to which the load is connected,

5

 $R_{Th} = 10\Omega$  and  $V_{Th} = 40V$ . The maximum power supplied to the load is

- Ans
- ✗ 1. 160 W
  - ✗ 2. 80 W
  - ✓ 3. 40 W
  - ✗ 4. 1 W

Question ID : 3084111095

Chosen Option : 1

Q.11 A transistor supplies 0.5 W to a 1 k $\Omega$  load. The zero signal dc collector current is 27 mA and  
 6 dc collector current with an applied sinusoidal signal is 30mA. Compute the second harmonic distortion of the circuit?

- Ans ☒ 1. 30 %  
☒ 2. 15 %  
☒ 3. 10 %  
☒ 4. 20 %

Question ID : 3084111139

Chosen Option : 1

Q.11 The transfer function of the overall system when connected in  
 7

- Ans ☒ 1. Parallel gives the product of the individual transfer functions  
☒ 2. Parallel gives the sum of the individual transfer functions  
☒ 3. Series gives the sum of the individual transfer functions  
☒ 4. Series gives the highest of the individual transfer functions

Question ID : 3084111114

Chosen Option : 2

Q.11 What is the major factor to determine whether a medium is free space, lossless dielectric,  
 8 lossy dielectric or good conductor?

- Ans ☒ 1. Loss tangent  
☒ 2. Constitutive parameters  
☒ 3. Attenuation constant  
☒ 4. Reflection coefficient

Question ID : 3084111192

Chosen Option : 3

Q.11 If  $R_1$  is the ROC of  $x_1(n)$  and  $R_2$  is the ROC of  $x_2(n)$ , then the ROC of  $x_1(n)$  convoluted  
 9  $x_2(n)$  is

- Ans ☒ 1.  $R_1 - R_2$   
☒ 2.  $R_1 \cup R_2$   
☒ 3.  $R_1 \cap R_2$   
☒ 4.  $R_1 + R_2$

Question ID : 3084111111

Chosen Option : 2

Q.12 For the intermediate stages, the common collector stages are not used because

Ans

- ✓ 1. Voltage gain of such a stage is less than unity
- ✗ 2. Input impedance of such a stage is infinity
- ✗ 3. Current gain of such a stage is less than unity
- ✗ 4. Output impedance of such a stage is infinity

Question ID : 3084111130  
Chosen Option : 1