

GATE-2015

Question Paper

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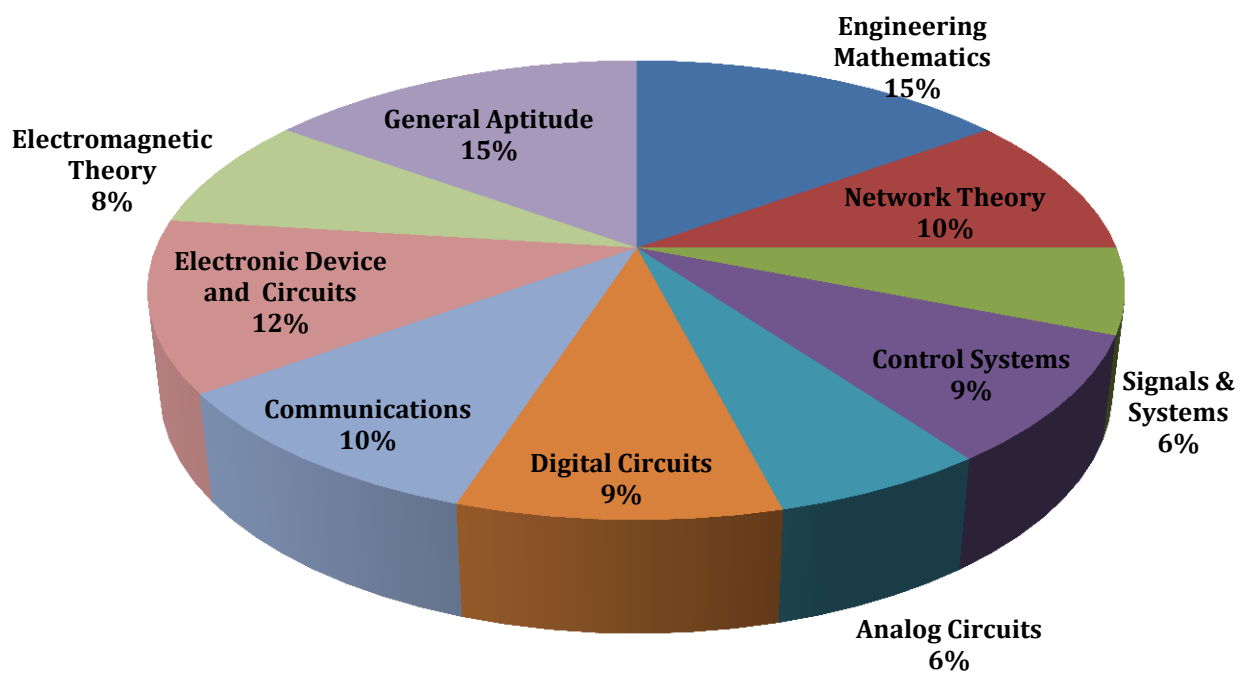
Answer Keys

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1. Question Paper Analysis
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ANALYSIS OF GATE 2015 SET-1

Electronics and Communication Engineering



GATE-2015-ECE-SET-1

SUBJECT	NO OF QUESTION	Topics Asked in Paper	Total Marks
Engineering Mathematics	1M:5 2M:5	Linear Algebra, Probability and Distribution Calculus, Differential Equation Complex Variable	15
Network Theory	1M:4 2M:3	Network Solution and methodology Transient /Study State Analysis of RLC Circuit to DC input , Sinusoidal study state Analysis	10
Signals & Systems	1M:2 2M:2	Introduction to S&S, Linear Time invariant (LTI)System, Z-Transform	6
Control Systems	1M:3 2M:3	Basic of Control System, Stability & Routh Hurwitz Criterion, Root Locus Technique Frequency Response Analysis Nyquist Plot Compensators & Controllers	9
Analog Circuits	1M:2 2M:2	Diode -Circuit -Analysis &Application Feedback Oscillator Circuit Operational Amplifier and Its Application	6
Digital Circuits	1M:3 2M:3	Boolean Algebra & K Map, Logic Gates AD/DA Convertor, Semiconductor memory	9
Communications	1M:2 2M:4	DSB-SC,SSB, and VSB, Modulation, Receiver, Digital Communication	10
Electronic Device and Circuits	1M:2 2M:5	Semiconductor theory, P-n Junction Theory R Characteristics, Transistor Theory (BIT, FE) FET(TEFT,MOSFET,)& CMOS	12
Electromagnetic Theory	1M:2 2M:3	Electronics & Magnetic Field Electromagnetic Waves, Guided Waves	8
General Aptitude	1M:5 2M:5	Numerical Ability Verbal Ability	15
Total	65		100

GATE 2015 Examination
Electronics and Communication Engineering

Test Date: 31/01/2015

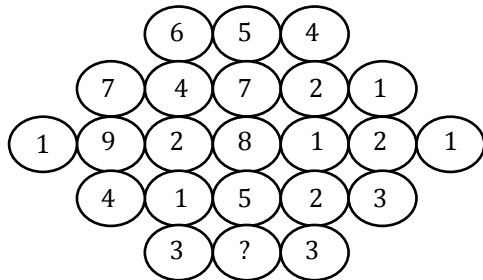
Test Time: 9:00 AM 12:00 PM

Subject Name: EC ELECTRONICS AND COMMUNICATION ENGINEERING

Section: General Aptitude

1. If $\log_x (5/7) = -1/3$, then the value of x is
(A) 343/125 (C) $-25/49$
(B) 125/343 (D) $-49/25$
[Ans. A]
2. Choose the appropriate word/phrase, out of the four options given below, to complete the following sentence :
Frogs _____
(A) croak (C) hiss
(B) roar (D) patter
[Ans. A]
3. Choose the word most similar meaning to the given word:
Educe
(A) Exert (C) Extract
(B) Educate (D) Extend
[Ans. C]
4. Operates \square, \diamond and \rightarrow are defined by:
 $a \square b = \frac{a-b}{a+b}$; $a \diamond b = \frac{a+b}{a-b}$; $a \rightarrow b = ab$
(A) -2 (C) 1
(B) -1 (D) 2
[Ans. C]
5. Choose the most appropriate word from the options given below to complete the following sentence.
The principal presented the chief guest with a _____, as token of appreciation.
(A) momento (C) momentum
(B) memento (D) moment
[Ans. B]

6. Fill in the missing value



[Ans. *]Range: 3 to 3

7. The following question presents a sentence, part of which is underlined. Beneath the sentence you find four ways of phrasing the underlined part. Following the requirements of the standard written English, select the answer that produces the most effective sentence.

Tuberculosis, together with its effects, ranks one of the leading causes of death in India.

- (A) ranks as one of the leading causes of death
 (B) rank as one of the leading causes of death
 (C) has the rank of one of the leading causes of death
 (D) are one of the leading causes of death

[Ans. A]

8. A cube side 3 units is formed using a set of smaller cubes of side 1 unit. Find the proportion of the number of faces of the smaller cubes visible to those which are NOT visible.

- (A) 1 : 4
 (B) 1 : 3
 (C) 1 : 2
 (D) 2 : 3

[Ans. C]

9. Humpty Dumpty sits on a wall every day while having lunch. The wall sometimes breaks. A person sitting on the wall falls if the wall breaks.

Which one of the statements below is logically valid and can be inferred from the above sentences?

- (A) Humpty Dumpty always falls while having lunch
 (B) Humpty Dumpty does not fall sometimes while having lunch
 (C) Humpty Dumpty never falls during dinner
 (D) When Humpty Dumpty does not sit on the wall, the wall does not break

[Ans. B]

10. Read the following paragraph and choose the correct statement.

Climate change has reduced human security and threatened human well being. An ignored reality of human progress is that human security largely depends upon environmental security. But on the contrary, human progress seems contradictory to environmental security. To keep up both at the required level is a challenge to be addressed by one and all. One of the ways to curb the climate change may be suitable scientific innovations,

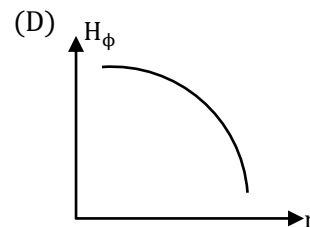
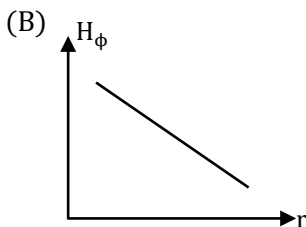
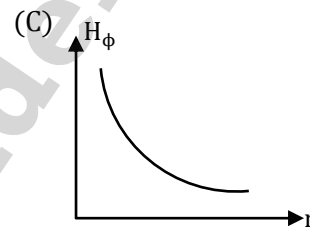
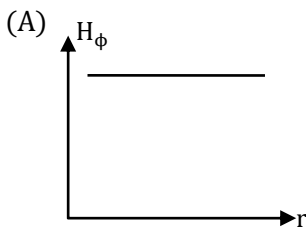
while the other may be the Gandhian perspective on small scale progress with focus on sustainability.

- (A) Human progress and security are positively associated with environmental security.
- (B) Human progress is contradictory to environmental security.
- (C) Human security is contradictory to environmental security.
- (D) Human progress depends upon environmental security.

[Ans. B]

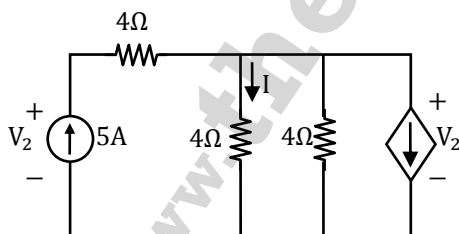
Section: Electronics and Communication Engineering

1. Consider a straight, infinitely long, current carrying conductor lying on the z-axis. Which one of the following plots (in linear scale) qualitatively represents the dependence of H_ϕ on r , where H_ϕ is the magnitude of the azimuthal component of magnetic field outside the conductor and r is the radial distance from the conductor?



[Ans. C]

2. In the given circuit, the values of V_1 and V_2 respectively are

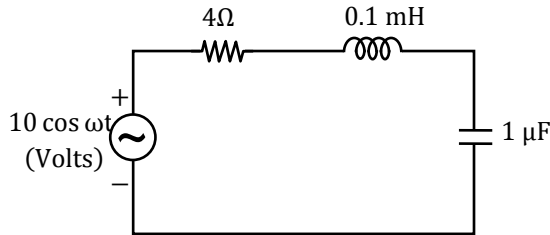


- (A) 5 V, 25 V
- (B) 10 V, 30 V

- (C) 15 V, 35 V
- (D) 0 V, 20 V

[Ans. A]

3. In the circuit shown, at resonance, the amplitude of the sinusoidal voltage (in Volts) across the capacitor is _____.



[Ans. *] Range: 25 to 25

4. Suppose A and B are two independent events with probabilities $P(A) \neq 0$ and $P(B) \neq 0$. Let \bar{A} and \bar{B} be their complements. Which one of the following statements is FALSE?

(A) $P(A \cap B) = P(A) P(B)$

(C) $P(A \cup B) = P(A) + P(B)$

(B) $P(A/B) = P(A)$

(D) $P(\bar{A} \cap \bar{B}) = P(\bar{A})P(\bar{B})$

[Ans. C]

5. Consider a four bit D to A converter. The analog value corresponding to a digital signals of values 0000 and 0001 are 0 V and 0.0625 V respectively. The analog value (in Volts) corresponding to the digital signal 1111 is _____.

[Ans. *] Range: 0.91 to 0.93

6. Let $z = x + iy$ be a complex variable. Consider that contour integration is performed along the unit circle in anticlockwise direction. Which one of the following statements is NOT TRUE?

(A) The residue of $\frac{z}{z^2 - 1}$ at $z = 1$ is $\frac{1}{2}$

(B) $\oint_c z^2 dz = 0$

(C) $\frac{1}{2\pi i} \oint_c \frac{1}{z} dz = 1$

(D) \bar{z} (complex conjugate of z) is analytical function

[Ans. D]

7. Consider the signal $s(t) = m(t)\cos(2\pi f_c t) + \hat{m}(t)\sin(2\pi f_c t)$ where $\hat{m}(t)$ denotes the Hilbert transform of $m(t)$ and the bandwidth of $m(t)$ is very small compared to f_c . The signal $s(t)$ is a

(A) high-pass signal

(B) low-pass signal

(C) band-pass signal

(D) double sideband suppressed carrier signal

[Ans. C]

8. A region of negative differential resistance is observed in the current voltage characteristics of a silicon PN junction if
- (A) both the P-region and the N-region are heavily doped
 - (B) the N-region is heavily doped compared to the P-region
 - (C) the P-region is heavily doped compared to the N-region
 - (D) an intrinsic silicon region is inserted between the P-region and the N-region

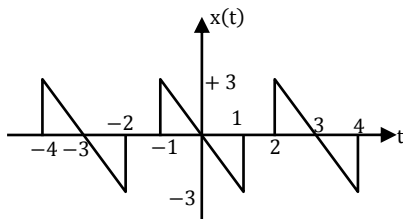
[Ans. A]

9. A sinusoidal signal of 2 kHz frequency is applied to a delta modulator. The sampling rate and step-size Δ of the delta modulator are 20,000 samples per second and 0.1 V, respectively. To prevent slope overload, the maximum amplitude of the sinusoidal signal (in Volts) is

- (A) $1/2\pi$
- (B) $1/\pi$
- (C) $2/\pi$
- (D) π

[Ans. A]

10. The waveform of aperiodic signal $x(t)$ is shown in the figure.



A signal $g(t)$ is defined by $g(t) = x\left(\frac{t-1}{2}\right)$. The average power of $g(t)$ is _____.

[Ans. *]Range: 1.5 to 1.5

11. The result of the convolution $x(-t) * \delta(-t - t_0)$ is
- (A) $x(t + t_0)$
 - (B) $x(t - t_0)$
 - (C) $x(-t + t_0)$
 - (D) $x(-t - t_0)$

[Ans. D]

12. A function $f(x) = 1 - x^2 + x^3$ is defined in the closed interval $[-1, 1]$. The value of x , in the open interval $(-1, 1)$ for which the mean value theorem is satisfied, is

- (A) $-1/2$
- (B) $-1/3$
- (C) $1/3$
- (D) $1/2$

[Ans. B]

13. In an 8085 microprocessor, the shift registers which store the result of an addition and the overflow bit are, respectively

- (A) B and F
- (B) A and F
- (C) H and F
- (D) A and C

[Ans. B]

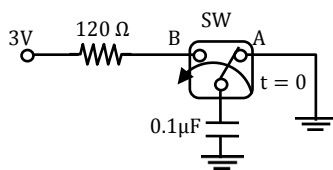
14. The electric field component of a plane wave travelling in a lossless dielectric medium is given by $\vec{E}(z, t) = \hat{a}_y 2 \cos\left(10^8 t - \frac{z}{\sqrt{2}}\right)$ V/m. The wavelength (in m) for the wave is _____.

[Ans. *]Range: 8.88 to 8.89

15. A unity negative feedback system has the open-loop transfer function $G(s) = \frac{K}{s(s+1)(s+3)}$. The value of the gain $K (>0)$ at which the root locus crosses the imaginary axis is _____.

[Ans. *]Range: 12 to 12

16. In the circuit shown, the switch SW is thrown from position A to position B at time $t = 0$. The energy (in μ J) taken from the 3 V source to charge the $0.1 \mu\text{F}$ capacitor from 0 V to 3 V is _____



- (A) 0.3 (C) 0.9
(B) 0.45 (D) 3

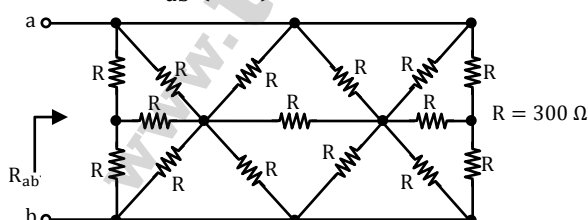
[Ans. C]

17. Negative feedback in a closed-loop control system DOES NOT

- (A) reduce the overall gain
(B) reduce bandwidth
(C) improve disturbance rejection
(D) reduce sensitivity to parameter variation

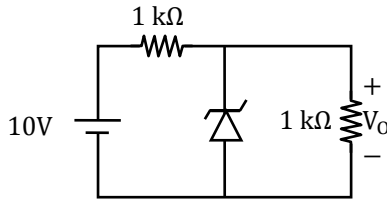
[Ans. B]

18. In the network shown in the figure, all resistors are identical with $R = 300 \Omega$. The resistance R_{ab} (in Ω) of the network is _____.



[Ans. *]Range: 100 to 100

19. In the circuit shown below, the Zener diode is ideal and the Zener voltage is 6 V. The output voltage V_0 (in volts) is _____.



[Ans. *]Range: 5 to 5

20. A 16 Kb (=16,384 bit) memory array is designed as a square with an aspect ratio of one (number of rows is equal to the number of columns). The minimum number of address lines needed for the row decoder is _____.

[Ans. *]Range: 7 to 7

21. Consider a system of linear equations :

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

$$x - 3y + 4z = 1, \text{ and } -2x + 4y - 6z = k$$

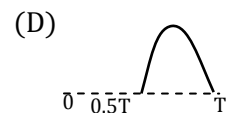
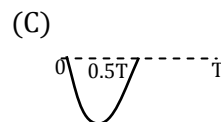
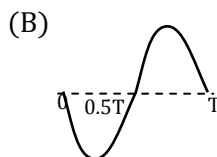
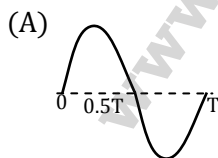
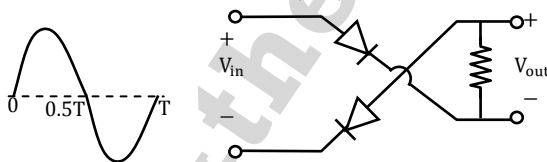
The value of k for which the system has infinitely many solution is _____.

[Ans. *]Range: 2 to 2

22. A silicon sample is uniformly doped with donor type impurities with a concentration of $10^{16}/\text{cm}^3$. The electron and hole mobilities in the sample are $1200 \text{ cm}^2/\text{V-s}$ and $400 \text{ cm}^2/\text{V-s}$ respectively. Assume complete ionization of impurities. The charge of an electron is $1.6 \times 10^{-19} \text{ C}$. The resistivity of the sample (in $\Omega\text{-cm}$) is_____.

[Ans. *]Range: 0.52 to 0.520

23. For the circuit with ideal diodes shown in the figure, the shape of the output (V_{out}) for the given sine wave input (V_{in}) will be



[Ans. C]

24. The polar plot of the transfer function $G(s) = \frac{10(s+1)}{s+10}$ for $\omega \leq \infty$ will be in the

(A) first quadrant

(C) third quadrant

(B) second quadrant

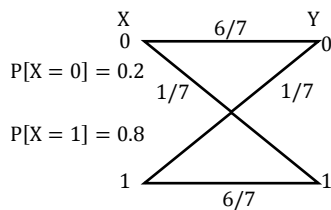
(D) fourth quadrant

[Ans. A]

25. The value of p such that the vector $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ is an eigenvector of the matrix $\begin{bmatrix} 4 & 1 & 2 \\ p & 2 & 1 \\ 14 & -4 & 10 \end{bmatrix}$ is ____

[Ans. *] Range: 17 to 17

26. The input X to Binary Symmetric Channel (BSC) shown in the figure is '1' with probability 0.8. The cross-over probability is $1/7$. If the received bit $Y = 0$, the conditional probability that '1' was transmitted is _____.

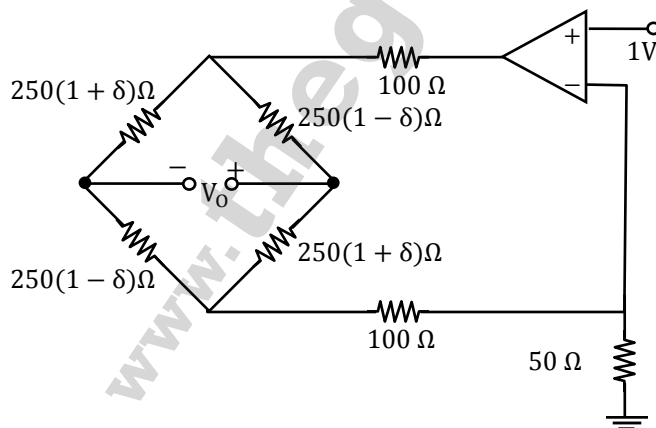


[Ans. *] Range: 0.4 to 0.4

27. For a silicon diode with long P and N regions, the acceptor and donor impurity concentrations are $1 \times 10^{17} \text{ cm}^{-3}$ and $1 \times 10^{15} \text{ cm}^{-3}$, respectively. The lifetimes of electrons in P region and holes in N region are both $100 \mu\text{s}$. The electron and hole diffusion coefficients are $49 \text{ cm}^2/\text{s}$ and $36 \text{ cm}^2/\text{s}$, respectively. Assume $kT/q = 26 \text{ mV}$, the intrinsic carrier concentration is $1 \times 10^{10} \text{ cm}^{-3}$, and $q = 1.6 \times 10^{-19} \text{ C}$. When a forward voltage of 208 mV is applied across the diode, the hole current density (in nA/cm^2) injected from P region to N region is _____.

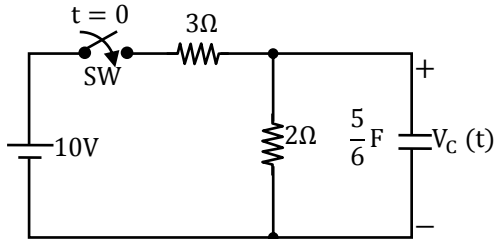
[Ans. *] Range: 96 to 9

28. In the circuit shown, assume that the op-amp is ideal. The bridge output voltage V_0 (in mV) for $\delta = 0.05$ is _____.



[Ans. *] Range: 250 to 250

29. In the circuit shown, switch SW is closed at $t = 0$. Assuming zero initial conditions, the value of $V_C(t)$ (in Volts) at $t = 1$ sec is _____.



[Ans. *]Range: 2.528 to 2.528

30. A vector \vec{P} is given by $\vec{P} = x^3y\vec{a}_x - x^2y^2\vec{a}_y - x^2yz\vec{a}_z$. Which of the following statements is TRUE?
- (A) \vec{P} is solenoidal, but not irrotational
 (B) \vec{P} is irrotational, but not solenoidal
 (C) \vec{P} is neither solenoidal nor irrotational
 (D) \vec{P} is both solenoidal and irrotational

[Ans. A]

31. Two sequences $[a, b, c]$ and $[A, B, C]$ are related as,

$$\begin{bmatrix} A \\ B \\ C \end{bmatrix} = \begin{bmatrix} 1 & 1 & 1 \\ 1 & W_3^{-1} & W_3^{-2} \\ 1 & W_3^{-2} & W_3^{-4} \end{bmatrix} \begin{bmatrix} a \\ b \\ c \end{bmatrix} \text{ where } W_3 = e^{j\frac{2\pi}{3}}$$

If another sequence $[p, q, r]$ is derived as,

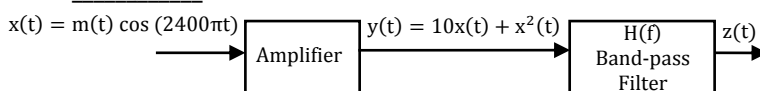
$$\begin{bmatrix} p \\ q \\ r \end{bmatrix} = \begin{bmatrix} 1 & 1 & 1 \\ 1 & W_3^1 & W_3^2 \\ 1 & W_3^2 & W_3^4 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ 0 & W_3^2 & 0 \\ 0 & 0 & W_3^4 \end{bmatrix} \begin{bmatrix} A/3 \\ A/3 \\ C/3 \end{bmatrix}$$

then the relationship between the sequences $[p, q, r]$ and $[a, b, c]$ is

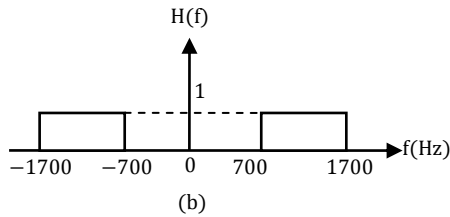
- (A) $[p, q, r] = [b, a, c]$ (C) $[p, q, r] = [c, a, b]$
 (B) $[p, q, r] = [b, c, a]$ (D) $[p, q, r] = [c, b, a]$

[Ans. C]

32. In the system shown in Figure (a), $m(t)$ is a low-pass signal with bandwidth W Hz. The frequency response of the band-pass filter $H(f)$ is shown in Figure (b). If it is desired that the output signal $z(t) = 10x(t)$, the maximum value of W (in Hz) should be strictly less than _____.

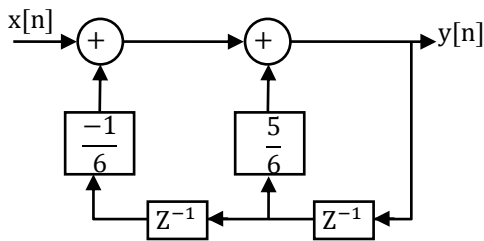


(a)



[Ans. *]Range: 350 to 350

33. For the discrete-time system shown in the figure, the poles of the system transfer function are located at



- (A) 2, 3 (C) 1/2, 1/3
(B) 1/2, 3 (D) 2, 1/3

[Ans. C]

34. The transmitted signal in a GSM system is of 200 kHz bandwidth and 8 users share a common bandwidth using TDMA. If at a given time 12 users are talking in a cell, the total bandwidth of the signal received by the base station of the cell will be at least (in kHz) _____.

[Ans. *]Range: 16.66 to 16.66

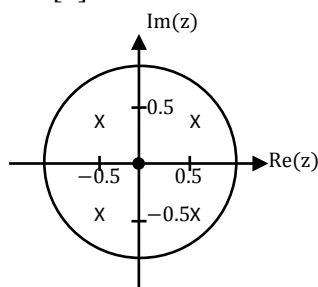
35. The electric field intensity of a plane wave traveling in free space is given by the following expression

$$E(x, t) = a_y 24\pi \cos(\omega t - k_0 x) \text{ (V/m)}$$

In this field, consider a square area 10 cm × 10 cm on a plane $x + y = 1$. The total time-averaged power (in mW) passing through the square area is _____.

[Ans. *]Range: 53.29 to 53.29

36. The pole-zero diagram of a causal and stable discrete-time system is shown in the figure. The zero at the origin has multiplicity 4. The impulse response of the system is $h[n]$. If $h[0] = 1$, we can conclude



- (A) $h[n]$ is real for all n
- (B) $h[n]$ is purely imaginary for all n
- (C) $h[n]$ is real for only even n
- (D) $h[n]$ is purely imaginary for only odd n

[Ans. C]

37. The built-in potential of an abrupt p-n junction is 0.75 V. If its junction capacitance (C_j) at a reverse bias (V_R) of 1.25 V is 5 pF, the value of C_j (in pF) when $V_R = 7.25$ V is _____.

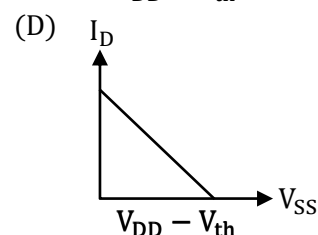
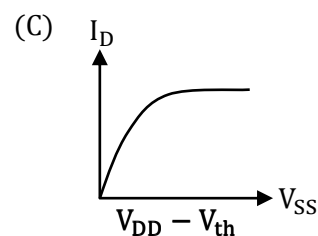
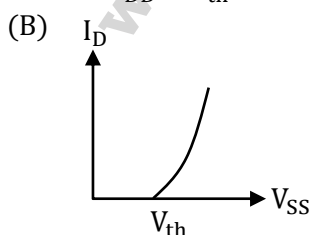
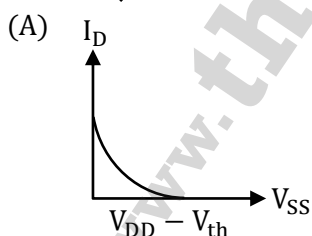
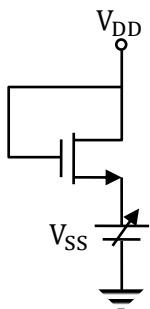
[Ans. *]Range: 2.5 to 2.5

38. The Boolean expression $F(X, Y, Z) = \bar{X}YZ + X\bar{Y}\bar{Z} + XY\bar{Z} + XYZ$ converted into canonical product of sum (POS) form is

- (A) $(X + Y + Z)(X + Y + \bar{Z})(X + \bar{Y} + \bar{Z})(\bar{X} + Y + \bar{Z})$
- (B) $(X + \bar{Y} + Z)(\bar{X} + Y + \bar{Z})(\bar{X} + \bar{Y} + Z)(\bar{X} + \bar{Y} + \bar{Z})$
- (C) $(X + Y + Z)(\bar{X} + Y + \bar{Z})(X + \bar{Y} + Z)(\bar{X} + \bar{Y} + \bar{Z})$
- (D) $(X + \bar{Y} + \bar{Z})(\bar{X} + Y + Z)(\bar{X} + \bar{Y} + Z)(X + Y + Z)$

[Ans. A]

39. For the NMOSFET in the circuit shown, the threshold voltage is V_{th} , where $V_{th} > 0$. The source voltage V_{SS} is varied from 0 to V_{DD} . Neglecting the channel length modulation, the drain current I_D as a function of V_{SS} is represented by



[Ans. A]

40. The maximum area (in square unit) of a rectangle whose vertices lies on the ellipse $x^2 + 4y^2 = 1$ is _____

[Ans. *]Range: 1 to 1

41. The longitudinal component of the magnetic field inside an air-filled rectangular waveguide made of a perfect electric conductor is given by the following expression

$$H_z(x, y, z, t) = 0.1 \cos(25\pi x) \cos(30.3\pi y) \cos(12\pi \times 10^9 t - \beta z) \text{ (A/m)}$$

(A) TM_{12}

(C) TE_{21}

(B) TM_{21}

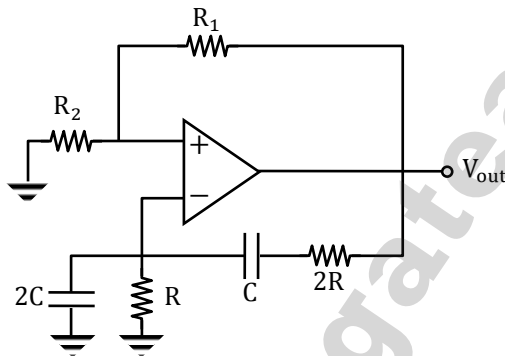
(D) TE_{12}

[Ans. C]

42. A lead compensator network includes a parallel combination of R and C in the feed-forward path. If the transfer function of the compensator is $G_c(S) = \frac{s+2}{s+4}$, the value of RC is _____

[Ans. *]Range: 0.5 to 0.5

43. The circuit shown in the figure has an ideal op-amp. The oscillation frequency and the condition to sustain the oscillations, respectively, are



(A) $\frac{1}{CR}$ and $R_1 = R_2$

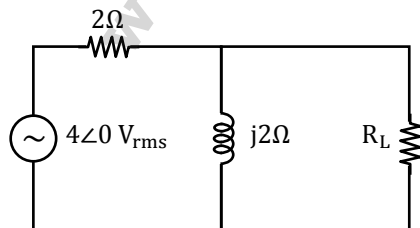
(C) $\frac{1}{2CR}$ and $R_1 = R_2$

(B) $\frac{1}{CR}$ and $R_1 = 4R_2$

(D) $\frac{1}{2CR}$ and $R_1 = 4R_2$

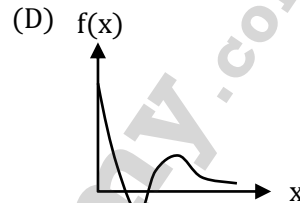
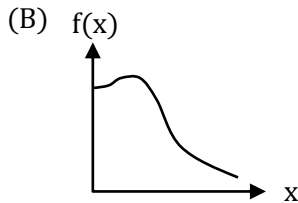
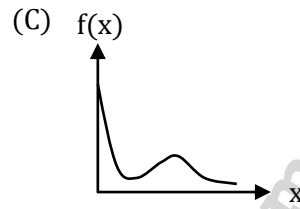
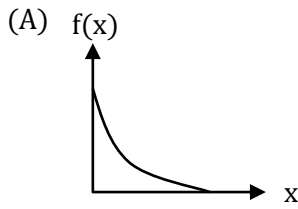
[Ans. D]

44. In the given circuit, the maximum power (in Watts) that can be transferred to the load R_L is _____



[Ans. *]Range: 1.5 to 1.7

45. Which of the following wave forms represent given function $f(x) = e^{-x}(x^2 + x + 1)$



[Ans. B]

46. The damping ratio of a series RLC circuit can be expressed as

(A) $\frac{R^2 C}{2L}$

(C) $\frac{R}{2} \sqrt{\frac{C}{L}}$

(B) $\frac{2L}{R^2 C}$

(D) $\frac{2}{R} \sqrt{\frac{L}{C}}$

[Ans. C]

47. A 3-input majority gate is defined by the logic function $M(a, b, c) = ab + bc + ca$. Which one of the following gate is represented by the function $M(\overline{M(a, b, c)}, M(a, b, c, c))$?

(A) 3-input NAND gate

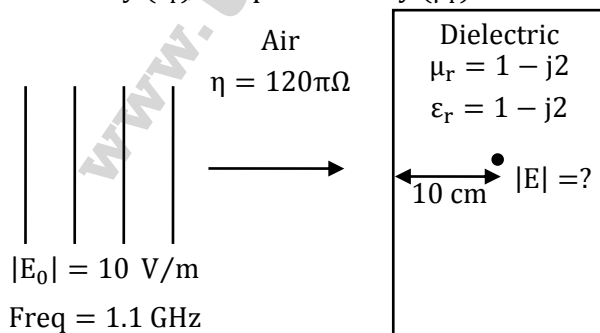
(C) 3-input NOR gate

(B) 3-input XOR gate

(D) 3-input XNOR gate

[Ans. B]

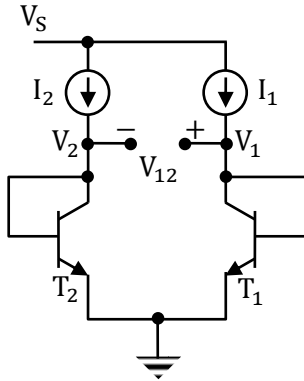
48. Consider a uniform plane wave with amplitude (E_0) of 10 V/m and 1.1 GHz frequency travelling in air, and incident normally on a dielectric medium with complex relative permittivity (ϵ_r) and permeability (μ_r) as shown in the figure.



The magnitude of the transmitted electric field component (in V/m) after it has travelled a distance of 10 cm inside the dielectric region is _____.

[Ans. *]Range: 0.1 to 0.1

49. In the circuit shown, $I_1 = 80 \text{ mA}$ and $I_2 = 4 \text{ mA}$. Transistors T_1 and T_2 are identical. Assume that the thermal voltage V_T is 26 mV at 27°C . At 50°C , the value of voltage $V_{12} = V_1 - V_2$ (in mV) is _____



[Ans. *]Range: 83.15 to 83.15

50. A source emits bit 0 with probability $\frac{1}{3}$ and bit with probability $\frac{2}{3}$. The emitted bits are communicated to the receiver. The receiver decides for either 0 or 1 based on the received value R . It is given that the conditional density functions of R are as

$$f_{R|0}(r) = \begin{cases} \frac{1}{4} & -3 \leq x \leq 1 \\ 0, & \text{otherwise} \end{cases} \text{ and } f_{R|1}(r) = \begin{cases} \frac{1}{6}, & -1 \leq x \leq 5 \\ 0 & \text{otherwise} \end{cases}$$

The minimum decision error probability is

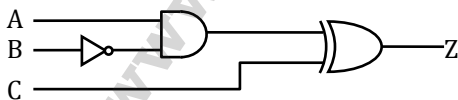
- (A) 0 (C) 1/9
(B) 1/12 (D) 1/6

[Ans. *]

51. A MOSFET in saturation has a drain current of 1 mA for $V_{DS} = 0.5 \text{ V}$. If the channel length modulation coefficient is 0.05 V^{-1} , the output resistance (in $\text{k}\Omega$) of the MOSFET is _____

[Ans. *]Range: 20 to 20

52. All the logic gates shown in the figure have a propagation delay of 20 ns . Let $A = C = 0$ and $B = 1$ until time $t = 0$. At $t = 0$, all the inputs flip (i.e. $A = C = 1$ and $B = 0$) and remain in that state. For $t > 0$, output $Z = 1$ for a duration (in ns) of



[Ans. *]Range: 20 to 20

53. The solution of the differential equation $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + y = 0$ with $y(0) = y'(0) = 1$ is

- (A) $(2 - t)e^t$ (C) $(2 + t)e^{-t}$
(B) $(1 + 2t)e^{-t}$ (D) $(1 - 2t)e^t$

[Ans. B]

54. The open-loop transfer function of a unity feedback configuration is given as $G(s) = \frac{K(s+4)}{(s+8)(s^2-9)}$. The value of a gain $K(>0)$ for which $-1+ j2$ lies on the root locus is _____.

[Ans. *]Range: 25.54 to 25.55

55. A plant transfer function is given as $G(s) = \left(K_P + \frac{K_I}{s}\right) \frac{1}{s(s+2)}$. When the plant operates in a unity feedback configuration, the condition for the stability of the closed loop system is

(A) $K_P > \frac{K_I}{2} > 0$

(C) $2K_I < K_P$

(B) $2K_I > K_P > 0$

(D) $2K_I > K_P$

[Ans. A]