ELECTRONIC COMMUNICATIONS ENGINEERING

Memory Based Questions

1. $\frac{dy}{dx} = (y-1)x$, which of the following are two possible solutions.

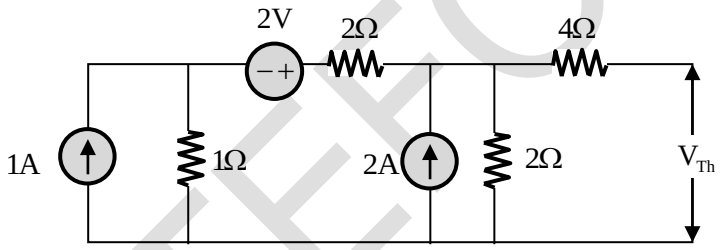
(A) $\ell n|y-1| = 2x^2 + c,\ y = 1$ (B) $\ell n|y-1| = 2x^2 + c,\ y = -1$

(C) $\ell n|y-1| = 0.5x^2 + c,\ y = 1$ (D) $\ell n|y-1| = 0.5x^2 + c,\ y = -1$

2. $f(x_1 + x_2) = f(x_1) + f(x_2)$, if $x > 1$, then which of the following is correct?

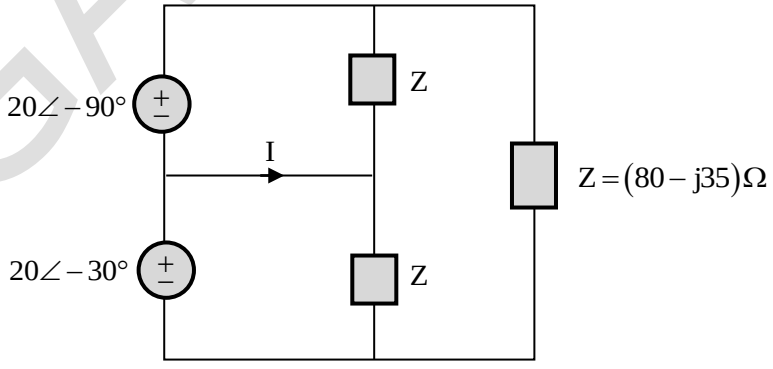
(A) e^x (B) e^{-x} (C) $\sqrt{x}$ (D) $\frac{1}{x}$

3. Determine V_{Th} to the following circuit



(A) 2.8 (B) 3.6 (C) 5 (D) 2.1

4.

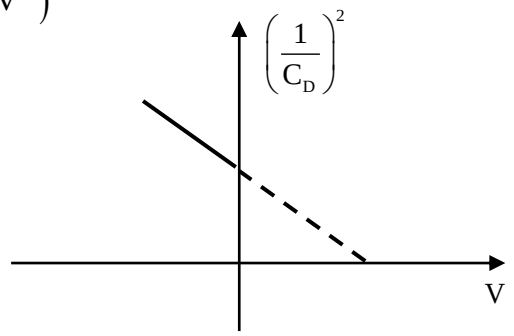


(A) 1A (B) 2A (C) 3A (D) 0A

5. Given effective energy densities of holes is twice that of electrons, what is the value of $E_{Fi} - E_{midgap}$?$(V_T = 26\,mV)$

(A) 9 MeV (B) 18.02 MeV (C) 7.02 MeV (D) 16.02 MeV

6. The depletion capacitance C_D is 50 pF at reverse bias 0.2V. The slope of given curve is _____ $\times 10^{20}\left(F^{-2}V^{-1}\right)$



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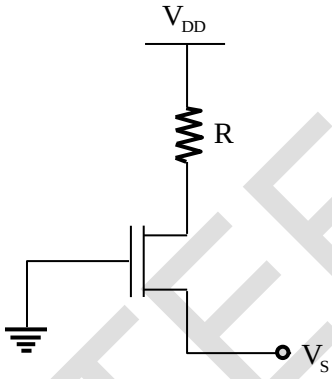


What is the Norton equivalent resistance at source terminal?

(A) $\frac{r_{ds} + R}{1 + g_m r_{ds}}$ (B) $r_{ds} + R$

(C) $\frac{1}{g_m} + r_{ds} + R$ (D) $\frac{r_{ds}}{1 + g_m r_{ds}}$

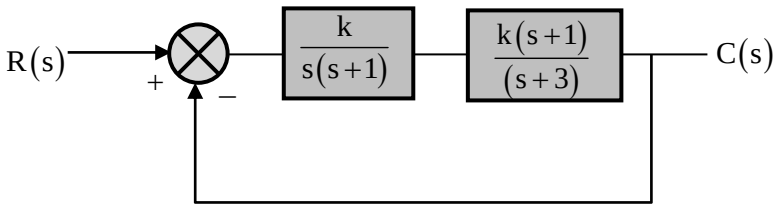
8. Given characteristic equation $s^3 + 3s^2 + s(k+2) + 3k = 0$,which of the following is root break away (or) break in point intersection ?

(A) $(-\infty - 2)$ (B) $(-3, -2)$

(C) $(-1, -2)$ (D) $(-1, 0)$

9. Given $G(s)=\dfrac{k(s+11)}{s(s+2)(s+8)}$, for what value of k such that, the closed loop system is marginal stable?

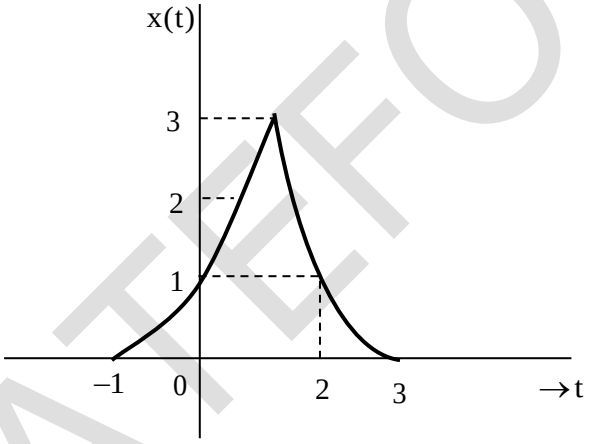
10.



Unit ramp steady state error is 0.1, then the value of k is _____.

11. If the Random variable 'X' have uniformly distributed range [-2, 10], then Y=2X-6, what is the value of $P(Y \le 7 \mid X \ge 5)$.

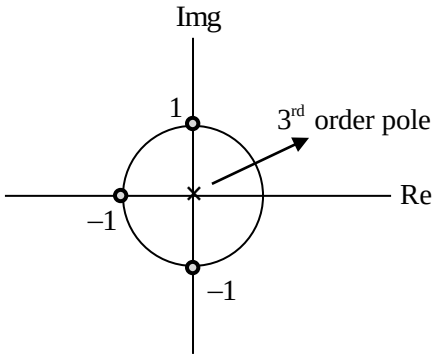
12. Given



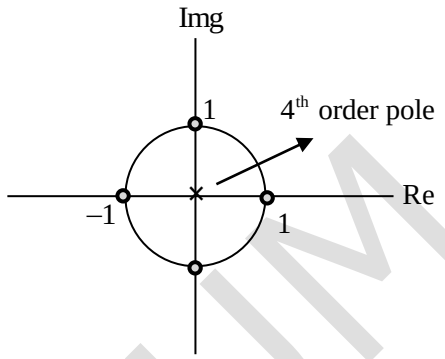
What is the value of $\int_{-\infty}^{\infty} |X(\omega)|^2 \, d\omega$

13. Given difference equation of input-output relation is $y(n)=\sum_{k=0}^{3}(-1)^k x(n-k)$ which of the following is correct representation of transfer function?

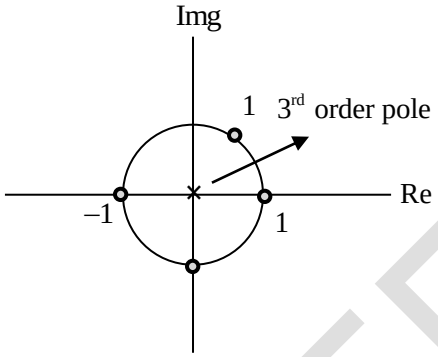
(A)



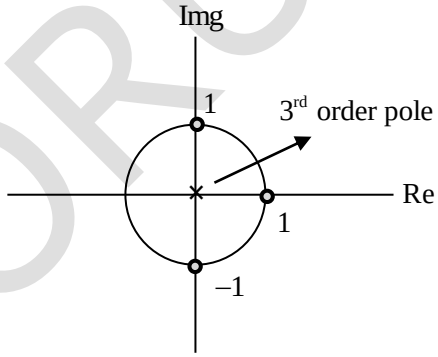
(B)



(C)



(D)



14. $x(t)=\cos(200\pi t)$ is sampled at $t=\frac{x}{400}$. Given $X(k)=\sum_{k=0}^{7}x(n)e^{\frac{-j\pi kn}{4}}$

Which of the following is correct?

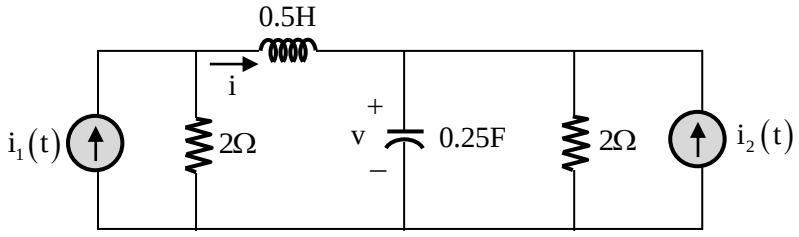
(A) X(3) and X(5) are non-zero

(B) X(4) are non-zero

(C) X(2) and X(6) are non-zero

(D) All X(k) values are non-zero

15.



Which of the following state transition matrix is correct?

(A) $\frac{d}{dt}\begin{bmatrix} v(t) \\ i(t) \end{bmatrix} = \begin{bmatrix} -4 & -4 \\ -2 & 4 \end{bmatrix}\begin{bmatrix} v \\ i \end{bmatrix} + \begin{bmatrix} 4 & 0 \\ -4 & -4 \end{bmatrix}\begin{matrix} i_1 \\ i_2 \end{matrix}$

(B) $\frac{d}{dt}\begin{bmatrix} v(t) \\ i(t) \end{bmatrix} = \begin{bmatrix} -2 & -4 \\ -4 & 4 \end{bmatrix}\begin{bmatrix} v \\ i \end{bmatrix} + \begin{bmatrix} 0 & 4 \\ 4 & 0 \end{bmatrix}\begin{bmatrix} i_1 \\ i_2 \end{bmatrix}$

(C) $\frac{d}{dt}\begin{bmatrix} v(t) \\ i(t) \end{bmatrix} = \begin{bmatrix} -2 & 4 \\ -4 & -4 \end{bmatrix}\begin{bmatrix} v \\ i \end{bmatrix} + \begin{bmatrix} 0 & 4 \\ -4 & 4 \end{bmatrix}\begin{bmatrix} i_1 \\ i_2 \end{bmatrix}$

(D) $\frac{d}{dt}\begin{bmatrix} v(t) \\ i(t) \end{bmatrix} = \begin{bmatrix} 2 & -4 \\ -4 & -4 \end{bmatrix}\begin{bmatrix} v \\ i \end{bmatrix} + \begin{bmatrix} 4 & 4 \\ 4 & 4 \end{bmatrix}\begin{bmatrix} i_1 \\ i_2 \end{bmatrix}$

16. Which following is FALSE of vector field 'A'?

(A) $\nabla \times A = 0$ is A is any field

(B) If A is irrotational, then $\nabla^2.A = 0$

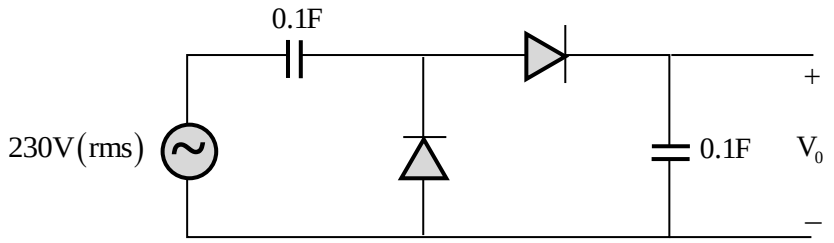
(C) $\nabla \times (\nabla \times A) = \nabla(\nabla.A) - \nabla^2 A$

(D) If A is solenoidal, then $\nabla.A = 0$

17. $E = (a_x + 2a_y + ba_z)\cos(\omega t + 3x - y - z)$. The value of b is_____.

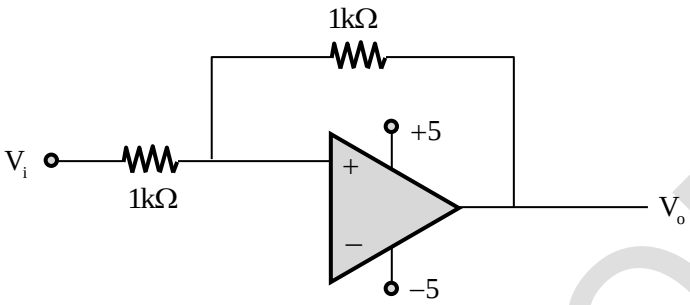
18. The transmission line length $\frac{3\lambda}{4}$, have characteristic impedance 50Ω and load terminated $Z_L = 400\Omega$ What is input impedance which is seen from input end ? _____(Ω)

19. The circuit shown below.

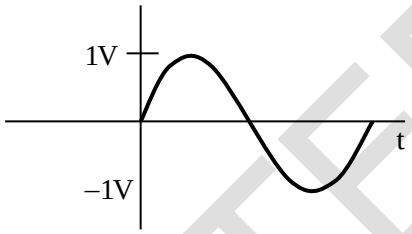


What is value of V_o (volts).

20.



V_i sin usodial voltage



Which of the following is correct?

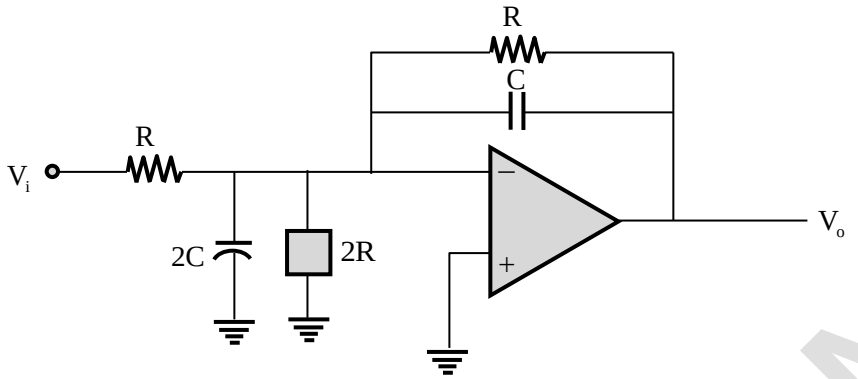
(A) Inverted sinusoidal voltage with ±1V

(B) Constant source voltage

(C) Square wave with ±5V .

(D) Non-inverted sinusoidal with ±1V.

21. Given $R = 2k\Omega$ $C = 1\mu F$. The op-amp circuit is shown below, find the 3-dB cut-off frequency



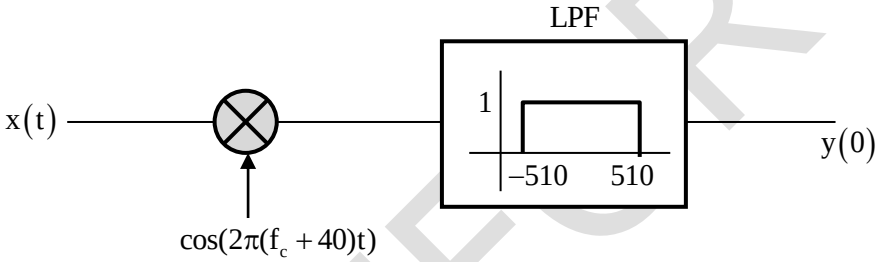
(A) 159.15 Hz

(B) 79.57 Hz

(C) 68.02 Hz

(D) 325.06 Hz

22.



Where $x(t) = m(t)\cos(2\pi f_c t)$

$m(t) = 2\cos(1000\pi t)$, given $f_c = 1M$ Hz

(A) $\cos(920\pi t)$

(B) $\cos(510\pi t)$

(C) $\cos(940\pi t)$

(D) None of these

Disclaimer: Based on student test experiences in the stream of EC, we have analyzed the questions which will help you understand the pattern and will give you an edge in your upcoming exam