

Super Talent Batches



MADE EASY

India's Best Institute for IES, GATE & PSUs

announcing

Electronics Engineering

Super Talent Batches

at Delhi Centre

1 **st Batch** : Commencing from **Mid May**
Morning Batch

2 **nd Batch** : Commencing from **Mid June**
Evening Batch

Eligibility (Any of the following)

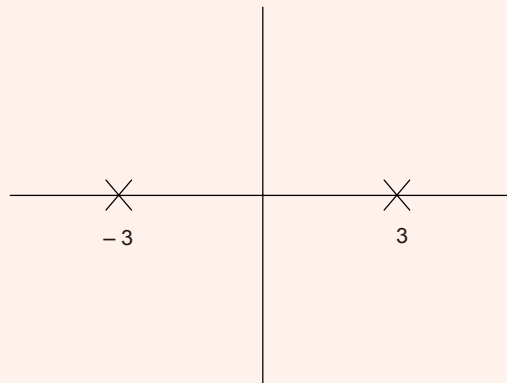
- Top 2000 Rank in GATE
- B.Tech from IIT
- B.Tech from Private Engineering college with 70% marks
- Appeared in IES or 3 PSUs Interview
- B.Tech from NIT with 65% marks

Benefits

- Better Teaching Environment
- Extra teaching hours
- In-depth coverage of subjects

Solution: (b)

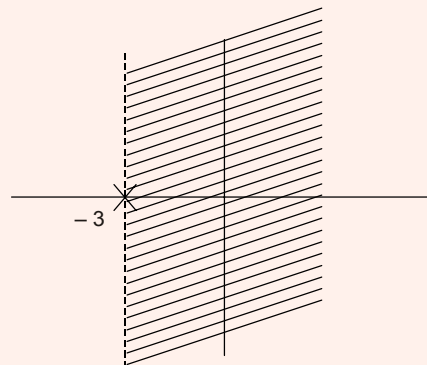
$$H(S) = \frac{1}{(S-2)(S+3)}$$



If $H_1(S) = (S-2)$

then $H(S)H_1(S) = \frac{1}{(S+3)}$

then



⇒ Casual

Q.4 If sequence of 12 consecutive odd number are given, sum of first 5 number is 485. What is the sum of last 5 consecutive numbers.

Solution: (555)

$$n + (n + 2) + (n + 4) + (n + 6) + (n + 8) = 485$$

$$5n + 20 = 485$$

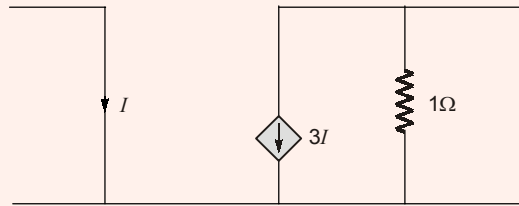
$$n = \frac{465}{5} = 93$$

$$(n + 14) + (n + 16) + (n + 18) + (n + 20) + (n + 22) = ?$$

$$= 5n + 90$$

$$= 5(93) + 90 = 90 + 450 + 15 = 555$$

Q.5 To find: Which circuit is this ?



- (a) Voltage control, voltage source (b) Voltage control, current source
(c) Current control, current source (d) Current control, voltage source

Solution: (c)

Q.6 If the unilateral L.T. of signal $f(t)$ is given as $\frac{1}{S^2 + S + 1}$ then the Laplace transform of signal $t.f(t)$ will be ____

- (a) $\frac{1}{(S^2 + S + 1)^2}$ (b) $\frac{1}{S^2 + S + 1}$
(c) $\frac{-2S + 1}{S^2 + S + 1}$ (d) $\frac{2S + 1}{(S^2 + S + 1)^2}$

Solution: (d)

$$f(t) \leftrightarrow \frac{1}{(S^2 + S + 1)}$$

$$f(t) \leftrightarrow -\frac{d}{dS} \left[\frac{1}{(S^2 + S + 1)} \right]$$

$$= +\frac{1(2S + 1)}{(S^2 + S + 1)^2} = \frac{(2S + 1)}{(S^2 + S + 1)^2}$$

Q.7 If a signal $x(n) = (0.5)^n u(n)$ is convolved with itself the signal obtained is $y(n)$, then the value of $Y(0) =$ ____.

Solution: (0)

$$y_{(n)} = (0.5)^n u(n) \times (0.5)^n u(n)$$

$$y_{(n)} = \sum_{k=-\infty}^{\infty} (0.5)^k u(k) (0.5)^{n-k} u(n-k)$$

$$y_{(n)} = \sum_{k=0}^n (0.5)^k 1; n \geq 0 = (0.5)^0 + (0.5)^1 + \dots + (0.5)^n$$

$$y_{(n)} = \frac{((0.5)^{n+1} - 1)}{-0.5} u[n]$$

$$y_{(n)} = 2(1 - (0.5)^{n+1}) u(n)$$

$$Y(z) = \frac{2z}{z-1} - \frac{z}{z-0.5}$$

$$Y(0) = 0$$

Q.8 If $\left(\frac{2}{3}\right)^n u(n+3) \leftrightarrow \frac{A e^{-j6\pi f}}{1 - \frac{2}{3} e^{-j2\pi f}}$ where $u(n)$ is unit step sequence then the value of A

Solution: (3.375)

$$u(n) \leftrightarrow \frac{Z}{Z-1}$$

$$a^n u(n) \leftrightarrow \frac{Z}{Z-a}$$

$$\left(\frac{2}{3}\right)^{-3} \times \left(\frac{2}{3}\right)^{n+3} u(n+3) \leftrightarrow \left(\frac{2}{3}\right)^{-3} \times Z^{+3} \frac{Z}{\left(Z - \frac{2}{3}\right)}$$

Put $Z = e^{j\omega} = e^{j2\pi f}$

$$= \left(\frac{2}{3}\right)^{-3} \frac{e^{j6\pi f} \times e^{j2\pi f}}{\left(e^{j2\pi f} - \frac{2}{3}\right)} = \frac{\left(\frac{2}{3}\right)^{-3} e^{j6\pi f} \times e^{j2\pi f}}{e^{j2\pi f} \left(1 - \frac{2}{3} e^{j2\pi f}\right)}$$

$$\therefore A = \left(\frac{2}{3}\right)^{-3} = \frac{3^3}{2^3} = \left(\frac{27}{8}\right)$$

Q.9 If $f(x, y) = x^n y^m = P$. If x is doubled and y is halved, then which relation is true

(a) $2^{n-m} P$

(b) $2^{m-n} P$

(c) $(m-n) P$

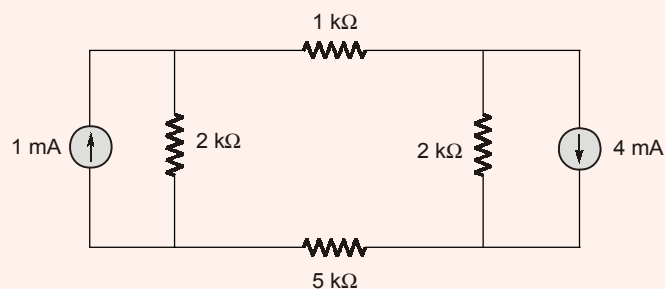
(d) $(n-m) P$

Solution: (a)

$$f(x,y) = (2x)^n \times \left(\frac{y}{2}\right)^m$$

$$= 2^n \times x^n \frac{y^m}{2^m} = \frac{2^n}{2^m} x^n y^m = 2^{n-m} P$$

Q.10 Find the magnitude of current in the 1 kΩ resistor.



Solution: (1 Ampere)

Q.11 If a matrix $\dot{x}(t) = \begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix} x(t)$. Then the state transition matrix is given as _____

(a) $\begin{bmatrix} 1 & 0 \\ 0 & e^t \end{bmatrix}$

(b) $\begin{bmatrix} 1 & e^t - 1 \\ 0 & 1 \end{bmatrix}$

(c) $\begin{bmatrix} 1 & 0 \\ te^t & 1 \end{bmatrix}$

(d) $\begin{bmatrix} 0 & 1 \\ 1 & e^t \end{bmatrix}$

Solution: (b)

Q.12 If there is a telephone station where time of incoming is independent of the time of other calls coming in past or in future. Then the pdf of this system in a fixed interval of time will be _____

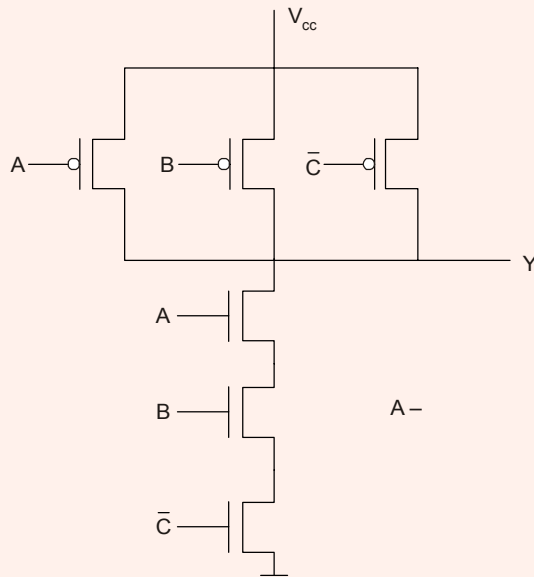
(a) Poisson

(b) Gaussian

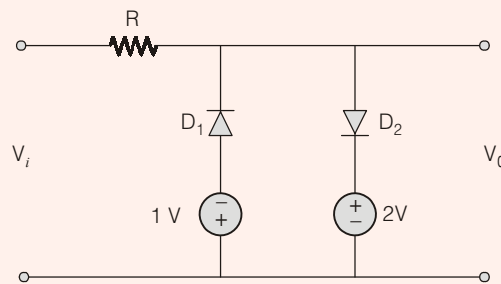
(c) Gamma

(d) Binomial

Solution: (a)



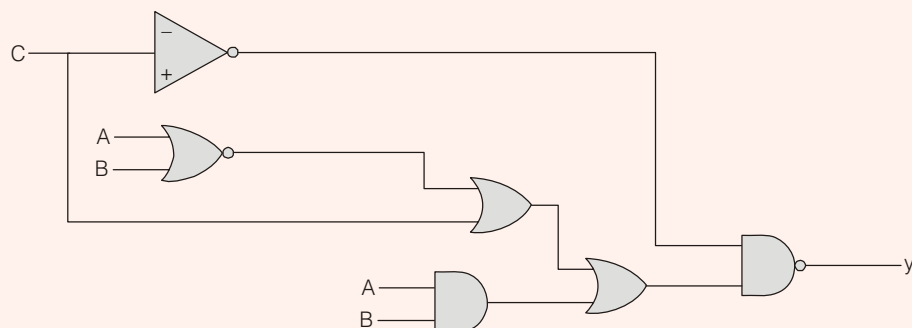
Q.18 The output voltage V_0 of the circuit shown is



- (a) $-0.3 \text{ V} < V_0 < 1.3 \text{ V}$ (b) $-0.3 \text{ V} < V_0 < 2.3 \text{ V}$
(c) $-1.7 \text{ V} < V_0 < 2.7 \text{ V}$ (d) $-1.7 \text{ V} < V_0 < 1.3 \text{ V}$

Solution: (c)

Q.19 If $c = 0$ is the given logic circuit, find y .



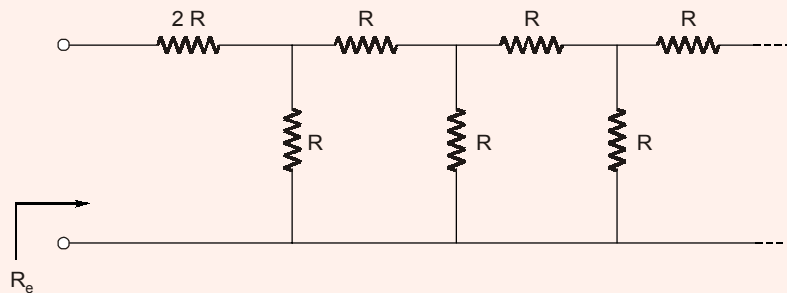
- (a) $\bar{A}B + A\bar{B}$ (b) $\bar{A} + \bar{B}$
(c) $A + B$ (d) AB

Solution: (a)

$$y = \overline{\overline{A+B} + AB} = \overline{A+B} \times \overline{AB}$$

$$= (\overline{A+B}) \times \overline{AB} = (A+B)(\overline{A} + \overline{B}) = \overline{A}B + A\overline{B}$$

Q.20 R_e is _____ $k\Omega$. (Assume $R = 1 k\Omega$)

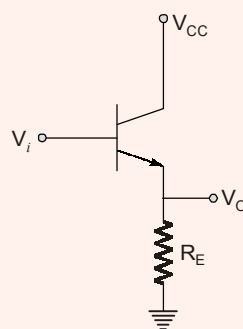


Solution: (2.79)

Q.21 For an antenna radiating in free space, the Electric field at a distance of 1 km is found to be 12 mV/m. Given intrinsic impedance of free space is $120 \pi \Omega$, magnitude of average power density due to this antenna at a distance of 2 km from the antenna is _____

Solution: (0.047)

Q.22 In the above diagram what is the condition satisfied so that the gain of the above common collector amplifier is constant



- (a) $I_C R_E \gg V_T$
- (c) $R I_C \ll 1$

- (b) $I_m R_E \gg 1$
- (d) $I_C R_E \ll V_T$

Solution: (a)

Q.27 If in a certain code system, “good luck” is certain “Kcldg” and “All the best” as “tsbhtl”. Then “are the exam” is written as

- (a) Mxhtr (b) Mtzhx
(c) cMxht (d) htcMx

Solution: (a)

Q.28 The solution of the differential equation is $\frac{d^2x}{dt^2} + \frac{2dx}{dt} + x = 0$

- (a) ae^{-t} (b) $ate^{-t} + be^{-t} + be^{-2t}$
(c) $ae^{-t} + bte^{-t}$

Where a and b are some constant

Solution: (c)

Q.29 After the discussion, Tom said to me “Please revert”. He excerpts me to

- (a) retract (b) get back to him
(c) move in reverse (d) retreat

Solution: (b)

Q.30 $\sum_0^{\infty} \frac{1}{n!} =$ value of the sum motion equal to _____

- (a) $2/n2$ (b) e
(c) 2 (d) $\sqrt{2}$

Solution: (b)

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