Super **Talent Batches**



India's Best Institute for IES. GATE & PSUs

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)

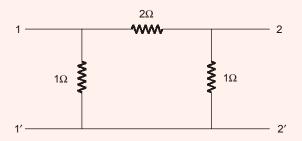
- Top 2000 Rank in GATE
- Appeared in IES or 3 PSUs Interview
- B.Tech from IIT
- B.Tech from NIT with 65% marks
- B.Tech from Private Engineering college with 70% marks

Benefits

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

Gate 16th Feb Evening

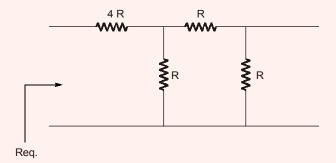
 $\textbf{Q.1} \quad Find~Z-parameter~(Z_{11},Z_{12},Z_{21},Z_{22})$



Solution:

$$\begin{bmatrix} \frac{3}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{3}{4} \end{bmatrix}$$

 $\mathbf{Q.2}$ Find \mathbf{R}_{eq}



Solution: (14R/3)

Q.3 A stable LTI system has a transfer function $H(S) = \frac{1}{S^2 + S - 6}$ to make this system causal it needs to be cascaded with another LTI system having T.F. $\mathrm{H_{1}}(\mathrm{S})$. Then $\mathrm{H_{1}}(\mathrm{S})$ is

(a) S + 3

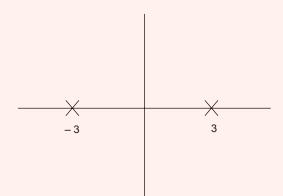
(b) S-2

(c) S - 6

(d) S + 1

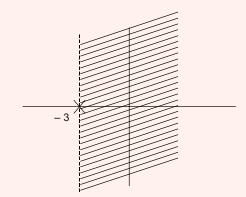
Solution: (b)

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



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

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



then

⇒ Casual

 ${f Q.4}$ 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)

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

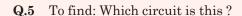
$$5 n + 20 = 485$$

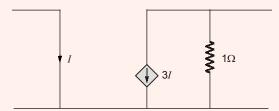
$$n = \frac{465}{5} = 93$$

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

$$= 5n + 90$$

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





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

Solution: (c)

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)

$$f(t) \longleftrightarrow \frac{1}{\left(S^2 + S + 1\right)}$$

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

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

Q.7 If a signal $x(n) = (0.5)^n u(n)$ is convolued with itself the signal obtained is y(n), then the value of $Y(0) = \underline{\hspace{1cm}}$.

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

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

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

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

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

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

$$Y(0) = 0$$

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

$$Z = e^{J\omega} = e^{J2 \pi f}$$

$$= \left(\frac{2}{3}\right)^{\!\!-3} \frac{e^{\mathrm{j}6\pi f} \times e^{\mathrm{j}2\pi f}}{\left(e^{\mathrm{j}2\pi f} - \frac{2}{3}\right)} = \frac{\left(\frac{2}{3}\right)^{\!\!-3} e^{\mathrm{j}6\pi f} \times e^{\mathrm{j}2\pi f}}{e^{\mathrm{J}2\pi f} \left(1 - \frac{2}{3}e^{\mathrm{j}2\pi f}\right)}$$

:.

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

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

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

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

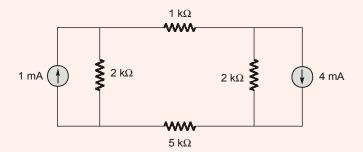
(c) (m-n) P

(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 k Ω resistor.



Solution: (1 Ampere)

Q.11 If a matrix $x'(t) = \begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix} x(t)$. 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) Gaussion

(c) Gamma

(d) Binomial

- Q.13 If STA 1423 and starting address of the program was IFFEH. Then instruction is fetched, executed by the μP . Then the data present at the A_{15} A_8 will be
 - (a) IF/ F 20 23

(b) IF IF 20 14 14

(c) IF IF 14 14

(d) IF IF FE 14

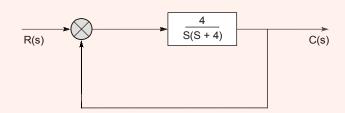
Solution: (c)

2000

address carried by lines $A_{15} - A_8$ is 1F, i.e.

High order address and it carries "14" after of code fetch cycle.

Q.14 If for the given system



Then natural frequency of the system is

(a) 2

(b) 4

(c) 5

(d) 6

Solution: (a)

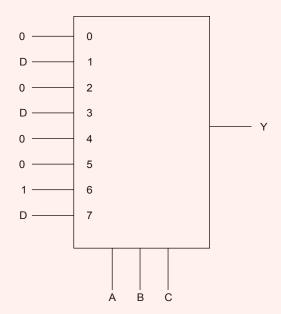
- Q.15 If the CE-configuration of the BJT transistor is not provided with by-pass capacitor, it will have
 - (a) Ri↑Av↑

(b) Ri↑Av↓

(c) Ri↓Av↓

(d) Ri↓Av↑

Q.16 For the given 8×1 multiplex, the output will be



Solution: $(\Sigma m(3, 7, 12, 13, 15))$

CI AB	00	01	11	10
00	0	0	1	0
01	0	0	1	0
11	1	1	1	0
10	0	0	0	0

 Σ m(3, 7, 12, 13, 15).

Q.17 The equivalent output of the circuit will be

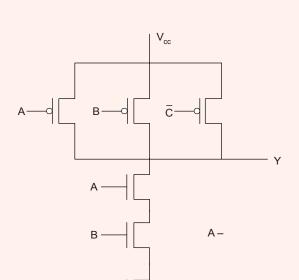
(a)
$$A' + B' + C$$

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

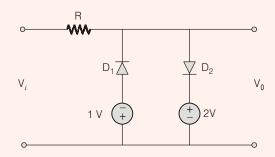
(d) None of these

$$Y = \overline{A \times B \times \overline{C}}$$

$$Y = \left(\overline{A} + B + C\right)$$



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



(a)
$$-0.3 \text{ V} < \text{V}_0 < 1.3 \text{ V}$$

(c) $-1.7 \text{ V} < \text{V}_0 < 2.7 \text{ V}$

(c)
$$-1.7 \text{ V} < \text{V}_0 < 2.7 \text{ V}$$

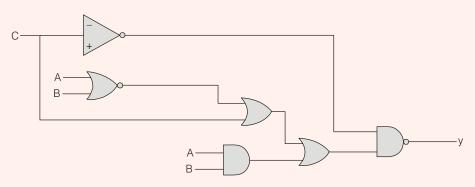
(b)
$$-0.3 \text{ V} < \text{V}_0 < 2.3 \text{ V}$$

(b)
$$-0.3 \text{ V} < \text{V}_0 < 2.3 \text{ V}$$

(d) $-1.7 \text{ V} < \text{V}_0 < 1.3 \text{ V}$

Solution: (c)

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



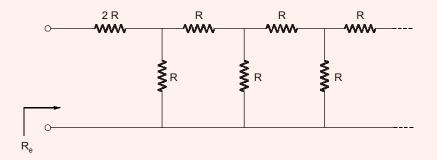
- (a) $\overline{A}B + A\overline{B}$
- (c) A + B

- (b) $\overline{A} + \overline{B}$
- (d) AB

Solution: (a)

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

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

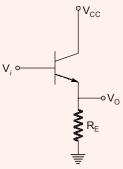


Solution: (2.79)

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 amplifer is constant



$$\begin{array}{ll} \text{(a)} & \text{I}_{\text{C}} \, \text{R}_{\text{E}} >> \text{V}_{\text{T}} \\ \text{(c)} & \text{RI}_{\text{C}} << 1 \end{array}$$

(b)
$$I_m R_E >> 1$$

(b)
$$I_m R_E >> 1$$

(d) $I_C R_E << V_T$

GATE-2014 Exam Solutions (16 Feb) **Electronics Engineering (Evening Session)**

$Parcels \ from \ sender \ S \ to \ receiver \ R \ passes. \ Sequentially \ through \ two \ post \ offices. \ Each$
post-offices has a probability $\frac{1}{5}$ of losing an incoming parcel, undependable of all other
parcels. Given that parcel is lost, the probability that it was lost by $2^{ m nd}$ post office is
ľ

Solution: (0.04)

- Q.24 If the series is given as 13 M, 17 Q, 19 S, ____ then the next term will be
 - (a) 22 W

(b) 23 W

(c) 22 U

(d) 20 V

Solution: (b)

13 M, 17 Q, 19 S, 23 W

Place apphabet

13 M

14 N

15 O

16 P

17 Q

18 R

19 S

20 T

21 U

22 V

23 W

13, 17, 19, 23 are prime numbers.

- Q.25 A person was awarded at a function, he said he was VINDICATED. Which word is nearly related to underline word.
 - (a) Chastened

(b) Substantiated

(c) Pushed

(d) Defamed

Solution: (b)

- Q.26 A government policy was DISAGREED by the following members, which is nearly selected to underline word
 - (a) dissent

(b) decent

(c) descent

(d) decadent

Q.27 If in a certain code system, "good luck" is certain "Kcldg" and "All the best" as "tsbhtll". 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 $\sum_{n=0}^{\infty} \frac{1}{n!}$ = value of the sum motion equal to _____

(a) 2ln2

(b) e

(c) 2

(d) $\sqrt{2}$