

# Andhra Pradesh State Council of Higher Education

## Notations :

- 1.Options shown in green color and with ✓ icon are correct.
- 2.Options shown in red color and with ✗ icon are incorrect.

<b>Question Paper Name :</b>	Electronics and Communication Engineering 30th May 2024 Shift 1
<b>Duration :</b>	120
<b>Total Marks :</b>	120
<b>Display Marks:</b>	No
<b>Share Answer Key With Delivery Engine :</b>	Yes
<b>Calculator :</b>	None
<b>Magnifying Glass Required? :</b>	No
<b>Ruler Required? :</b>	No
<b>Eraser Required? :</b>	No
<b>Scratch Pad Required? :</b>	No
<b>Rough Sketch/Notepad Required? :</b>	No
<b>Protractor Required? :</b>	No
<b>Show Watermark on Console? :</b>	Yes
<b>Highlighter :</b>	No
<b>Auto Save on Console?</b>	Yes
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<b>Show Reports :</b>	No

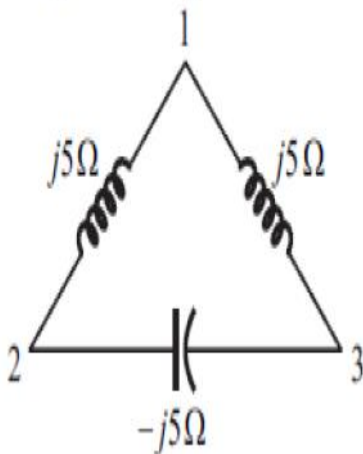
Show Progress Bar :	No
Is this Group for Examiner? :	No
Examiner permission :	Cant View
Show Progress Bar? :	No

## Electronics and Communication Engineering

Section Id :	33300849
Section Number :	1
Mandatory or Optional :	Mandatory
Number of Questions :	120
Section Marks :	120
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Is Section Default? :	null

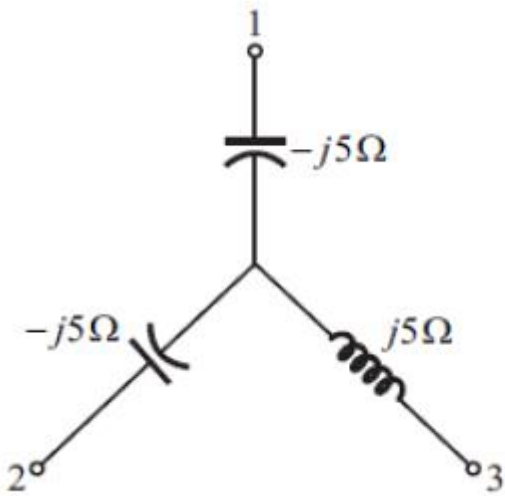
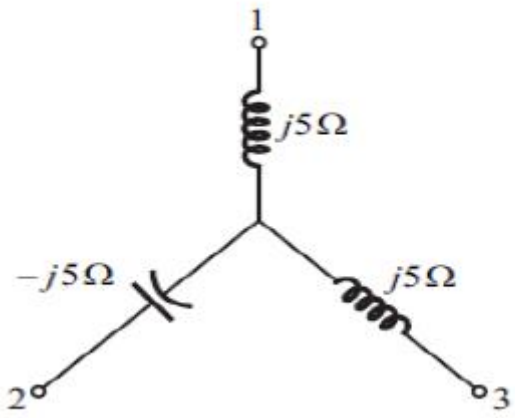
Question Number : 1 Question Id : 3330085761 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Identify the Y equivalent of  $\Delta$  network of the circuit shown in Figure below

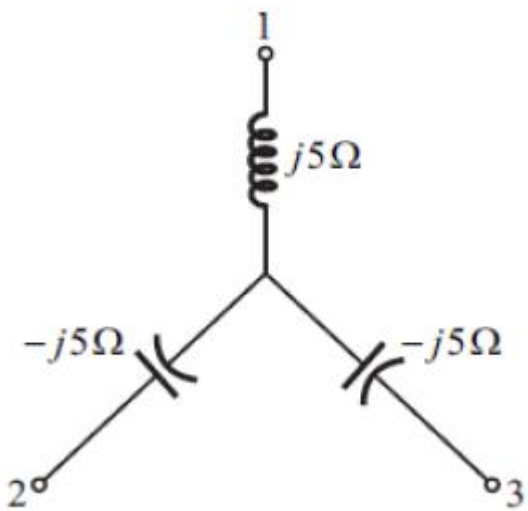


Options :

1. ✖

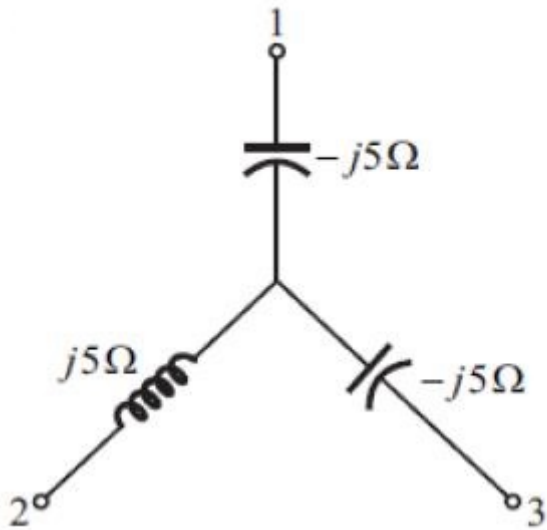


2. ✘



3. ✔

4. ✘



Question Number : 2 Question Id : 3330085762 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The mesh current method

- (I) Works with both planar and non-planar circuits
- (II) Uses Kirchhoff's voltage law

Which of the above is correct?

Options :

1. ✘ I and II

2. ✔ II only

3. ✘ I only

4. ✘ Neither I nor II

**Question Number : 3 Question Id : 3330085763 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If there are 5 branches and 4 nodes in graph, then the number of mesh equations that can be formed are?

**Options :**

1. ✓ 2

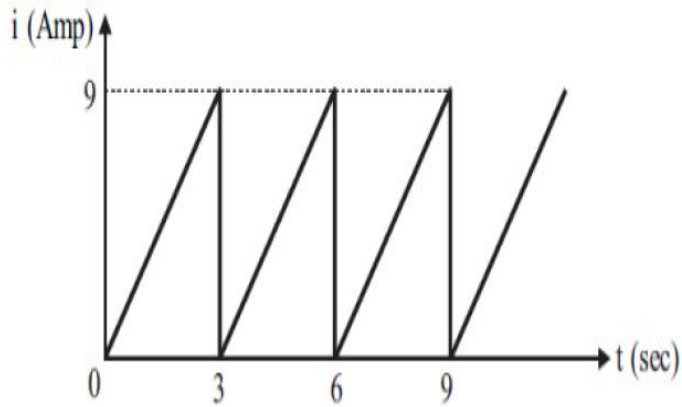
2. ✗ 4

3. ✗ 6

4. ✗ 8

**Question Number : 4 Question Id : 3330085764 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The current waveform  $i(t)$  in a pure resistor of  $20\ \Omega$  is as shown in Figure below, then the power dissipated in the resistor is

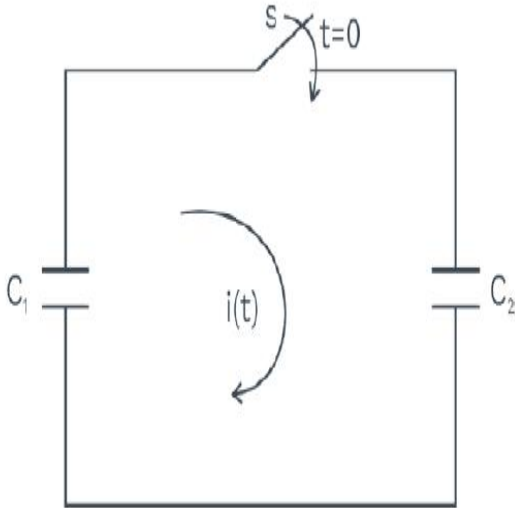


Options :

1. ✘ 135W
2. ✔ 540W
3. ✘ 270W
4. ✘ 14.58W

Question Number : 5 Question Id : 3330085765 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In the following figure,  $C_1$  and  $C_2$  are ideal capacitors.  $C_1$  has been charged to 12 V before the ideal switch  $S$  is closed at  $t = 0$ . The current  $i(t)$  for all  $t$  is

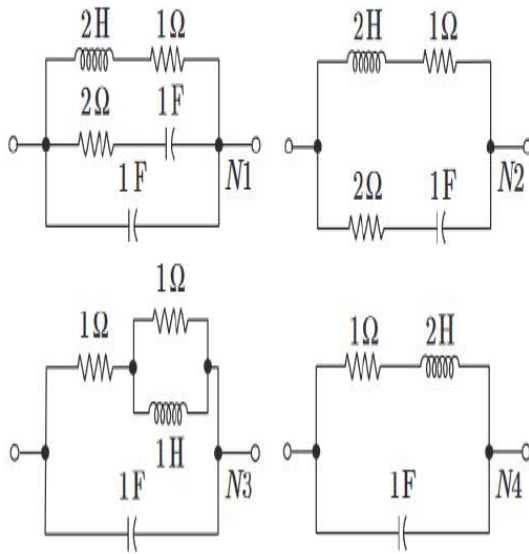


Options :

1. ✘ Zero
2. ✔ An impulse function
3. ✘ An exponentially decaying function
4. ✘ A step function

Question Number : 6 Question Id : 3330085766 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Among the four networks, N1, N2, N3 and N4, given in the following figure the networks having identical driving point function are



Options :

N1 and N2

1. ✘

N2 and N4

2. ✘

N1 and N3

3. ✔

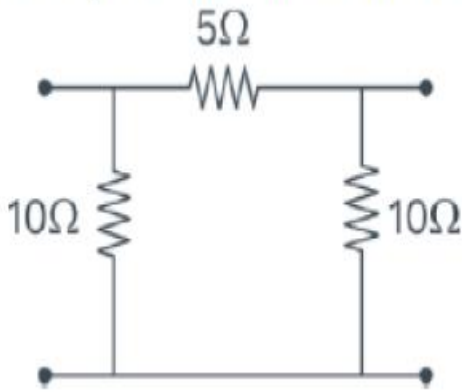
N1 and N4

4. ✘

Question Number : 7 Question Id : 3330085767 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0



The 2-port admittance matrix of the circuit shown is given by



Options :

1. ✘ 
$$\begin{bmatrix} 15 & 5 \\ 5 & 15 \end{bmatrix}$$

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

3. ✔ 
$$\begin{bmatrix} 0.3 & 0.2 \\ 0.2 & 0.3 \end{bmatrix}$$

4. ✘ 
$$\begin{bmatrix} 3.33 & 5 \\ 5 & 3.33 \end{bmatrix}$$

Question Number : 8 Question Id : 3330085768 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

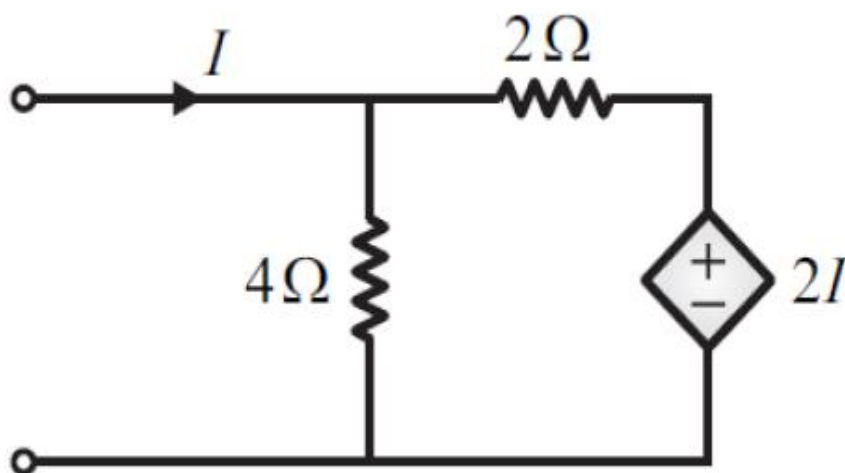
In superposition theorem, when we consider the effect of one voltage source, all the other current sources are \_\_\_\_\_

Options :

1. ✘ Shorted
2. ✔ Opened
3. ✘ Removed
4. ✘ Undisturbed

Question Number : 9 Question Id : 3330085769 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The circuit shown in Figure is equivalent to a load of



Options :

1. ✘  $\frac{4}{3}$  Ohms

4 Ohms

2. ✘

$\frac{8}{3}$  Ohms

3. ✔

2 Ohms

4. ✘

**Question Number : 10 Question Id : 3330085770 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The current through a series RL circuit is  $\frac{1}{4}e^{\left(-\frac{1}{2}\right)t}$  when excited by a unit impulse voltage. The values of R and L are respectively

**Options :**

8, 4

1. ✘

4, 2

2. ✘

2, 4

3. ✔

1, 4

4. ✘

Question Number : 11 Question Id : 3330085771 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

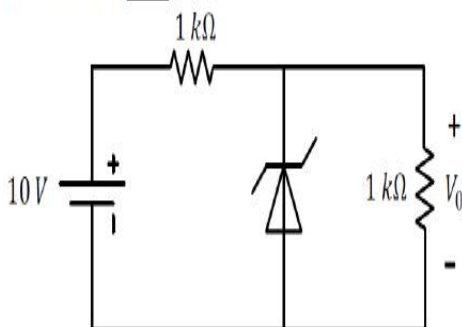
If  $E_F$  (Fermi energy level)  $>$   $E_{Fi}$  (intrinsic Fermi energy level), then the type of semiconductor is \_\_\_

Options :

1. ✓ n-type
2. ✗ Elementary
3. ✗ P-type
4. ✗ Compound

Question Number : 12 Question Id : 3330085772 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

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



Options :

1. ✘ 2.5V

2. ✔ 5V

3. ✘ 6V

4. ✘ 3V

Question Number : 13 Question Id : 3330085773 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which process of the Electron-hole pair is responsible for emitting of light?

Options :

1. ✘ Gradient

2. ✘ Drift

3. ✔ Recombination

## Diffusion

4. ✖

**Question Number : 14 Question Id : 3330085774 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In MOSFET fabrication, the channel length is defined during the process of

**Options :**

1. ✖ Isolation oxide growth

2. ✖ Channel stop implantation

3. ✓ Poly-silicon gate patterning

4. ✖ Lithography step leading to the contact pads

**Question Number : 15 Question Id : 3330085775 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

How does a FET behave when the V-I characteristics are to the left of pinch off for an n channel FET?

**Options :**

1. ✓

## Voltage controlled resistor

2. ✘ Amplifier

3. ✘ Switch

4. ✘ Diode

Question Number : 16 Question Id : 3330085776 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The direction of the diffusion current depends on

Options :

1. ✘ Applied field

2. ✘ Mobility of charge carrier

3. ✔ Charge carrier concentration

## Permittivity

4. ✖

Question Number : 17 Question Id : 3330085777 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Match items in Group1 with items in Group2, most suitably.

GROUP-I	GROUP-II
P. LED	1. Heavy doping
Q. Avalanche photo diode	2. Coherent radiation
R. Tunnel diode	3. Spontaneous emission
S. LASER	4. Current gain

Options :

P - 1, Q - 2, R - 4, S - 3

1. ✖

P - 2, Q - 3, R - 1, S - 4

2. ✖

P - 3 Q - 4, R - 1, S - 2

3. ✔

P - 2, Q - 1, R - 4, S - 3

4. ✖



**Question Number : 18 Question Id : 3330085778 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A silicon PN junction diode is forward biased with a constant current at room temperature carrying a constant current of 1 mA. When the temperature is increased by  $10^{\circ}\text{C}$ , the forward bias voltage across the PN junction is approximately equal to

**Options :**

1. ✘ Increases by 60 mV
2. ✘ Increases by 25 mV
3. ✘ Decreases by 60 mV
4. ✔ Decreases by 25 mV

**Question Number : 19 Question Id : 3330085779 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The early effect in a bipolar junction transistor is caused by

**Options :**

1. ✘ Fast turn-on

Large collector-base reverse bias

2. ✓

Fast turn-off

3. ✘

Large emitter-base forward bias

4. ✘

**Question Number : 20 Question Id : 3330085780 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In IC technology, dry oxidation (using dry oxygen) as compared to wet oxidation (using steam or water vapor) produces

**Options :**

Superior quality oxide with a higher growth rate

1. ✘

Inferior quality oxide with a higher growth rate

2. ✘

Inferior quality oxide with a lower growth rate

3. ✘

Superior quality oxide with a lower growth rate

4. ✓

**Question Number : 21 Question Id : 3330085781 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If P is Passivation, Q is n-well implant, R is metallization and S is source/drain diffusion, then the order in which they are carried out in a standard n-well CMOS fabrication process, is

**Options :**

1. ✘ P -Q -R - S

2. ✔ Q - S -R -P

3. ✘ R -P -S -Q

4. ✘ S -R -Q-P

**Question Number : 22 Question Id : 3330085782 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Let R denote the responsivity of a PIN photodetector and  $\lambda$  ( $\mu\text{m}$ ) is the wavelength. Figure of merit for the photo detector is quantum efficiency. The expression for quantum efficiency ( $\mu$ ) is given by\_

**Options :**

1. ✘  $\mu = \frac{12.4R}{\lambda}$

2. ✘ 
$$\mu = \frac{12400R}{\lambda}$$

3. ✔ 
$$\mu = \frac{1.24R}{\lambda}$$

4. ✘ 
$$\mu = \frac{0.124R}{\lambda}$$

**Question Number : 23 Question Id : 3330085783 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For an N-channel enhancement-type MOSFET, if the source is connected at a higher potential than that of the bulk (i.e.  $V_{SB} > 0$ ), the threshold voltage  $V_{Th}$  of the MOSFET will

**Options :**

1. ✘ Remains unchanged

2. ✘ Decreases

3. ✘ Change in polarity

Increases

4. ✓

**Question Number : 24 Question Id : 3330085784 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The phenomenon known as 'early effect' in a bipolar transistor refers to a reduction of the effective base width caused by

**Options :**

Electron-hole recombination at the base

1. ✘

The reverse biasing of the base-collector junction

2. ✓

The forward biasing of emitter-base junction

3. ✘

The early removal of stored base charge during saturation to cut-off switching

4. ✘

**Question Number : 25 Question Id : 3330085785 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The DC current gain ( $\beta$ ) of a BJT is 50. Assuming that the emitter injection efficiency is 0.995, the base transport factor is

Options :

1. ✓ 0.985

2. ✘ 0.990

3. ✘ 0.980

4. ✘ 0.995

Question Number : 26 Question Id : 3330085786 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A circuit that uses an amplifier with passive filter elements is called as a(n)

Options :

1. ✘ Relaxation oscillator

2. ✘ Signal generator

3. ✘ Differential amplifier

4.

## Active filter



Question Number : 27 Question Id : 3330085787 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If the input to a comparator is a sine wave, the output is

Options :

1. ✘ Ramp voltage

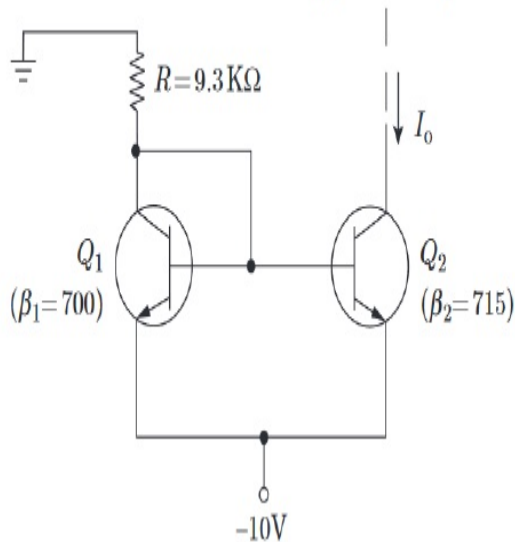
2. ✘ Sine wave

3. ✔ Rectangular wave

4. ✘ Sawtooth wave

Question Number : 28 Question Id : 3330085788 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In the silicon BJT circuit shown below, assume that emitter area of transistor  $Q_1$  is half that of transistor  $Q_2$ , then what is the value of the current  $I_o$  is approximately



Options :

1.  0.5 mA
2.  9.3 mA
3.  2.0 mA
4.  15 mA

**Question Number : 29 Question Id : 3330085789 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Three identical amplifiers with each one having a voltage gain of 50, input resistance of 1 kΩ and output resistance of 250 Ω are cascaded. The open circuit voltage gain of the combined amplifier is



**Options :**

1. ✘ 49 dB
2. ✘ 102 dB
3. ✔ 98 dB
4. ✘ 51 dB

**Question Number : 30 Question Id : 3330085790 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following statements are true?

P: JFET is biased to operate it in active region

Q: MOSFET is biased to operate it in saturation region

**Options :**

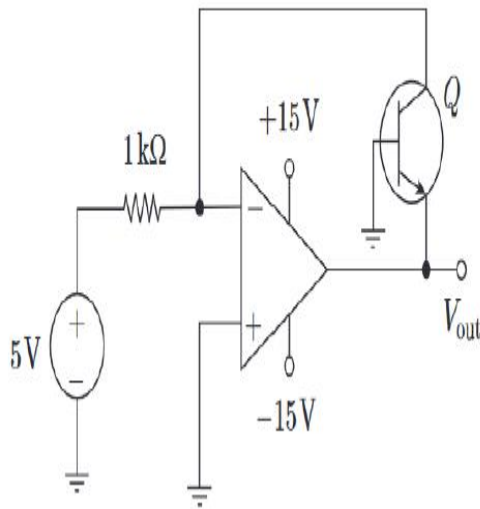
1. ✘ Both P and Q are correct
2. ✘ P is correct and Q is incorrect
3. ✔ P is incorrect and Q is correct

Both P and Q are incorrect

4. ✘

Question Number : 31 Question Id : 3330085791 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In the circuit shown in the following Figure, what is the output voltage ( $V_{out}$ ) if a silicon transistor Q and an ideal op-amp are used?



Options :

1. ✘ -15 V

2. ✔ -0.7 V

3. ✘ +0.7 V

4. ✘

+15 V

**Question Number : 32 Question Id : 3330085792 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In Wein's bridge oscillator, if  $R_1 = R_2$  and  $C_1 = C_2$  then the typical values of open loop gain and feedback factor to obtain the sustained oscillations are

**Options :**

1. ✘ 1,1

2. ✘  $\infty, 0$

3. ✘ 1, 1/2

4. ✔ 3, 1/3

**Question Number : 33 Question Id : 3330085793 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A negative going trigger pulse is applied to pin 2 of the IC 555 timer, passes through the threshold level of

Options :

$\frac{V_{CC}}{3}$  and sets the Flip-flop

1. ✓

$\frac{V_{CC}}{3}$  and resets the Flip-flop

2. ✗

$\frac{2V_{CC}}{3}$  and sets the Flip-flop

3. ✗

$\frac{2V_{CC}}{3}$  and resets the Flip-flop

4. ✗

**Question Number : 34 Question Id : 3330085794 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

An amplifier has  $A_v = 1000 \pm 100$ . Determine the feedback needed to keep the gain within  $\pm 0.1\%$ .

Options :

1. ✓

0.099

2. ✘ 1.000

3. ✘ 1.100

4. ✘ 10.00

**Question Number : 35 Question Id : 3330085795 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A monostable multivibrator has  $R = 120\text{k}\Omega$  and the time delay  $T = 1000\text{ms}$ , calculate the value of  $C$ ?

**Options :**

1. ✘  $0.9\mu\text{F}$

2. ✘  $1.32\mu\text{F}$

3. ✔  $7.5\mu\text{F}$

2.49 $\mu$ F

4. ✖

**Question Number : 36 Question Id : 3330085796 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

How to achieve 50% duty cycle in adjustable rectangular wave generator? (Assume  $R_1 \rightarrow$  Resistor connected between supply and discharge and  $R_2 \rightarrow$  Resistor connected between discharge and trigger input.)

**Options :**

1. ✖  $R_1 < R_2$

2. ✖  $R_1 > R_2$

3. ✔  $R_1 = R_2$

4. ✖  $R_1 \geq R_2$

**Question Number : 37 Question Id : 3330085797 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Simplify the following expression with A, B, C three variables,  $F(A, B, C) = \sum(1,3,5,7)$

**Options :**

1. ✘  $\bar{A}C + AB$

2. ✘ A

3. ✘ B

4. ✔ C

Question Number : 38 Question Id : 3330085798 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The decimal equivalent of  $(101111.1101)_2$  is

Options :

1. ✘ 52.6789

2. ✘ 38.6254

3. ✔ 47.8125

4. ✘ 51.6328

**Question Number : 39 Question Id : 3330085799 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following circuit is used as a special signal to demultiplex the address bus and data bus?

**Options :**

1. ✘ Priority Encoder

2. ✘ Decoder

3. ✔ Address Latch Enable

4. ✘ Demultiplexer

**Question Number : 40 Question Id : 3330085800 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The number of memory cycles required to execute the 8085 instruction LDA 3000 H is

**Options :**

1. ✔ 4



2. ✘ 2

3. ✘ 3

4. ✘ 5

Question Number : 41 Question Id : 3330085801 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The POS form is suitable for circuit using

Options :

1. ✔ NOR

2. ✘ AND

3. ✘ XOR

4. ✘ NAND

Question Number : 42 Question Id : 3330085802 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$A + A\bar{B} + A\bar{B}.C + A\bar{B}.C.\bar{D}$  simplifies to

Options :

1. ✘  $A + \bar{D}$

2. ✘  $A + \bar{C}$

3. ✘  $A + B$

4. ✔  $A$

Question Number : 43 Question Id : 3330085803 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The minimum number of comparators required to build an eight-bit-flash ADC is

Options :

1. ✘ 8

2. ✔ 255

256

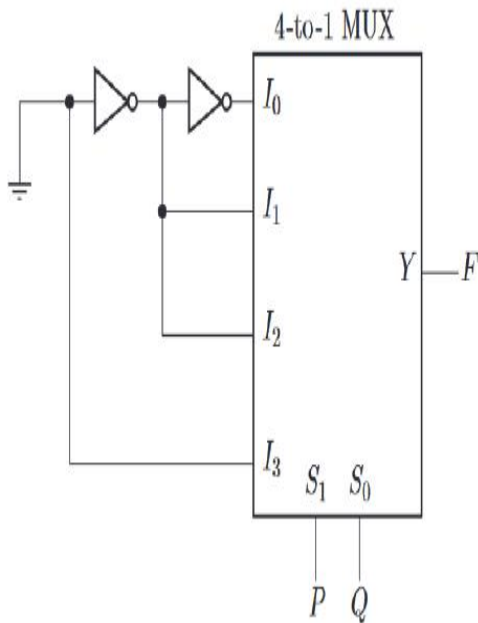
3. ✘

64

4. ✘

**Question Number : 44 Question Id : 3330085804 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The logic function implemented by the circuit shown in Figure below is (ground implies a logic '0')



**Options :**

$$F = XOR(P, Q)$$

1. ✔

$$F = OR(P, Q)$$

2. ✘

$$F = XNOR (P, Q)$$

3. ✘

$$F = AND (P, Q)$$

4. ✘

**Question Number : 45 Question Id : 3330085805 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The number of memory cycles required to execute the following 8085 instructions

I. STA 3000 H

II. LXI D, F0F1 H would be

**Options :**

1. ✘ 4 for (I) and 4 for (II)

2. ✔ 4 for (I) and 3 for (II)

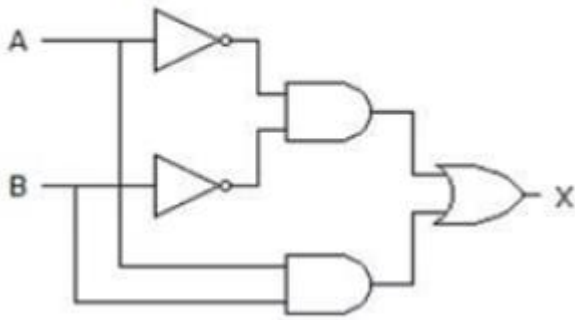
3. ✘ 3 for (I) and 3 for (II)

4. ✘ 3 for (I) and 4 for (II)

**Question Number : 46 Question Id : 3330085806 Display Question Number : Yes Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The logic circuit shown in Figure below is a



**Options :**

- 1. ✘ Half adder
- 2. ✔ XNOR
- 3. ✘ Equality detector
- 4. ✘ Full adder

**Question Number : 47 Question Id : 3330085807 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For a square wave signal with a frequency of 10 kHz, calculate the output frequencies for Mod 2, Mod 4, and Mod 10 counter.

**Options :**

- 1.

20 KHz, 40 KHz, 100 KHz

✘

50 Hz, 25Hz, 0.1 Hz

2. ✘

50 KHz, 25 KHz, 10 KHz

3. ✘

5 KHz, 2.5KHz, 1 KHz

4. ✔

**Question Number : 48 Question Id : 3330085808 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A 10-bit successive approximation type A/D converter has quantization error of 10 mV. The digital output corresponding to analog input of 4.365 V would be

**Options :**

0110110110

1. ✘

0100100100

2. ✘

0110110100

3. ✔

1101101100

4. ✖

Question Number : 49 Question Id : 3330085809 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

One example of the use of an S-R flip-flop is as \_\_\_\_\_

Options :

Transition pulse generator

1. ✖

Racer

2. ✖

Switch debouncer

3. ✔

Astable oscillator

4. ✖

Question Number : 50 Question Id : 3330085810 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The primary function of a clamper circuit is

Options :

Suppress variations in signal voltage

1. ✘

Raise the positive cycle of the signal

2. ✘

Lower the negative cycle of the signal

3. ✘

Introduce a DC level to an ac signal

4. ✔

Question Number : 51 Question Id : 3330085811 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

What is the period of the following signal,  $x(t) = \sin(18\pi t + 78^\circ)$  ?

Options :

1/9

1. ✔

1/3

2. ✘

2/9

3. ✘



49

4. ✘

Question Number : 52 Question Id : 3330085812 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A PAM signal can be detected by using

Options :

An ADC

1. ✘

A bandpass filter

2. ✘

An integrator

3. ✔

A high pass filter

4. ✘

Question Number : 53 Question Id : 3330085813 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A function  $x(t)$  is said to have half-wave odd symmetry if \_\_\_\_\_

Options :

$$x(t) = -x\left[t \pm \frac{T}{2}\right]$$

1. ✓

$$x(t) = x\left[t - \frac{T}{4}\right]$$

2. ✗

$$x(t) = x\left[t - \frac{T}{2}\right]$$

3. ✗

$$x(t) = -x\left[t + \frac{T}{4}\right]$$

4. ✗

**Question Number : 54 Question Id : 3330085814 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

What are the conditions called which are required for a signal to fulfil to be represented as Fourier series?

Options :

Dirichlet's conditions

1. ✓

## Gibbs phenomenon

2. ✘

## Fourier conditions

3. ✘

## Fourier phenomenon

4. ✘

**Question Number : 55 Question Id : 3330085815 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The impulse response of a continuous time system is given by  $h(t) = \delta(t - 1) + \delta(t - 3)$ . The value of the step response at  $t = 2$  is

**Options :**

1. ✘ 2

2. ✘ 3

3. ✘ 0

4. ✔ 1

Question Number : 56 Question Id : 3330085816 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Find the initial value, if it exists of the signal with Laplace transform given below

$$X(s) = \frac{s + 4}{s^2 + 3s + 5}$$

Options :

1. ✓ 1

2. ✗ 4/5

3. ✗ 5/4

4. ✗  $\infty$

Question Number : 57 Question Id : 3330085817 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Fourier transform of  $x(t) = e^{-a|t-2|}$  is

Options :

1. ✗  $e^{jw} \frac{a}{a^2 + w^2}$

$$e^{j2w} \frac{a}{a^2 - w^2}$$

2. ✘

$$e^{-jw} \frac{a}{a^2 - w^2}$$

3. ✘

$$e^{-j2w} \frac{2a}{a^2 + w^2}$$

4. ✔

Question Number : 58 Question Id : 3330085818 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

As  $x$  is increased from  $-\infty$  to  $\infty$ , the function  $f(x) = \frac{e^x}{1+e^x}$

Options :

Monotonically increases

1. ✔

Increases to a maximum value and then decreases

2. ✘

Monotonically decreases

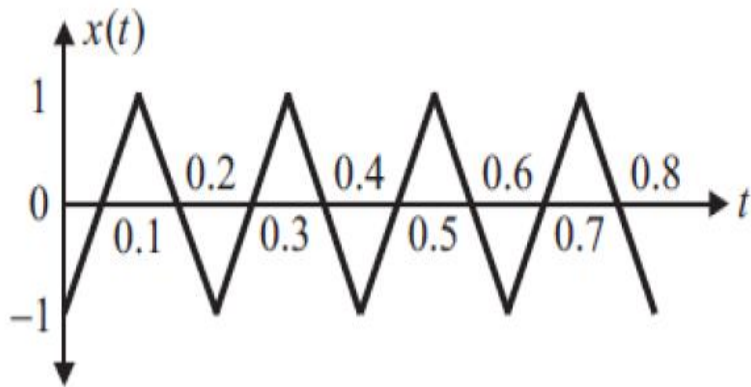
3. ✘

Decreases to a minimum value and then increases

4. ✘

Question Number : 59 Question Id : 3330085819 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

What is the fundamental angular frequency in rad/sec for a given below Figure?



Options :

1. ✘ 5

2. ✘  $5\pi$

3. ✘ 10

4. ✔  $10\pi$

Question Number : 60 Question Id : 3330085820 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A discrete-time signal  $x[n] = \text{Sin}(\pi^2 n)$ ,  $n$  being an integer, is

Options :

Periodic with period  $\pi$

1. ✘

Periodic with period  $\pi/2$

2. ✘

Periodic with period  $\pi^2$

3. ✘

Not periodic

4. ✔

Question Number : 61 Question Id : 3330085821 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following system is not stable with input  $x(n)$  and output  $y(n)$  ?

Options :

$$y(n) = 20 \text{Sin}\{x(n)\} + 10$$

1. ✘

2. ✘  $y(n) = e^{x(n)}$

3. ✔  $y(n) = \sum_{k=-\infty}^n x(k)$

4. ✘  $y(n) = \sum_{k=-2}^2 x(n-k)$

**Question Number : 62 Question Id : 3330085822 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $x[n] = [1, 0, -2, 3]$  and  $y[n] = x[n]$  convolved with itself, the maximum value of  $y[n]$  is

**Options :**

1. ✘ 4

2. ✔ 9

3. ✘ 2

4.





**Question Number : 63 Question Id : 3330085823 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A signal is processed by a causal filter with transfer function  $G(s)$ . For a distortion free output signal waveform,  $G(s)$  must

**Options :**

Provide zero phase shift for all frequency

1. ✘

Provide constant phase shift for all frequency

2. ✘

Provide linear phase shift that is proportional to frequency

3. ✔

Provide a phase shift that is inversely proportional to frequency

4. ✘

**Question Number : 64 Question Id : 3330085824 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which type of control system uses both feedforward and feedback control strategies?

**Options :**

Open-loop control system

1. ✘

Closed-loop control system

2. ✔

Proportional control system

3. ✘

On-off control system

4. ✘

**Question Number : 65 Question Id : 3330085825 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

According to Nyquist stability criterion, where should be the position of all zeros of  $q(s)$  corresponding to s-plane?

**Options :**

On left half

1. ✔

At the centre

2. ✘

3. ✘ On right half

4. ✘ Random

**Question Number : 66 Question Id : 3330085826 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The open-loop DC gain of a unity negative feedback system with closed-loop transfer function  $\frac{s+4}{s^2+7s+13}$  is

**Options :**

1. ✘ 4/13

2. ✘ 4

3. ✔ 4/9

4. ✘ 13

**Question Number : 67 Question Id : 3330085827 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction**

Time : 0

The polar plot of a transfer function passes through the critical point  $(-1,0)$ . Gain margin is

Options :

1. ✓ Zero

2. ✗

3. ✗ -1dB

4. ✗

1dB

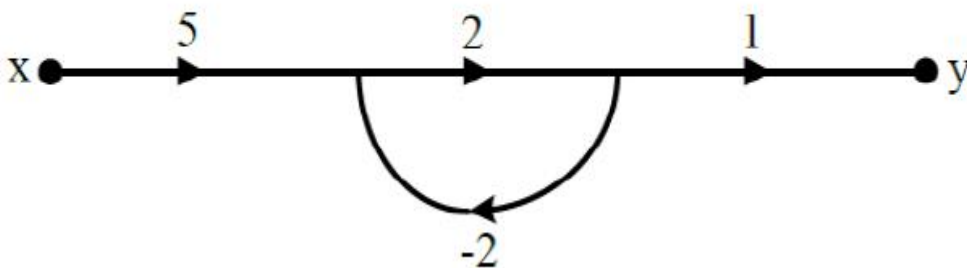
3. ✗

Infinity

4. ✗

Question Number : 68 Question Id : 3330085828 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In the signal flow graph of figure  $y/x$  equals



Options :

1. ✗ 3

2. ✘  $5/3$

3. ✔ 2

4. ✘  $5/2$

Question Number : 69 Question Id : 3330085829 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Routh Hurwitz criterion is used to determine

Options :

1. ✘ Relative stability of the system

2. ✘ Time response of the system

3. ✔ Absolute stability of the system

4. ✘ Roots of characteristic equation graphically

Question Number : 70 Question Id : 3330085830 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If the characteristic equation of a closed-loop system is  $s^2 + 2s + 2 = 0$ , then the system is

Options :

1. ✘ Overdamped

2. ✘ Critically damped

3. ✘ Undamped

4. ✔ Underdamped

Question Number : 71 Question Id : 3330085831 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In a Proportional-Integral-Derivative (PID) controller

Options :

1. ✘ The proportional term introduces damping to the system

2. ✘ The derivative term eliminates steady-state error
3. ✔ The integral term improves transient response
4. ✘ The proportional term contributes to steady-state accuracy

**Question Number : 72 Question Id : 3330085832 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Consider a stable linear time-invariant (LTI) system with a transfer function  $G(s)$ . Which of the following statements regarding Bode and Nyquist plots is true?

**Options :**

1. ✘ Bode plots provide information about the system's stability, while Nyquist plots provide information about its frequency response
2. ✘ Bode plots are used to analyze the system's transient response, while Nyquist plots are used for steady-state analysis
3. ✘ Nyquist plots are applicable only for stable systems, while Bode plots can be used for both stable and unstable systems

Bode plots display the magnitude and phase response of the system, while Nyquist plots show the system's gain and phase margin

4. ✓

**Question Number : 73 Question Id : 3330085833 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The roots of the characteristic equation  $2S^3 + 3S^2 + 4S + 6 = 0$  are

**Options :**

1. ✓  $S = -1.5, S = \pm j\sqrt{2}$

2. ✗  $S = -1, S = \pm j\sqrt{2}$

3. ✗  $S = -1, S = -4, S = -6$

4. ✗  $S = -1, S = -2, S = -3$

**Question Number : 74 Question Id : 3330085834 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which one of the following is not the property of root loci?



**Options :**

The root locus is symmetrical about imaginary axis

1. ✓

They start from the open loop poles and terminate at the open loop zeroes

2. ✘

The breakaway points are determined from  $dK/ds = 0$

3. ✘

Segments of the real axis are the part of the root locus if and only if the total number of real poles and zeroes to their right is odd.

4. ✘

**Question Number : 75 Question Id : 3330085835 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A transfer function of control system does not have pole-zero cancellation. Which one of the following statements is true?

**Options :**

System is neither controllable nor observable

1. ✘

System is completely controllable and observable

2. ✓

3. ✘

System is observable but uncontrollable

System is controllable but unobservable

4. ✖

Question Number : 76 Question Id : 3330085836 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If the highest modulation frequency is 5 kHz, find out bandwidth.

Options :

1. ✖ 5 kHz

2. ✔ 10 kHz

3. ✖ 2.5 kHz

4. ✖ 705 kHz

Question Number : 77 Question Id : 3330085837 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Identify the true statement with reference to immediate addressing mode

**Options :**

1. ✓ In this mode, data is accessed by specifying the register name in which it is stored
2. ✗ In this mode, value of operand is held within the instruction itself.
3. ✗ In this mode, memory location of data is stored in a register
4. ✗ This mode is useful for accessing fixed memory locations such as memory mapped I/O devices

**Question Number : 78 Question Id : 3330085838 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In PCM, if the number of quantization levels is increased from 4 to 64, then the bandwidth requirement will approximately equal to

**Options :**

1. ✓ 3 times
2. ✗ 4 times

3. ✘ 2 times

4. ✘ 6 times

**Question Number : 79 Question Id : 3330085839 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

At a given probability of error, binary coherent FSK is inferior to binary coherent PSK by

**Options :**

1. ✘ 6 dB

2. ✔ 3 dB

3. ✘ 2 dB

4. ✘ 0 dB

**Question Number : 80 Question Id : 3330085840 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In QAM, both \_\_\_\_\_ of a carrier frequency are varied.

Options :

1. ✘ Frequency and amplitude
2. ✘ Phase and frequency
3. ✔ Amplitude and phase
4. ✘ Differential amplitude

Question Number : 81 Question Id : 3330085841 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following analog modulation scheme requires the minimum transmitted power and minimum channel bandwidth

Options :

1. ✘ VSB
2. ✘ DSBSC
3. ✔ SSB

4. ✘ AM

**Question Number : 82 Question Id : 3330085842 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For a modulation index  $m_f$  much less than 1, the FM signal is considered as

**Options :**

1. ✘ Narrow band VSB

2. ✔ Narrow band FM

3. ✘ Wideband AM

4. ✘ Wideband FM

**Question Number : 83 Question Id : 3330085843 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A TDMA system uses 25 MHz for the forward link, which is broken into radio channels of 200 kHz. If 8 speech channels are supported on a single radio channel, how many simultaneous users can be accommodated?

Options :

1. ✘ 25

2. ✘ 200

3. ✘ 1600

4. ✔ 1000

Question Number : 84 Question Id : 3330085844 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Coherent demodulation of FSK signal can be detected using

Options :

1. ✘ Bandpass filters

2. ✘ Bandpass filters and envelope detectors

3. ✔ Matched filter

## Discriminator

4. ✖

**Question Number : 85 Question Id : 3330085845 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The use of non uniform quantization leads to

**Options :**

1. ✖ Reduction in transmission bandwidth

2. ✖ Increase in maximum SNR

3. ✔ Increase in SNR for low level signals

4. ✖ Simplification of quantization process

**Question Number : 86 Question Id : 3330085846 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

How many users or voice channels are supported for each 200 KHz channel in GSM?

**Options :**



1. ✓ 8

2. ✗ 3

3. ✗ 64

4. ✗ 12

**Question Number : 87 Question Id : 3330085847 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The midband gain of an amplifier is 100 and the lower cutoff frequency is 1kHz. The gain of the amplifier at a frequency of 20Hz is approximately

**Options :**

1. ✓ 2

2. ✗ 20

3. ✗ 50

4. ✗ 100

Question Number : 88 Question Id : 3330085848 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Match the following

(i) Convert alternating current into pulsating current	( a ) Filter
(ii)DC reinsertor	( b ) Clipper
(iii)Removes the part of the waveform	( c ) Rectifier
(iv)Removes the unwanted ac ripples	( d ) Clamper

Options :

( i ) – ( a ), ( ii ) – ( d ), ( iii ) – ( c ), ( iv ) – ( b )

1. ✘

( i ) – ( b ), ( ii ) – ( a ), ( iii ) – ( c ), ( iv ) – ( d )

2. ✘

( i ) – ( c ), ( ii ) – ( d ), ( iii ) – ( b ), ( iv ) – ( a )

3. ✔

( i ) – ( a ), ( ii ) – ( c ), ( iii ) – ( d ), ( iv ) – ( b )

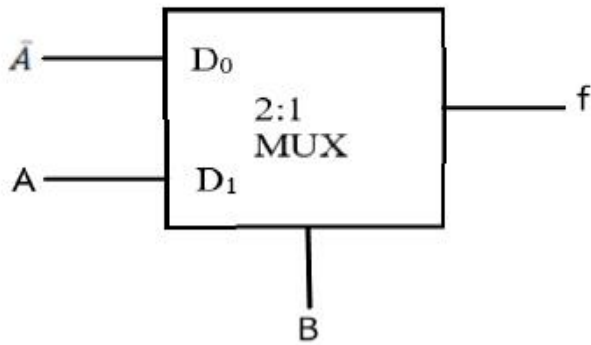
4. ✘

Question Number : 89 Question Id : 3330085849 Display Question Number : Yes Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Time : 0

The following multiplexer gives the logic gate of a/an



Options :

1. ✘ Ex-OR gate

2. ✔ Ex-NOR gate

3. ✘ NOR gate

4. ✘ NAND gate

Question Number : 90 Question Id : 3330085850 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction

Time : 0

How many minimum number of flip flops are required to make a mod-479 counter?

Options :

1. ✘ 6

2. ✘ 7

3. ✘ 8

4. ✔ 9

**Question Number : 91 Question Id : 3330085851 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

\_\_\_\_\_ is used for the removal of  $\text{SiO}_2$  from desired regions such that the desired impurities can be diffused

**Options :**

1. ✔ Photo etching

2. ✘ Epitaxial growth

3. ✘ Oxidation

4. ✘

# Chemical Vapour Deposition

Question Number : 92 Question Id : 3330085852 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The characteristic equation of JK flip-flop is

Options :

$$Q(t + 1) = JQ(t) + k$$

1. ✘

$$Q(t + 1) = J + KQ(t)$$

2. ✘

$$Q(t + 1) = \bar{J} \overline{Q(t)} + \bar{K} Q(t)$$

3. ✘

$$Q(t + 1) = J\overline{Q(t)} + \bar{K} Q(t)$$

4. ✔

Question Number : 93 Question Id : 3330085853 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following statement is correct with respect to Latch?

**Options :**

It normally samples its inputs and changes its outputs only at times determined by clocking signal

1. ✘

It checks all of its inputs continuously and changes its outputs accordingly at any time independent of a clocking signal

2. ✔

It is an electronic circuit with three stable states

3. ✘

It is a tristate device and used in memories

4. ✘

**Question Number : 94 Question Id : 3330085854 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The output of each stage of flip-flop is connected to input of next stage flip-flop and the complement output of the last stage flip-flop output is again connected to the input of first stage Flip-flop then this is called

**Options :**

Ring counter

1. ✘

Twisted ring counter

2. ✔

3.

## Ripple counter

✖

## Decade counter

4. ✖

Question Number : 95 Question Id : 3330085855 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The number of flip-flops used in a decade counter is

Options :

1. ✖ 8

2. ✖ 5

3. ✓ 4

4. ✖ 10

Question Number : 96 Question Id : 3330085856 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Add the two numbers 87H and 79H in the 8085 microprocessors, then

**Options :**

Carry flag = 0 and zero flag = 0

1. ✖

Carry flag = 0 and zero flag = 1

2. ✖

Carry flag = 1 and zero flag = 0

3. ✖

Carry flag = 1 and zero flag = 1

4. ✔

**Question Number : 97 Question Id : 3330085857 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which theorem relates the line integral of a vector field over a closed curve to the surface integral of the curl of the field over the surface bounded by the curve?

**Options :**

Stokes's theorem

1. ✔

Gauss's theorem

2. ✖



Green's theorem

3. ✘

Divergence theorem

4. ✘

**Question Number : 98 Question Id : 3330085858 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The curl of a vector field  $F$  is zero throughout a region of space. What does this imply about the behavior of  $F$ ?

**Options :**

The field  $F$  is solenoidal.

1. ✘

The field  $F$  is irrotational

2. ✔

The field  $F$  is conservative.

3. ✘

The field  $F$  is neither solenoidal nor irrotational.

4. ✘

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following assertions accurately describes Gauss's theorem?

**Options :**

It connects a line integral of a vector field with a surface integral of the field's curl.

1. ✘

It links a surface integral of a vector field with a line integral of the field's curl.

2. ✘

It correlates a line integral of a vector field with a volume integral of the field's curl.

3. ✘

It associates a surface integral of a vector field with a volume integral of the field's divergence.

4. ✔

**Question Number : 100 Question Id : 3330085860 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is not a source of magnetostatic fields

**Options :**

A dc current in a wire

1. ✘

2. ✘

A permanent magnet

3. ✓ An electric field linearly changing with time

4. ✘ A charged disk rotating at uniform speed

Question Number : 101 Question Id : 3330085861 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which one of the following field patterns represents a TEM wave traveling in positive x direction?

Options :

1. ✘  $E = +8\hat{y}, H = -4\hat{z}$

2. ✘  $E = -2\hat{y}, H = -3\hat{z}$

3. ✓  $E = +2\hat{z}, H = +2\hat{y}$

4. ✘  $E = -3\hat{y}, H = +4\hat{z}$

**Question Number : 102 Question Id : 3330085862 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If an electromagnetic wave travels in the positive x-direction, and its electric field oscillates in the y-direction, what is the polarization of the wave?

**Options :**

1. ✖ Linear polarization along the x-axis
2. ✖ Elliptical polarization
3. ✖ Circular polarization
4. ✔ Linear polarization along the y-axis

**Question Number : 103 Question Id : 3330085863 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In which scenario would you expect the highest amount of refraction to occur when an electromagnetic wave passes from one medium to another?

**Options :**

1. ✖ When the incident angle is close to 0 degrees.

2. ✓ When the incident angle is close to 90 degrees.

3. ✗ When the incident angle is close to 45 degrees.

4. ✗ Refraction is independent of the incident angle.

**Question Number : 104 Question Id : 3330085864 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a transmission line with a characteristic impedance  $Z_0$ , what happens if the load impedance  $Z_L$  matches  $Z_0$ ?

**Options :**

1. ✓ Maximum power is transferred to the load

2. ✗ No power is transferred to the load

3. ✗ Half of the power is transferred to the load

4. ✗ The voltage across the load is maximum

**Question Number : 105 Question Id : 3330085865 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The primary advantage of using a rectangular waveguide over other transmission line types is

**Options :**

1. ✘ Lower attenuation
2. ✔ Higher power handling capability
3. ✘ Easier fabrication
4. ✘ Greater flexibility in design

**Question Number : 106 Question Id : 3330085866 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Fundamental principle behind the propagation of light in dielectric waveguides and optical fibers is

**Options :**

1. ✔ Total internal reflection

2. ✘  
Diffraction

3. ✘  
Absorption

4. ✘  
Refraction

**Question Number : 107 Question Id : 3330085867 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

What is the radiation pattern of a point source antenna in free space?

**Options :**

1. ✘  
Isotropic

2. ✔  
Omnidirectional

3. ✘  
Bidirectional

4. ✘  
Directional

Question Number : 108 Question Id : 3330085868 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The purpose of using a transmission line segment with a length of  $\lambda/8$  in impedance matching is

Options :

To introduce a phase shift of 90 degrees

1. ✘

To provide a direct connection between the source and the load

2. ✘

To transform the impedance seen by the load

3. ✔

To minimize signal reflections at the load

4. ✘

Question Number : 109 Question Id : 3330085869 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Determine the value of  $p$  such that the rank of  $A = \begin{bmatrix} 1 & 3 & 4 \\ 0 & 2 & 5 \\ 1 & p & 7 \end{bmatrix}$  is 2

Options :

1. ✘ 8/5



2. ✓ 21/5

3. ✗ 20/7

4. ✗ 3/4

Question Number : 110 Question Id : 3330085870 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The matrix  $A = \begin{bmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix}$  has eigenvalues 2,3,6 then the eigenvalues of  $4A^{-1}$  are

Options :

1. ✓ 2, 4/3, 2/3

2. ✗ 2,3,6

3. ✗ 8,12,24

4. ✗

$1/2, 1/3, 1/6$

Question Number : 111 Question Id : 3330085871 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The values of  $\mu$  which satisfies the equation  $A^{100}X = \mu X$ , where  $A = \begin{bmatrix} 2 & 1 & -1 \\ 0 & -2 & -2 \\ 1 & 1 & 0 \end{bmatrix}$

Options :

1. ✘  $0,0,0$

2. ✘  $1,1,1$

3. ✘  $1,-1,1$

4. ✔  $0,1,1$

Question Number : 112 Question Id : 3330085872 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\int_{-\pi/2}^{\pi/2} \left( \frac{1}{1 + e^{\tan x}} \right) dx =$$

Options :

1. ✘ 0

2. ✘ 1

3. ✔  $\pi/2$

4. ✘ -1

Question Number : 113 Question Id : 3330085873 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of  $\int_0^3 \int_0^1 (x^2 + 3y^2) dy dx =$

Options :

1. ✔ 12

2. ✘ 13

3. ✘ 11

4. ✘ 14

**Question Number : 114 Question Id : 3330085874 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A solution of the ODE  $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 6y = 0$  is such that  $y(0) = 2$  and  $y(1) = -\frac{(1-3e)}{e^3}$ .

The value of  $\frac{dy}{dx}(0) =$

**Options :**

1. ✘ 4

2. ✘ 2

3. ✔ -3

4. ✘ 0

**Question Number : 115 Question Id : 3330085875 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Complete integral of the partial differential equation  $2\sqrt{p} + 3\sqrt{q} = 6x + 2y$  is

Options :

$$z = \frac{1}{12}(6x + a)^2 + \frac{1}{54}(2y - a)^3 + b$$

1. ✖

$$z = \frac{1}{72}(6x + a)^3 + \frac{1}{54}(2y - a)^3 + b$$

2. ✔

$$z = \frac{1}{12}(6x - a)^2 + \frac{1}{72}(2y + a)^3 + b$$

3. ✖

$$z = \frac{1}{54}(6x + a)^3 + \frac{1}{12}(2y - a)^3 + b$$

4. ✖

Question Number : 116 Question Id : 3330085876 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The radius of convergence of Taylor's series expansion of  $f(z) = \frac{z-1}{z^2}$  in powers of  $(z-1)$  is ....

Options :

1. ✔

1

2. ✘ 0

3. ✘  $\infty$

4. ✘ -1

Question Number : 117 Question Id : 3330085877 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\oint_C \frac{dz}{z^2+9} \text{ where } C \text{ is } |z - 3i| = 4$$

Options :

1. ✘  $\frac{\pi}{6}$

2. ✘  $\frac{\pi}{4}$

3. ✔  $\frac{\pi}{3}$

4. ✘  $\frac{\pi}{2}$

Question Number : 118 Question Id : 3330085878 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A fair die is thrown at random, find the probability of getting 5 or a number greater than 2 and is even

Options :

1. ✘  $\frac{1}{6}$

2. ✘  $\frac{2}{6}$

3. ✘  $\frac{4}{6}$

4. ✔  $\frac{3}{6}$

Question Number : 119 Question Id : 3330085879 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For any two arbitrary events A and B, which of the following is true

Options :

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

1. ✘

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

2. ✘

$$P(A \cup B) \leq P(A) + P(B)$$

3. ✔

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

4. ✘

Question Number : 120 Question Id : 3330085880 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Starting from  $x_0 = 1$  , one step Newton- Raphson method in solving the equation  $x^3 + 3x - 7 = 0$  , gives the next value as

Options :

0.5

1. ✘

1.5

2. ✔

1.415

3. ✘



4. ✖

1.9