

# 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.

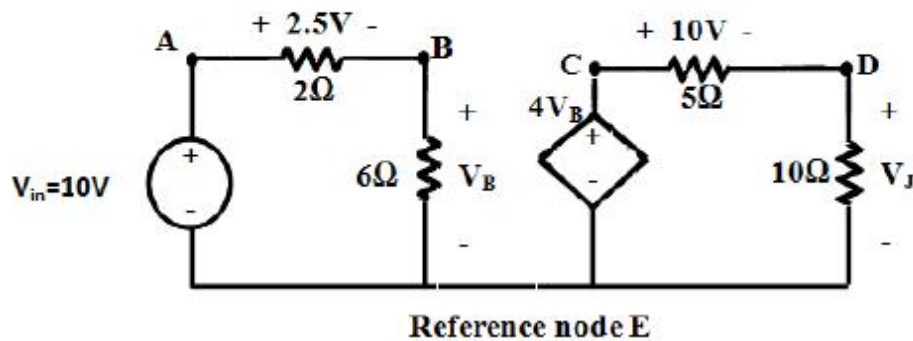
<b>Question Paper Name :</b>	Instrumentation Engineering 29th Sep 2021 Shift1
<b>Duration :</b>	120
<b>Total Marks :</b>	120
<b>Display Marks:</b>	No
<b>Share Answer Key With Delivery Engine :</b>	Yes
<b>Calculator :</b>	None
<b>Magnifying Glass Required? :</b>	No
<b>Ruler Required? :</b>	No
<b>Eraser 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? ( SA type of questions will be always auto saved ) :</b>	Yes
<b>Is this Group for Examiner? :</b>	No

# Instrumentation Engineering

Section Id :	8737182
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

Question Number : 1 Question Id : 873718121 Display Question Number : Yes Is Question Mandatory : No

Find voltage  $V_J$  from the below network?



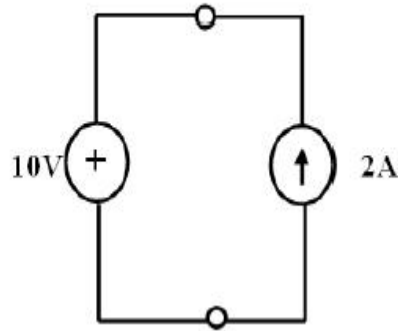
Options :

1. ✓ 20V
2. ✗ 15V
3. ✗ 9V
4. ✗ -20V

Question Number : 2 Question Id : 873718122 Display Question Number : Y

**Mandatory : No**

Which source is delivering and which source is absorbing power from the below figure?



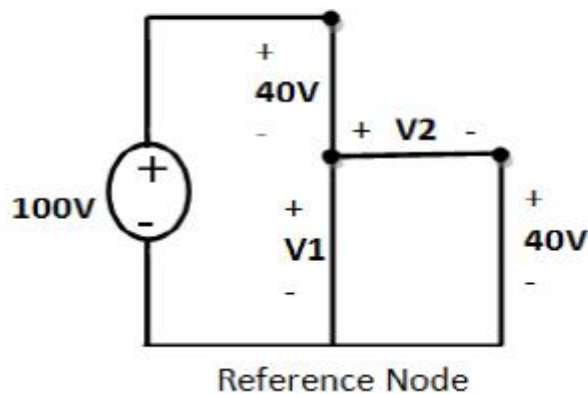
**Options :**

1. ✘ 10 volts source absorbing 20W, 2A source delivering -20W
2. ✘ 10 volts source absorbing -20W, 2A source delivering 20W
3. ✘ 10 volts source absorbing -20W, 2A source delivering -20W
4. ✔ 10 volts source absorbing 20W, 2A source delivering 20W

**Question Number : 3 Question Id : 873718123 Display Question Number : Yes Is Question**

**Mandatory : No**

Find the Voltage  $V_2$  from the below network?



**Options :**

1. ✘ -20V

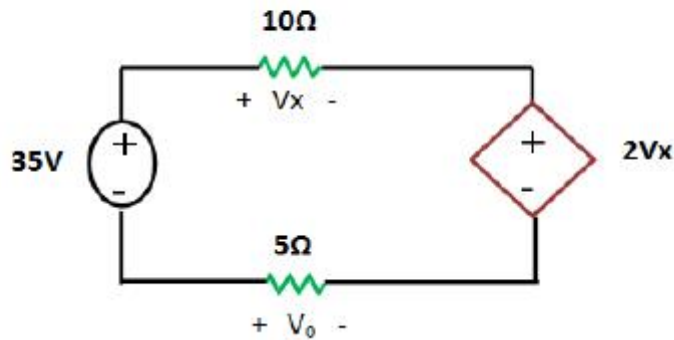
2. ✘ 10V

3. ✔ 20V

4. ✘ 15

Question Number : 4 Question Id : 873718124 Display Question Number : Yes Is Question Mandatory : No

Find  $V_X$ ,  $V_O$  from the below network?



Options :

1. ✘ -10V, 5V

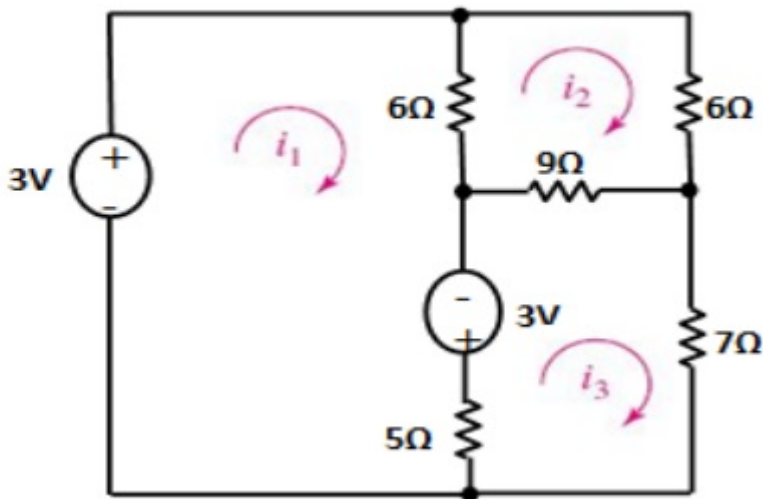
2. ✔ 10V, -5V

3. ✘ 8V, 10V

4. ✘ -10V, -5V

Question Number : 5 Question Id : 873718125 Display Question Number : Yes Is Question Mandatory : No

Find  $i_1$ ,  $i_2$  and  $i_3$  from the below network?

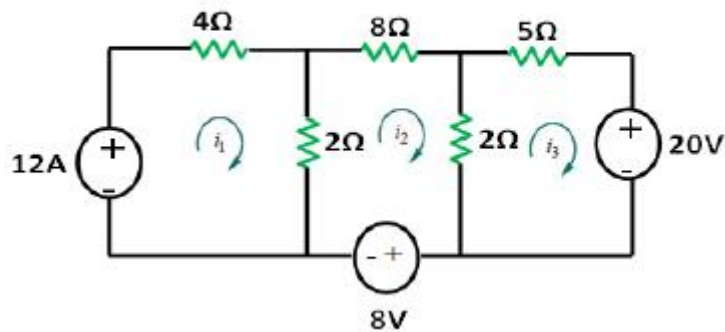


Options :

1. ✓  $i_1 = 0.989 \text{ A}$ ,  $i_2 = 0.15 \text{ A}$ ,  $i_3 = 0.15 \text{ A}$
2. ✗  $i_1 = -0.989 \text{ A}$ ,  $i_2 = 0.15 \text{ A}$ ,  $i_3 = 0.15 \text{ A}$
3. ✗  $i_1 = 0.989 \text{ A}$ ,  $i_2 = -0.15 \text{ A}$ ,  $i_3 = 0.15 \text{ A}$
4. ✗  $i_1 = 0.989 \text{ A}$ ,  $i_2 = 0.15 \text{ A}$ ,  $i_3 = -0.15 \text{ A}$

Question Number : 6 Question Id : 873718126 Display Question Number : Yes Is Question Mandatory : No

Find  $i_1$ ,  $i_2$  and  $i_3$  from the given network?



Options :

1. ✗  $i_1 = -1.7 \text{ A}$ ,  $0.9 \text{ A}$ ,  $3.11 \text{ A}$

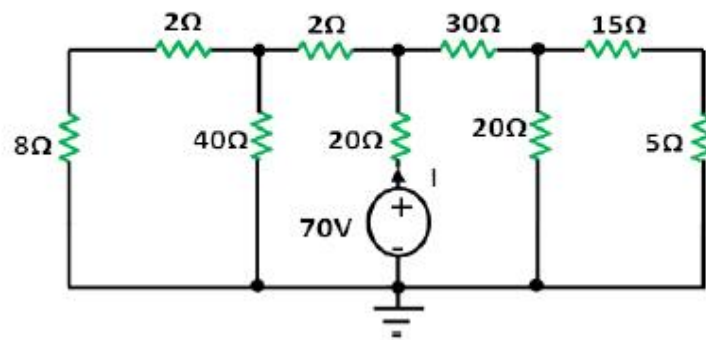
2. ✘  $i_1 = -1.7\text{A}, -0.9\text{A}, 3.11\text{A}$

3. ✘  $i_1 = -1.7\text{A}, 0.9\text{A}, -3.11\text{A}$

4. ✔  $i_1 = 1.7\text{A}, -0.9\text{A}, -3.11\text{A}$

Question Number : 7 Question Id : 873718127 Display Question Number : Yes Is Question Mandatory : No

Find current I in the given network



Options :

1. ✔  $I = 2.5\text{A}$

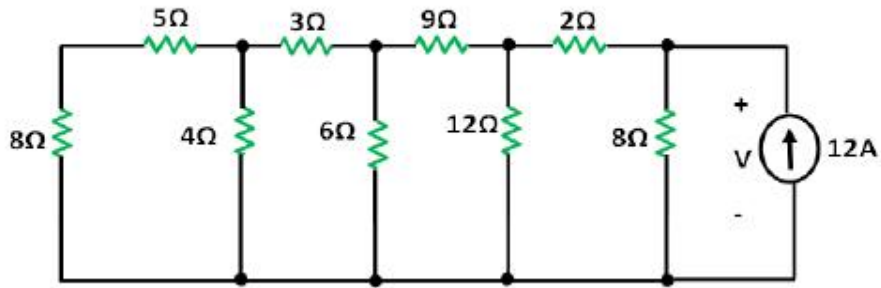
2. ✘  $I = -2.4\text{A}$

3. ✘  $I = -2.9\text{A}$

4. ✘  $I = -2.5\text{A}$

Question Number : 8 Question Id : 873718128 Display Question Number : Yes Is Question Mandatory : No

Find voltage across the current source

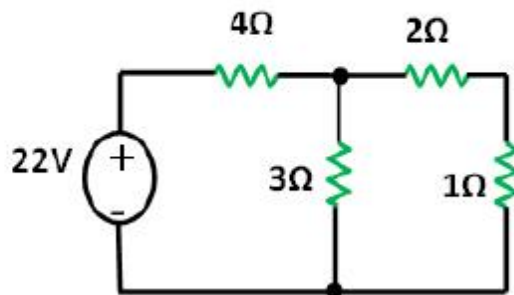


Options :

1. ✘  $-48\text{ V}$
2. ✘  $-47\text{ V}$
3. ✘  $-49\text{ V}$
4. ✔  $48\text{ V}$

Question Number : 9 Question Id : 873718129 Display Question Number : Yes Is Question Mandatory : No

Find the voltage across the 4 ohm and 2 ohm resistors respectively



Options :

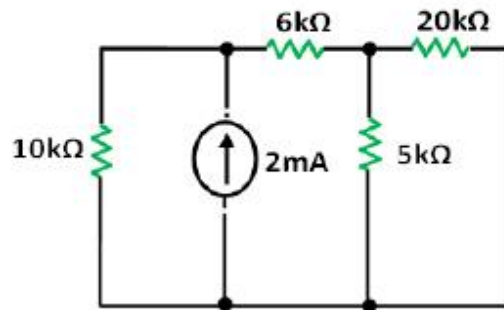
1. ✘  $-16\text{V}, -4\text{V}$
2. ✘  $-16\text{V}, 4\text{V}$

3. ✓ 16V, 4V

4. ✗ 16V, -4V

Question Number : 10 Question Id : 873718130 Display Question Number : Yes Is Question Mandatory : No

Find the current through the 10k ohm, 5k ohm in the given network



Options :

1. ✓ 1 mA, 0.8 mA

2. ✗ -1 mA , 0.8 mA

3. ✗ 1 mA, -0.8 mA

4. ✗ -1 mA, -0.8 mA

Question Number : 11 Question Id : 873718131 Display Question Number : Yes Is Question Mandatory : No

A capacitive micropone is the application of

Options :

1. ✗ Hygrometer



2. ✘ Capacitive moisture transducer
3. ✔ Capacitive displacement transducer
4. ✘ Capacitive strain transducer

**Question Number : 12 Question Id : 873718132 Display Question Number : Yes Is Question Mandatory : No**

Identify the active transducer in the following

**Options :**

1. ✔ Thermocouple
2. ✘ Thermistor
3. ✘ Strain Guage
4. ✘ LVDT

**Question Number : 13 Question Id : 873718133 Display Question Number : Yes Is Question Mandatory : No**

The relation between sensitivity and scale factor of a transducer is given by

**Options :**

1. ✘ Scale factor is double of sensitivity factor
2. ✔ Scale factor is inverse of sensitivity factor

3. ✖ Sensitivity is inverse of scale factor

4. ✖ Sensitivity is equal to scale factor

**Question Number : 14 Question Id : 873718134 Display Question Number : Yes Is Question Mandatory : No**

A metal with temperature coefficient of resistance has a value 200, its initial resistance is given by  $40\Omega$ . For an increase in  $300^{\circ}\text{C}$  to  $350^{\circ}\text{C}$  what will be the final resistance value?

**Options :**

1. ✔  $40\text{ K}\Omega$

2. ✖  $4\text{ K}\Omega$

3. ✖  $40\ \Omega$

4. ✖  $400\ \Omega$

**Question Number : 15 Question Id : 873718135 Display Question Number : Yes Is Question Mandatory : No**

Self-inductance of an inductor is given by

**Options :**

1. ✖  $L = N/S$

2. ✖  $L = 1/S$

3. ✔  $L = N^2/S$

4. ✘  $L = N^2$

**Question Number : 16 Question Id : 873718136 Display Question Number : Yes Is Question Mandatory : No**

In kitchen applications a piezoelectric crystal is used for

**Options :**

1. ✘ Skimming milk
2. ✔ Lighting a gas stove
3. ✘ Rending
4. ✘ Mixing

**Question Number : 17 Question Id : 873718137 Display Question Number : Yes Is Question Mandatory : No**

Piezoelectric transducer consists of

**Options :**

1. ✘ Copper rod
2. ✘ Aluminum wire
3. ✘ Gold crystal
4. ✔ Quartz crystal

**Question Number : 18 Question Id : 873718138 Display Question Number : Yes Is Question Mandatory : No**

A strain gauge is a passive transducer and is employed for converting

**Options :**

1. ✓ Mechanical displacement into a change of resistance
2. ✗ Pressure into a change of resistance
3. ✗ Force into a displacement
4. ✗ Pressure into displacement

**Question Number : 19 Question Id : 873718139 Display Question Number : Yes Is Question Mandatory : No**

Certain type of materials generates an electrostatic charge or voltage when mechanical force is applied across them. Such materials are called

**Options :**

1. ✓ Piezo-electric
2. ✗ Photo-electric
3. ✗ Thermo-electric
4. ✗ Photo-resistive

**Question Number : 20 Question Id : 873718140 Display Question Number : Yes Is Question Mandatory : No**

Pressure transducer for measuring blood pressure is

**Options :**

1. ✘ Strain gauge transducer only
2. ✔ Strain gauge or capacitive transducer
3. ✘ Resistive transducer
4. ✘ Fiber optic transducer

**Question Number : 21 Question Id : 873718141 Display Question Number : Yes Is Question**

**Mandatory : No**

pH value of venous blood is

**Options :**

1. ✘ 7.30
2. ✘ 7.40
3. ✔ 7.35
4. ✘ 7.45

**Question Number : 22 Question Id : 873718142 Display Question Number : Yes Is Question**

**Mandatory : No**

Strain gauge, LVDT and thermocouple are examples of

**Options :**

1. ✘ Active transducers
2. ✘ Passive transducers
3. ✔ Analog transducers
4. ✘ Primary transducers

**Question Number : 23 Question Id : 873718143 Display Question Number : Yes Is Question Mandatory : No**

An inverse transducer is a device which converts

**Options :**

1. ✔ An electrical quantity into a non electrical quantity
2. ✘ Electrical quantity into mechanical quantity
3. ✘ Electrical energy into thermal energy
4. ✘ Electrical energy into light energy

**Question Number : 24 Question Id : 873718144 Display Question Number : Yes Is Question Mandatory : No**

Relative humidity is:

**Options :**

The moisture present in a body of air expressed as a percentage of saturation at the

1. ✔ existing temperature
2. ✘ The moisture in a body of air, in grams per cubic meter

3. ✘ The temperature at which moisture will condense from a body of air

The ratio of actual moisture in a volume of air to the moisture that would exist at

4. ✘ optimum comfort in a similar volume

**Question Number : 25 Question Id : 873718145 Display Question Number : Yes Is Question Mandatory : No**

When a wet and dry bulb Psychrometer is read to determine relative humidity:

**Options :**

1. ✘ The dry bulb will read lower than the wet bulb

2. ✘ The two thermometers may read the same

3. ✔ The wet bulb will read lower than the dry bulb

4. ✘ A formula may be employed to relate the wet bulb reading to relative humidity

**Question Number : 26 Question Id : 873718146 Display Question Number : Yes Is Question Mandatory : No**

When the diode is shorted for both forward and reverse biased condition, meter reads

**Options :**

1. ✘ 0.2 V

2. ✘ 0.5 V

3. ✔ 0 V

4. ✘ 0.7 V

**Question Number : 27 Question Id : 873718147 Display Question Number : Yes Is Question Mandatory : No**

If the biasing voltage is 10 V and  $R = 1.0\text{Kohm}$ , then forward voltage for practical diode model will be

**Options :**

1. ✘ 5 V

2. ✔ 9.3 V

3. ✘ 10 V

4. ✘ 10.7 V

**Question Number : 28 Question Id : 873718148 Display Question Number : Yes Is Question Mandatory : No**

During diffusion, decrease in energy level of conduction band in n region is loss of \_\_\_\_

**Options :**

1. ✘ Lower energy electrons

2. ✔ Higher energy electrons

3. ✘ 1<sup>st</sup> Shell electrons

4. ✘ 2<sup>nd</sup> Shell electrons



Question Number : 29 Question Id : 873718149 Display Question Number : Yes Is Question

Mandatory : No

A small voltage drop occurs across pn region due to internal resistance of material, this small resistance is called \_\_\_\_

Options :

1. ✘ Static Resistance
2. ✔ Dynamic Resistance
3. ✘ Base Resistance
4. ✘ Drain Resistance

Question Number : 30 Question Id : 873718150 Display Question Number : Yes Is Question

Mandatory : No

Typical open circuit voltage for both forward and reverse biased condition is approximately

Options :

1. ✘ 0.6 V
2. ✘ 0.7 V
3. ✔ 2.6 V
4. ✘ 1.7 V

Question Number : 31 Question Id : 873718151 Display Question Number : Yes Is Question

Mandatory : No

RC coupling is used for \_\_\_\_\_ amplification

**Options :**

1. ✓ Voltage
2. ✗ Current
3. ✗ Power
4. ✗ Resistance

**Question Number : 32 Question Id : 873718152 Display Question Number : Yes Is Question**

**Mandatory : No**

When a multistage amplifier is to amplify d.c. signal, then one must use \_\_\_ coupling.

**Options :**

1. ✗ RC
2. ✗ Transformer
3. ✓ Direct
4. ✗ Indirect

**Question Number : 33 Question Id : 873718153 Display Question Number : Yes Is Question**

**Mandatory : No**

If a three-stage amplifier has individual stage gains of 10 db, 5 db and 12 db, then total gain in db is \_\_\_\_\_

**Options :**

1. ✗ 600 db

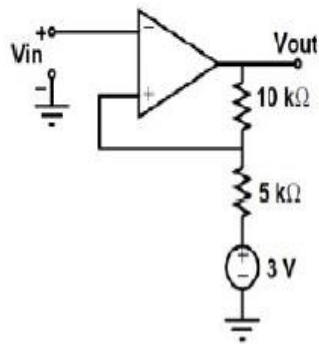
2. ✘ 24 db

3. ✘ 14 db

4. ✔ 27 db

**Question Number : 34 Question Id : 873718154 Display Question Number : Yes Is Question Mandatory : No**

For the operational amplifier circuit shown, the output saturation voltages are  $\pm 15\text{V}$ . The upper and lower threshold voltages for the circuit are, respectively,



**Options :**

1. ✘ +5 V and -5 V

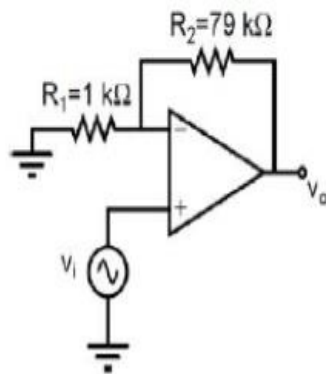
2. ✔ +7 V and -3 V

3. ✘ +3 V and -7 V

4. ✘ +3 V and -3 V

**Question Number : 35 Question Id : 873718155 Display Question Number : Yes Is Question Mandatory : No**

The amplifier circuit shown in the figure is implemented using a compensated operation amplifier (op-amp), and has an open-loop voltage gain,  $A_0=105$  V/V and an open-loop cut-off frequency,  $f_c=8$  Hz. The voltage gain of the amplifier at 15 kHz, in V/V is \_\_\_\_\_.

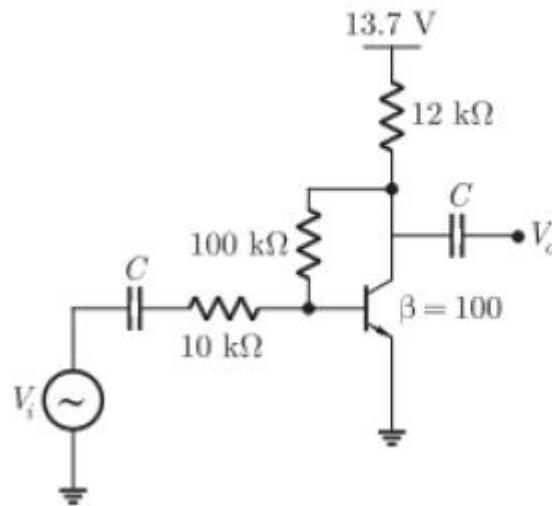


Options :

1. ✓ 43.3 to 45.3
2. ✗ 48.3 to 49.3
3. ✗ 47.3 to 49.3
4. ✗ 46.3 to 47.3

Question Number : 36 Question Id : 873718156 Display Question Number : Yes Is Question Mandatory : No

The voltage gain  $A_v$  of the circuit shown below is \_\_\_\_\_



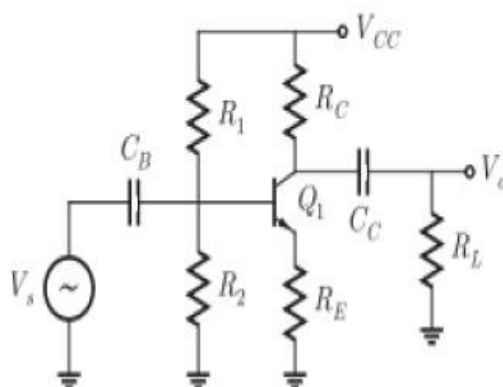
Options :

1. ✘  $|A_v| \sim 200$
2. ✘  $|A_v| \sim 250$
3. ✘  $|A_v| \sim 150$
4. ✔  $|A_v| \sim 100$

Question Number : 37 Question Id : 873718157 Display Question Number : Yes Is Question

Mandatory : No

The amplifier shown below has a voltage gain of -25, an input resistance of 10 kW, and a lower 3-dB cut-off frequency of 20 Hz. Which one of the following statements is **true** when the emitter resistance  $R_E$  is doubled?

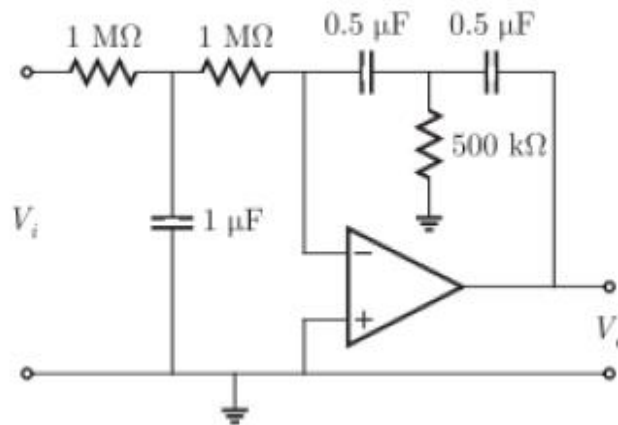


Options :

1. ✘ Collector bias current will increase
2. ✘ Input resistance will decrease
3. ✔ Magnitude of voltage gain will decrease
4. ✘ Lower 3-dB cut-off frequency will increase

Question Number : 38 Question Id : 873718158 Display Question Number : Yes Is Question Mandatory : No

The ideal opamp based circuit shown below acts as a \_\_\_\_\_



Options :

1. ✘ high-pass filter
2. ✘ band-pass filter
3. ✘ band-reject filter
4. ✔ low-pass filter

Question Number : 39 Question Id : 873718159 Display Question Number : Yes Is Question

Mandatory : No

An ideal value of stability factor is \_\_\_\_\_?

Options :

1. ✓ 1

2. ✗ 100

3. ✗ 200

4. ✗ 101

Question Number : 40 Question Id : 873718160 Display Question Number : Yes Is Question

Mandatory : No

Name the filter that has two pass bands?

Options :

1. ✗ Low pass filter

2. ✓ Band- reject filter

3. ✗ High pass filter

4. ✗ Band-pass filter

Question Number : 41 Question Id : 873718161 Display Question Number : Yes Is Question

Mandatory : No

$A(A + B) = ?$

Options :

1. ✗ AB

2. ✘ 1

3. ✘  $(1 + AB)$

4. ✔ A

**Question Number : 42 Question Id : 873718162 Display Question Number : Yes Is Question Mandatory : No**

De Morgan's theorem states that \_\_\_\_\_

**Options :**

1. ✔  $(AB)' = A' + B'$

2. ✘  $(A + B)' = A' * B$

3. ✘  $A' + B' = A'B'$

4. ✘  $(AB)' = A' + B$

**Question Number : 43 Question Id : 873718163 Display Question Number : Yes Is Question Mandatory : No**

\_\_\_\_\_ expressions can be implemented using either (1) 2-level AND-OR logic circuits or (2) 2-level NAND logic circuits.

**Options :**

1. ✘ POS

2. ✘ Literals



3. ✓ SOP

4. ✗ both POS and SOP

**Question Number : 44 Question Id : 873718164 Display Question Number : Yes Is Question Mandatory : No**

How much input and output needed for demultiplexer?

**Options :**

1. ✗ Many inputs to one output

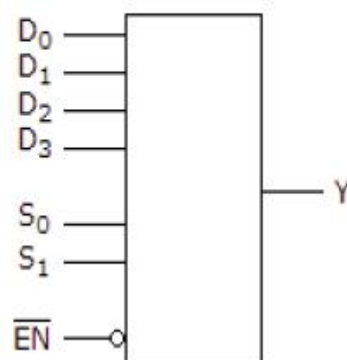
2. ✓ One input to many outputs

3. ✗ One input to one output

4. ✗ Many inputs to many outputs

**Question Number : 45 Question Id : 873718165 Display Question Number : Yes Is Question Mandatory : No**

For the device shown here, let all D inputs be LOW, both S inputs be HIGH, and the  $\overline{EN}$  input be HIGH. What is the status of the Y output?



**Options :**

1. ✓ LOW

2. ✖ HIGH

3. ✖ Don't Care

4. ✖ Cannot be determined

**Question Number : 46 Question Id : 873718166 Display Question Number : Yes Is Question Mandatory : No**

How many 2:1 multiplexers are required to generate  $2^n:1$  multiplexer?

**Options :**

1. ✖  $2^n$

2. ✔  $2^n-1$

3. ✖  $2^{n+1}$

4. ✖  $2^{n-1}$

**Question Number : 47 Question Id : 873718167 Display Question Number : Yes Is Question Mandatory : No**

Consider a 4 bit Johnson counter with an initial value of 0000. The counting sequence of this counter is:

**Options :**

1. ✖ 0, 1, 3, 7, 15, 14, 12, 8, 0

2. ✖ 0, 1, 3, 5, 7, 9, 11, 13, 15, 0

3. ✘ 0, 2, 4, 6, 8, 10, 12, 14, 0

4. ✔ 0, 8, 12, 14, 15, 7, 3, 1, 0

**Question Number : 48 Question Id : 873718168 Display Question Number : Yes Is Question Mandatory : No**

The minimum number of JK flip-flops required to construct a synchronous counter with the count sequence (0, 0, 1, 1, 2, 2, 3, 3, 0, 0,...) is \_\_\_\_\_

**Options :**

1. ✘ 0

2. ✘ 1

3. ✘ 2

4. ✔ 3

**Question Number : 49 Question Id : 873718169 Display Question Number : Yes Is Question Mandatory : No**

For a ring counter, the number of output states are always equal to \_\_\_\_\_

**Options :**

1. ✘ Number of input states

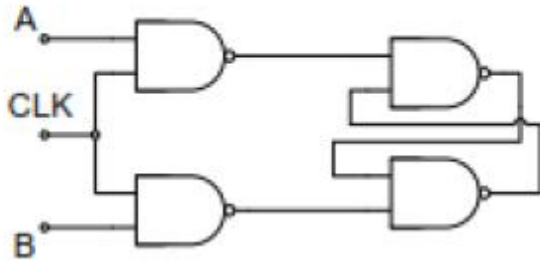
2. ✘ Number of clock pulses

3. ✘ Number of registers

4. ✓ Number of flip flops

Question Number : 50 Question Id : 873718170 Display Question Number : Yes Is Question Mandatory : No

Consider the given circuit. In this circuit, the race around \_\_\_\_\_



Options :

1. ✓ Does not occur
2. ✗ Occurs when CLK=0
3. ✗ Occurs when CLK=1 and A=B=1
4. ✗ Occurs when CLK=1 and A=B=0

Question Number : 51 Question Id : 873718171 Display Question Number : Yes Is Question Mandatory : No

Among the digital IC families ,ECL ,TTL and CMOS

Options :

1. ✓ ECL has the least propagation delay
2. ✗ TTL has largest fan out

3. ✘ CMOS has lowest noise margin
4. ✘ TTL has the lower power consumption

**Question Number : 52 Question Id : 873718172 Display Question Number : Yes Is Question Mandatory : No**

The basic function of TTL gate is which of the following functions?

**Options :**

1. ✘ AND
2. ✘ OR
3. ✘ NOR
4. ✔ NAND

**Question Number : 53 Question Id : 873718173 Display Question Number : Yes Is Question Mandatory : No**

Which of the following logic families dissipate minimum power

**Options :**

1. ✘ RTL
2. ✘ DTL
3. ✔ CMOS
4. ✘ I<sup>2</sup>L

Question Number : 54 Question Id : 873718174 Display Question Number : Yes Is Question

Mandatory : No

A microcontroller at-least should consist of:

Options :

1. ✘ RAM, ROM, I/O ports and timers
2. ✘ CPU, RAM, I/O ports and timers
3. ✔ CPU, RAM, ROM, I/O ports and timers
4. ✘ CPU, ROM, I/O ports and timers

Question Number : 55 Question Id : 873718175 Display Question Number : Yes Is Question

Mandatory : No

Which of the following are the components of a microprocessor?

Options :

1. ✘ ALU
2. ✘ Register array
3. ✘ Control unit
4. ✔ All the above

Question Number : 56 Question Id : 873718176 Display Question Number : Yes Is Question

Mandatory : No

The Fourier transform of a periodic waveform is

**Options :**

1. ✘ another periodic waveform
2. ✘ continuous spectrum
3. ✘ a periodic signal
4. ✔ a train of pulses

**Question Number : 57 Question Id : 873718177 Display Question Number : Yes Is Question Mandatory : No**

Parseval's theorem is used to find

**Options :**

1. ✘ energy of a signal in time domain
2. ✔ energy of a signal in frequency domain
3. ✘ output of a system for impulse input
4. ✘ output of a system for unit step input

**Question Number : 58 Question Id : 873718178 Display Question Number : Yes Is Question Mandatory : No**

Convolution of two voltage pulses of amplitudes 1 Volt and width 1 sec is a

**Options :**

1. ✘ rectangular pulse

2. ✘ square pulse
3. ✘ trapezoidal
4. ✔ triangular pulse

**Question Number : 59 Question Id : 873718179 Display Question Number : Yes Is Question Mandatory : No**

The power spectral density of white noise is

**Options :**

1. ✔ constant
2. ✘ band limited
3. ✘ impulse
4. ✘ low pass band limited

**Question Number : 60 Question Id : 873718180 Display Question Number : Yes Is Question Mandatory : No**

The number of AM broadcast stations that can be accommodated in a 100 KHz bandwidth for the highest modulating frequency of 5 KHz with no guard band is

**Options :**

1. ✘ 5
2. ✔ 10



3. ✖ 20

4. ✖ 50

**Question Number : 61 Question Id : 873718181 Display Question Number : Yes Is Question Mandatory : No**

In an AM signal, the peak antenna current is 13 Amp and the minimum current is 7 Amp.

The percentage modulation is

**Options :**

1. ✖ 20%

2. ✔ 30%

3. ✖ 50%

4. ✖ 100%

**Question Number : 62 Question Id : 873718182 Display Question Number : Yes Is Question Mandatory : No**

In FM system, if the depth of modulation is doubled, the output power

**Options :**

1. ✖ increases by a factor of 2

2. ✖ increases by a factor of 3

3. ✖ increases by a factor of 4

4. ✓ remains at unmodulated value

**Question Number : 63 Question Id : 873718183 Display Question Number : Yes Is Question**

**Mandatory : No**

The main advantage of super heterodyne receiver is

**Options :**

1. ✗ simple circuit
2. ✗ better tracking
3. ✓ improvement in selectivity and sensitivity
4. ✗ better alignment

**Question Number : 64 Question Id : 873718184 Display Question Number : Yes Is Question**

**Mandatory : No**

An increase in the modulation index leads to increase in bandwidth in case of

**Options :**

1. ✗ AM
2. ✓ FM
3. ✗ PM
4. ✗ PCM

Question Number : 65 Question Id : 873718185 Display Question Number : Yes Is Question

Mandatory : No

A PAM signal can be detected by

Options :

1. ✘ band pass filter
2. ✘ band stop filter
3. ✘ high pass filter
4. ✔ low pass filter

Question Number : 66 Question Id : 873718186 Display Question Number : Yes Is Question

Mandatory : No

As the sampling frequency is increased, the guard band becomes

Options :

1. ✘ smaller
2. ✘ remains same
3. ✔ larger
4. ✘ becomes narrow

Question Number : 67 Question Id : 873718187 Display Question Number : Yes Is Question

Mandatory : No

Which of the following gives maximum probability of error

Options :

1. ✓ ASK

2. ✗ FSK

3. ✗ PSK

4. ✗ DPSK

Question Number : 68 Question Id : 873718188 Display Question Number : Yes Is Question Mandatory : No

The total bandwidth required for a raised cosine spectrum is

Options :

1. ✗  $W/2$

2. ✗  $W$

3. ✓  $2W$

4. ✗  $4W$

Question Number : 69 Question Id : 873718189 Display Question Number : Yes Is Question Mandatory : No

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 : 70 Question Id : 873718190 Display Question Number : Yes Is Question Mandatory : No**

A PAM signal can be detected by using

**Options :**

1. ✘ an ADC

2. ✔ an integrator

3. ✘ a BPF

4. ✘ a HPF

**Question Number : 71 Question Id : 873718191 Display Question Number : Yes Is Question Mandatory : No**

The capacitive microphone is used for the detection of

**Options :**

1. ✘ Heart rate

2. ✘ Blood flow

3. ✓ Heart sound

4. ✗ PH electrode

Question Number : 72 Question Id : 873718192 Display Question Number : Yes Is Question

Mandatory : No

Magnetic blood flow meter works on ----- principle

Options :

1. ✗ Electrical conductivity

2. ✗ Electrical resistivity

3. ✓ Faraday law of induction

4. ✗ Impedance

Question Number : 73 Question Id : 873718193 Display Question Number : Yes Is Question

Mandatory : No

The normal PH of the blood is

Options :

1. ✗ 7

2. ✓ 7.4

3. ✗ 6

4. ✗ 8

**Question Number : 74 Question Id : 873718194 Display Question Number : Yes Is Question Mandatory : No**

\_\_\_\_\_ is the closeness with which an instrument reading approaches the true value of the variable being measured

**Options :**

1. ✓ Accuracy
2. ✗ Isolation
3. ✗ Linearity
4. ✗ Stability

**Question Number : 75 Question Id : 873718195 Display Question Number : Yes Is Question Mandatory : No**

An infrared LED is usually fabricated from

**Options :**

1. ✗ GA
2. ✗ Si
3. ✗ GaAs
4. ✓ Ga As P

**Question Number : 76 Question Id : 873718196 Display Question Number :**

**Mandatory : No**

Parallax error is not present in

**Options :**

1. ✘ moving coil meter
2. ✘ FET voltmeter
3. ✘ Diode voltmeter
4. ✔ Digital voltmeter

**Question Number : 77 Question Id : 873718197 Display Question Number : Yes Is Question**

**Mandatory : No**

The best method for precise measurement of low resistance is

**Options :**

1. ✔ Wheatstone bridge
2. ✘ Loss of charge method
3. ✘ Ohm meter
4. ✘ Kelvin double bridge

**Question Number : 78 Question Id : 873718198 Display Question Number : Yes Is Question**

**Mandatory : No**

Which of the following optical transducers is an active transducer

**Options :**



1. ✘ Photo emissive cell
2. ✘ Photo diode
3. ✘ Photo transistor
4. ✔ Photo voltaic cell

**Question Number : 79 Question Id : 873718199 Display Question Number : Yes Is Question Mandatory : No**

A moving coil galvanometer is made into a DC ammeter by connecting

**Options :**

1. ✘ a low resistance across the meter
2. ✘ a high resistance in series with the meter
3. ✔ a pure inductance across the meter
4. ✘ a capacitor in series with the meter

**Question Number : 80 Question Id : 873718200 Display Question Number : Yes Is Question Mandatory : No**

The Triac can be used as \_\_\_\_\_

**Options :**

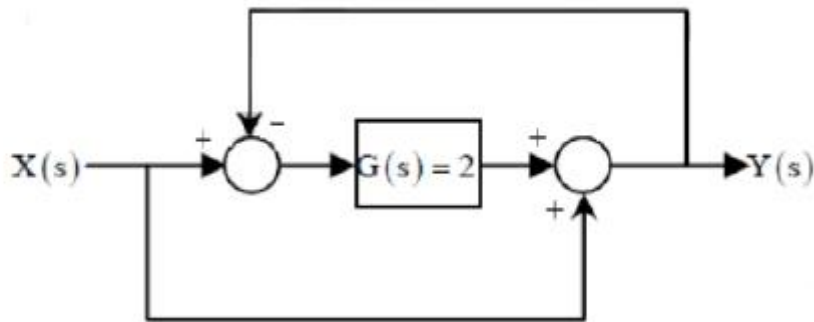
1. ✘ inverter
2. ✘ rectifier

3. ✓ multiquadrant chopper

4. ✗ cycloconverter

Question Number : 81 Question Id : 873718201 Display Question Number : Yes Is Question Mandatory : No

For the system shown in the figure,  $Y(s) / X(s) =$  \_\_\_\_\_.



Options :

1. ✗ 1

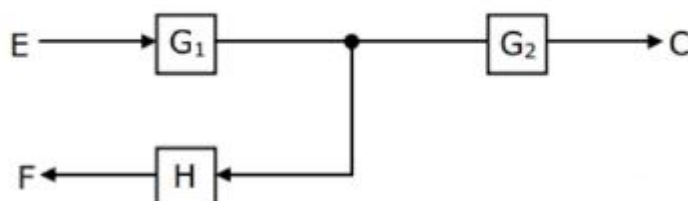
2. ✗ 2

3. ✗ 3

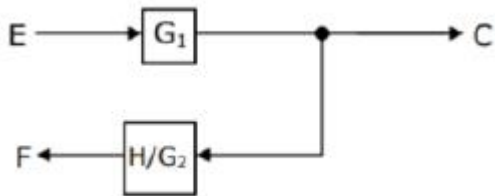
4. ✓ 4

Question Number : 82 Question Id : 873718202 Display Question Number : Yes Is Question Mandatory : No

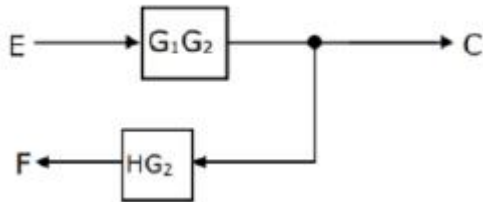
The equivalent of the block diagram in figure is given as



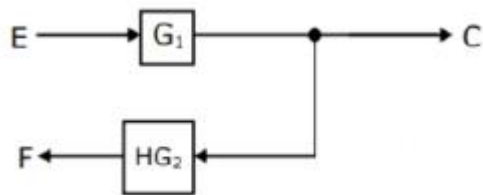
Options :



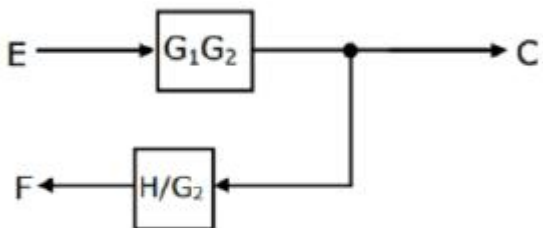
1. ✘



2. ✘



3. ✘



4. ✔

Question Number : 83 Question Id : 873718203 Display Question Number : Yes Is Question

Mandatory : No

For a second order system, damping ratio ( $\zeta$ ), is  $0 < \zeta < 1$ , then the roots of the characteristic polynomial are

Options :

1. ✘ Real but not equal

2. ✘ Real and equal

3. ✓ Complex conjugate

4. ✗ Imaginary

**Question Number : 84 Question Id : 873718204 Display Question Number : Yes Is Question Mandatory : No**

The number of roots of  $s^3+5s^2+7s+3=0$  in the left half of the s-plane are

**Options :**

1. ✗ 0

2. ✗ 1

3. ✗ 2

4. ✓ 3

**Question Number : 85 Question Id : 873718205 Display Question Number : Yes Is Question Mandatory : No**

Given the  $G(s)H(s)=K/s(s+1)(s+3)$ , the point of intersection of the asymptotes of the root loci with the real axis is

**Options :**

1. ✗ -4

2. ✗ 1.33

3. ✓ -1.33

4. ✗ 4

**Question Number : 86 Question Id : 873718206 Display Question Number : Yes Is Question Mandatory : No**

In the Bode-plot of a unity feedback control system, the value of phase of  $G(j\omega)$  at the gain cross over frequency is  $-125^\circ$ . The phase margin of the system is

**Options :**

1. ✘  $-125^\circ$
2. ✘  $-55^\circ$
3. ✔  $55^\circ$
4. ✘  $125^\circ$

**Question Number : 87 Question Id : 873718207 Display Question Number : Yes Is Question Mandatory : No**

A process with open-loop model,  $G(s) = \frac{K e^{-s\tau_d}}{\tau s + 1}$ , is controlled by a PID controller. For this process

**Options :**

1. ✘ the integral mode improves transient performance
2. ✔ the integral mode improves steady state performance
3. ✘ the derivative mode improves transient performance
4. ✘ the derivative mode improves steady state performance

Question Number : 88 Question Id : 873718208 Display Question Number : Yes Is Question

Mandatory : No

The open-loop transfer function of a plant is given as  $G(s)=1/s^2-1$ . If the plant is operated in a unity feedback configuration, then the lead compensator that can stabilize this control system is

Options :

1. ✘  $G(s)=10(s-1)/s+2$
2. ✘  $G(s)=10(s+4)/s+2$
3. ✔  $G(s)=10(s+2)/s+10$
4. ✘  $G(s)=2(s+2)/s+10$

Question Number : 89 Question Id : 873718209 Display Question Number : Yes Is Question

Mandatory : No

Let  $x(t)$  be the input to a linear, time-invariant system. The required output is  $4x(t-2)$ .

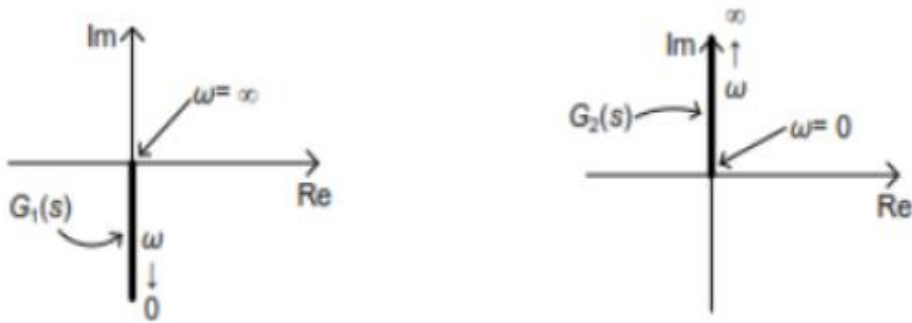
The transfer function of the system should be

Options :

1. ✘  $4e^{j4\pi f}$
2. ✘  $2e^{-j8\pi f}$
3. ✔  $4e^{-j4\pi f}$
4. ✘  $2e^{j8\pi f}$

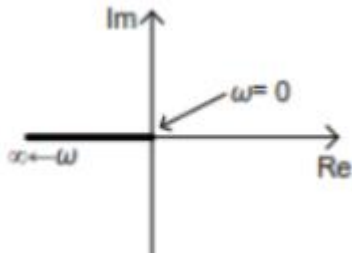
Question Number : 90 Question Id : 873718210 Display Question Number : Yes Is Question Mandatory : No

Nyquist plot of two functions  $G_1(s)$  and  $G_2(s)$  are shown in figure.

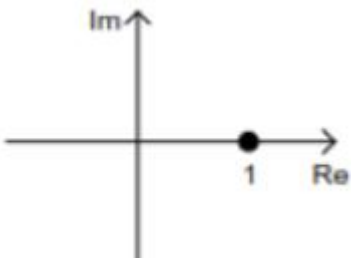


Nyquist plot of the product of  $G_1(s)$  and  $G_2(s)$  is

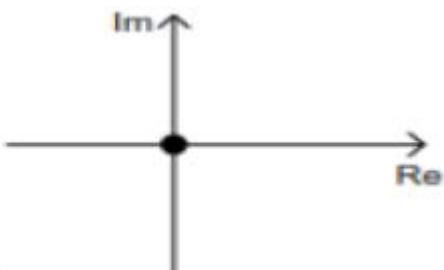
Options :



1. ✘

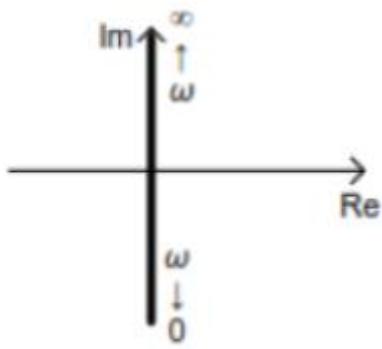


2. ✔



3. ✘

4. ✘



Question Number : 91 Question Id : 873718211 Display Question Number : Yes Is Question Mandatory : No

The Mass spectrum is a plot of

Options :

1. ✘ mass/charge
2. ✔ Ion abundance vs Mass/charge
3. ✘ ion abundance
4. ✘ electron motion

Question Number : 92 Question Id : 873718212 Display Question Number : Yes Is Question Mandatory : No

The unit of spectrum measured in Mass Spectrometry is

Options :

1. ✘ Coulombs/ unit charge
2. ✘ Hertz
3. ✘ Daltons



4. ✓ Daltons / unit charge

Question Number : 93 Question Id : 873718213 Display Question Number : Yes Is Question

Mandatory : No

Mass spectrometer can be used to identify \_\_\_\_\_ in the expired gas

Options :

1. ✗ Oxygen

2. ✗ Nitrogen

3. ✗ Carbon di-oxide

4. ✓ Gases other than O<sub>2</sub>, N<sub>2</sub>, CO<sub>2</sub>

Question Number : 94 Question Id : 873718214 Display Question Number : Yes Is Question

Mandatory : No

In a spectrophotometer for each wavelength setting, the reference is set by

Options :

1. ✗ Sample itself

2. ✗ UV lights

3. ✓ Black Cuvette

4. ✗ Visible light

**Question Number : 95 Question Id : 873718215 Display Question Number : Yes Is Question Mandatory : No**

The absorption filters used in the spectrophotometer consists of absorption filters made up of

**Options :**

1. ✓ Gelatine
2. ✗ Paper
3. ✗ Wood
4. ✗ Iodine

**Question Number : 96 Question Id : 873718216 Display Question Number : Yes Is Question Mandatory : No**

The 2 types of wavelength selectors in spectrophotometers are

**Options :**

1. ✓ Glass filters and interference filters
2. ✗ Glass filters and polarization filters
3. ✗ Glass filters and prisms
4. ✗ Glass filters and LEDs

**Question Number : 97 Question Id : 873718217 Display Question Number : Yes Is Question Mandatory : No**

In Laser production the amount change of Energy state is a function of

**Options :**

1. ✘ Absolute temperature
2. ✘ Valence electrons
3. ✘ Velocity
4. ✔ Plank's constant

**Question Number : 98 Question Id : 873718218 Display Question Number : Yes Is Question**

**Mandatory : No**

In an LED the holes lie in the \_\_\_\_\_ band and the electrons lie in the \_\_\_\_\_ band.

**Options :**

1. ✔ Valence, Conduction
2. ✘ Valence, Insulation
3. ✘ Valence, Inert
4. ✘ Conduction, Valence

**Question Number : 99 Question Id : 873718219 Display Question Number : Yes Is Question**

**Mandatory : No**

A biomedical application of photodetector is

**Options :**

1. ✘ MRI

2. ✘ Ultrasound

3. ✔ Pulse Oximeter

4. ✘ ECG

**Question Number : 100 Question Id : 873718220 Display Question Number : Yes Is Question Mandatory : No**

In a fiber optic cable the refractive index of the core is \_\_\_\_\_ than that of the cladding

**Options :**

1. ✔ greater

2. ✘ lesser

3. ✘ almost equal

4. ✘ equal

**Question Number : 101 Question Id : 873718221 Display Question Number : Yes Is Question Mandatory : No**

For a multimoded graded index Fibre Optic cable the core diameters are \_\_\_\_\_ than that of the single mode fiber

**Options :**

1. ✔ greater

2. ✘ lesser

3. ✘ almost equal

4. ✘ equal

**Question Number : 102 Question Id : 873718222 Display Question Number : Yes Is Question Mandatory : No**

In photoconductivity, the gain is (consider E- No of electrons; P- No of Protons; Ph-No of photons).

**Options :**

1. ✘ P/E

2. ✘ E/ P

3. ✔ E/ Ph

4. ✘ Ph/ E

**Question Number : 103 Question Id : 873718223 Display Question Number : Yes Is Question Mandatory : No**

Which of these bio-potentials is more directly useful to analyse the conscious level of a patient in anaesthesia

**Options :**

1. ✘ ECG

2. ✘ EMG

3. ✔ EEG

4. ✘ PCG

**Question Number : 104 Question Id : 873718224 Display Question Number : Yes Is Question Mandatory : No**

Which of the EEG frequency relates to the REM sleep?

**Options :**

1. ✘ Alpha

2. ✘ Beta

3. ✔ Theta

4. ✘ Delta

**Question Number : 105 Question Id : 873718225 Display Question Number : Yes Is Question Mandatory : No**

The Electrode Montage selector in an EEG machine selects \_\_\_ out of \_\_\_ electrode signals.

**Options :**

1. ✔ 8 , 20

2. ✘ 1, 20

3. ✘ 2, 20

4. ✘ 16, 20

Question Number : 106 Question Id : 873718226 Display Question Number : Yes Is Question

Mandatory : No

A blood vessel that enters the heart is a \_\_\_\_\_ and that enters any other organ is \_\_\_\_\_

Options :

1. ✓ vein, artery
2. ✗ artery, vein
3. ✗ superior, inferior vena cava
4. ✗ aorta, vein

Question Number : 107 Question Id : 873718227 Display Question Number : Yes Is Question

Mandatory : No

The main pumping action of the heart is accomplished by \_\_\_\_\_ and the associated pressure is said to be \_\_\_\_\_

Options :

1. ✗ Arteries, Systolic
2. ✓ Ventricles, Systolic
3. ✗ Arteries, diastolic
4. ✗ Ventricles, diastolic

Question Number : 108 Question Id : 873718228 Display Question Number : Yes Is Question

Mandatory : No

The amplitude of ECG, EMG, EEG can be in the range of

**Options :**

1. ✘ mV,  $\mu$ V, mV
2. ✔ mV, mV,  $\mu$ V
3. ✘  $\mu$ V, mv,  $\mu$ V
4. ✘  $\mu$ V,  $\mu$ V,  $\mu$ V

**Question Number : 109 Question Id : 873718229 Display Question Number : Yes Is Question**

**Mandatory : No**

For EMG measurements to a muscle mass and a muscle fiber \_\_\_\_\_ and \_\_\_\_\_ types of electrodes are respectively used.

**Options :**

1. ✘ Surface, Surface
2. ✔ Surface, Needle
3. ✘ Needle, Surface
4. ✘ Needle, Coaxial

**Question Number : 110 Question Id : 873718230 Display Question Number : Yes Is Question**

**Mandatory : No**

The prolonged QRS complex in ECG represents

**Options :**

1. ✘ First degree Block



2. ✓ Bundle Block

3. ✗ Fibrillation

4. ✗ Defibrillation

Question Number : 111 Question Id : 873718231 Display Question Number : Yes Is Question

Mandatory : No

Consider the linear system  $x + 2y + z = 3$ ;  $ay + 4z = 8$ ;  $x + 7y + az = b$ . The values of  $(a, b)$  for which the system has more than one solution are

Options :

1. ✗  $(4, -2), (2, 6)$

2. ✗  $(5, -11), (4, 7)$

3. ✗  $(2, 3), (3, -1)$

4. ✓  $(5, 11), (-4, -7)$

Question Number : 112 Question Id : 873718232 Display Question Number : Yes Is Question

Mandatory : No

For what values of  $\lambda$  the homogeneous system  $(\lambda - 2)x + 4y = 0$ ;  $4x + (\lambda - 2)y = 0$  has a nontrivial solution

Options :

1. ✗ 6, 2

2. ✗ 2, -6

3. ✓ 6,-2

4. ✗ -6,-2

Question Number : 113 Question Id : 873718233 Display Question Number : Yes Is Question Mandatory : No

$$\lim_{(x,y) \rightarrow (0,0)} \frac{-xy}{x^2+y^2}$$

Options :

1. ✓ Does not exist

2. ✗ 0

3. ✗ 0.5

4. ✗ -0.5

Question Number : 114 Question Id : 873718234 Display Question Number : Yes Is Question Mandatory : No

$$\int_0^1 \int_y^{\sqrt{y}} dx dy \text{ is equal to}$$

Options :

1. ✓  $\int_0^1 \int_{x^2}^x dy dx$

2. ✗  $\int_0^1 \int_{\sqrt{x}}^x dy dx$

3. ✗

$$\int_0^1 \int_x^{x^2} dy dx$$

4. ✘  $\int_0^1 \int_{\sqrt{x}}^{x^2} dy dx$

Question Number : 115 Question Id : 873718235 Display Question Number : Yes Is Question Mandatory : No

Solution of  $e^y dx + (xe^y + 3y^2) dy = 0$  is

Options :

1. ✔  $xe^y + y^3 = C$

2. ✘  $ye^x + y^3 = C$

3. ✘  $xe^y + x^3 = C$

4. ✘  $ye^x + x^3 = C$

Question Number : 116 Question Id : 873718236 Display Question Number : Yes Is Question Mandatory : No

The boundary value problem  $\frac{d^2y}{dx^2} + 25y = 0$ ;  $\frac{dy}{dx}(0) = 6$ ,  $\frac{dy}{dx}(\pi) = -9$

Options :

1. ✘ has exactly two solutions

2. ✘ has infinitely many solutions

3. ✘ has unique solution

4. ✓ has no solution

**Question Number : 117 Question Id : 873718237 Display Question Number : Yes Is Question Mandatory : No**

Ms. Perez figures that there is a 30 percent chance that her company will set up a branch office in Phoenix. If it does, she is 60 percent sure that she will made manager of this new operation. The probability that Perez will be a Phoenix branch office manager is

**Options :**

1. ✗ 0.25

2. ✓ 0.18

3. ✗ 0.12

4. ✗ 0.32

**Question Number : 118 Question Id : 873718238 Display Question Number : Yes Is Question Mandatory : No**

A binomial random variable has mean 5 and variance 4. The values of  $n$  and  $p$  that characterizes the distribution of this random variable are

**Options :**

1. ✗  $n = 25, p = 0.4$

2. ✗  $n = 20, p = 0.2$

3. ✓  $n = 25, p = 0.2$

4. ✖  $n = 24, p = 0.2$

Question Number : 119 Question Id : 873718239 Display Question Number : Yes Is Question Mandatory : No

$f(z) = |z|^2$  is

Options :

1. ✖ Differentiable everywhere
2. ✔ Differentiable only at  $z = 0$
3. ✖ Differentiable for all  $z$  in  $|z| < 1$
4. ✖ Nowhere differentiable

Question Number : 120 Question Id : 873718240 Display Question Number : Yes Is Question Mandatory : No

Let  $f(x) = x - e^{-x} = 0$ . Consider the initial guess  $x_0 = 1$  then the value of  $x_1$  in Newton-Raphson method to find out the root of  $f(x) = 0$  is

Options :

1. ✔ 0.5379
2. ✖ 0.612
3. ✖ 0.597
4. ✖ 0.585