

# 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.

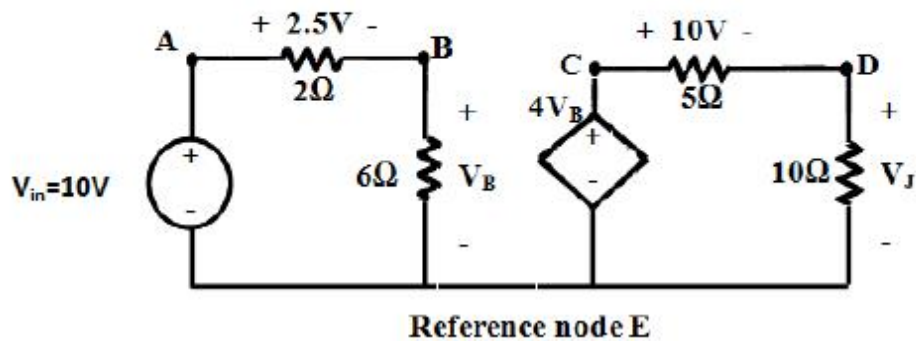
Question Paper Name :	Instrumentation Engineering 29th Sep 2021 Shift1
Duration :	120
Total Marks :	120
Display Marks:	No
Share Answer Key With Delivery Engine :	Yes
Calculator :	None
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console? ( SA type of questions will be always auto saved ) :	Yes
Is this Group for Examiner? :	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?



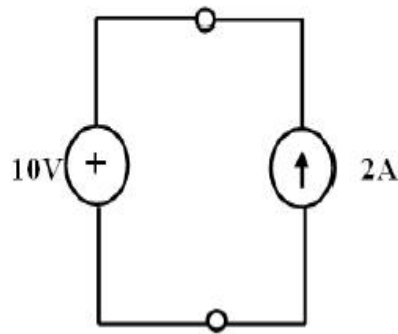
Options :

1. ✓ 20V
2. ✗ 15V
3. ✗ 9V
4. ✗ -20V

Question Number : 2 Question Id : 873718122 Display Question Number : Yes Is Question

**Mandatory : No**

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



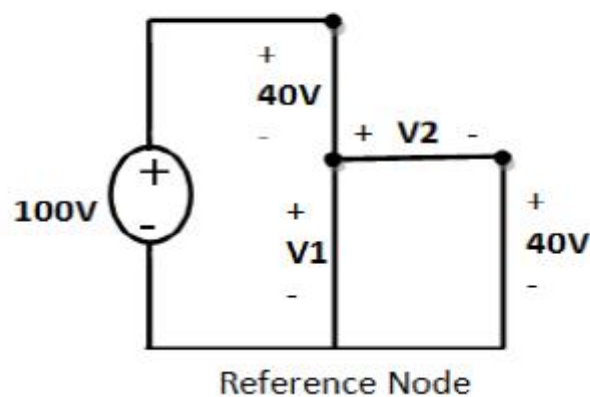
**Options :**

- 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

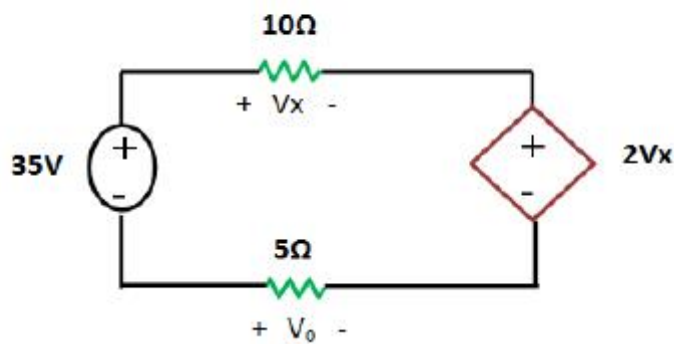
2. ✖ 10V

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

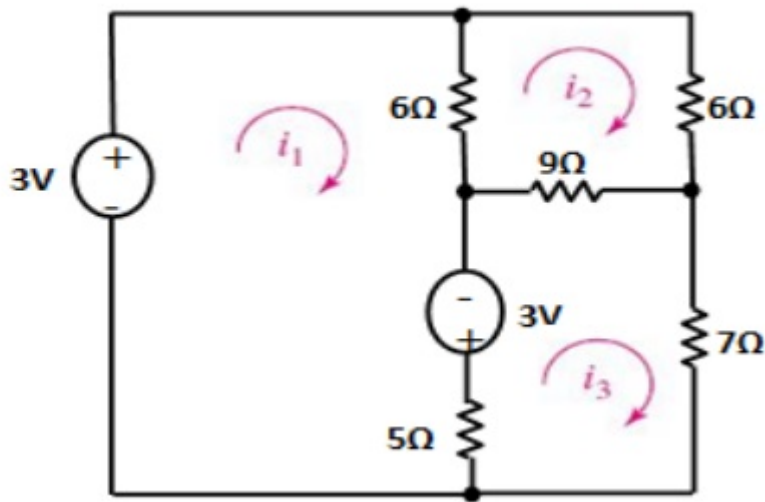
2. ✔ 10V, -5V

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?

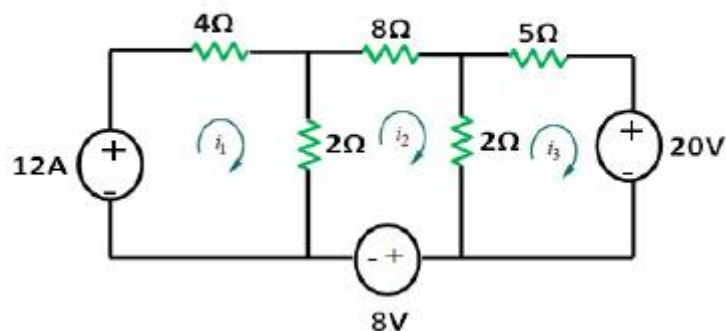


Options :

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

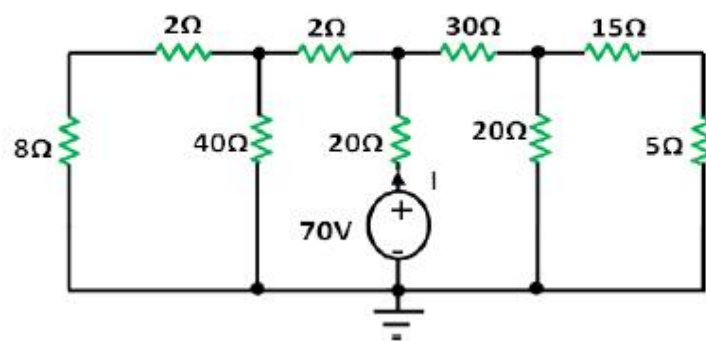
2. ✖  $i_1 = -1.7\text{A}, -0.9\text{A}, 3.11\text{A}$

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. ✔  $I = 2.5\text{A}$

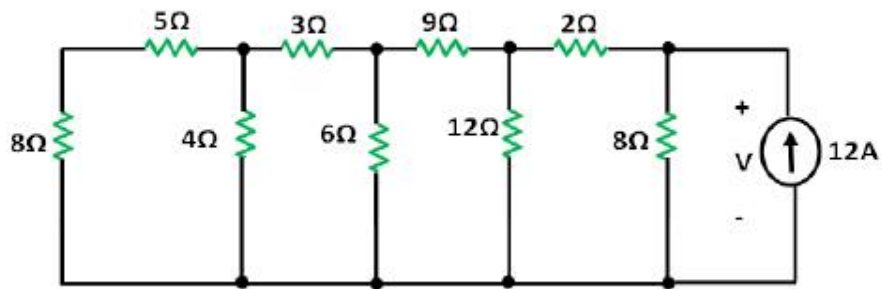
2. ✖  $I = -2.4\text{A}$

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

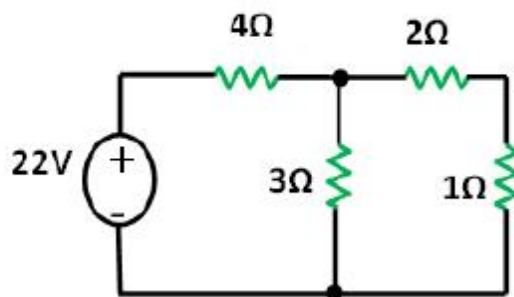


Options :

- 1. ✖ -48 V
- 2. ✖ -47 V
- 3. ✖ -49 V
- 4. ✔ 48 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 :

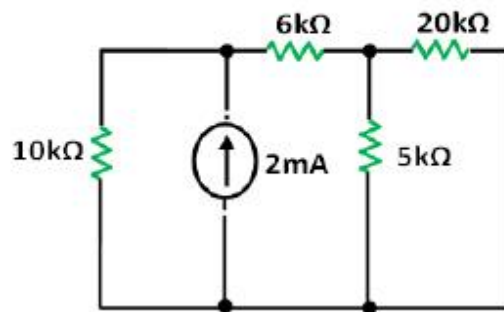
- 1. ✖ -16V,-4V
- 2. ✖ -16V,4V

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  $R = 1.0 \text{ K}\Omega$ , 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

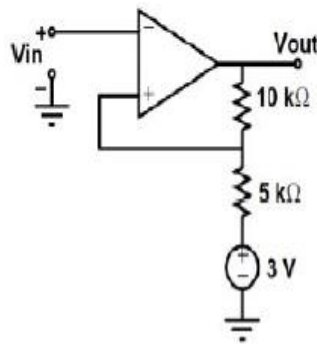
2. ✖ 24 db

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

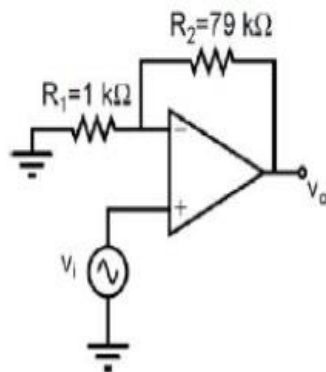
2. ✔ +7 V and -3 V

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 \_\_\_\_\_.

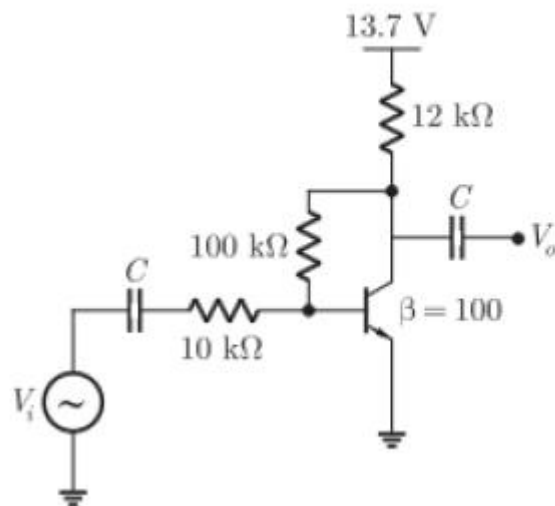


Options :

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 \_\_\_\_\_



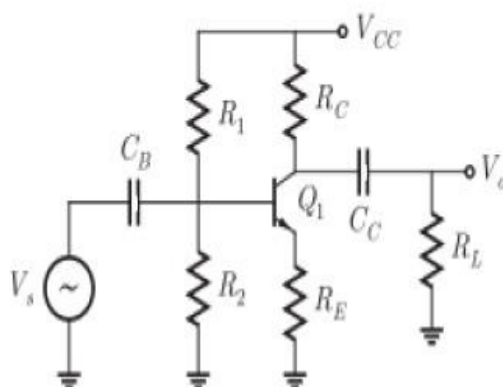
Options :

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?

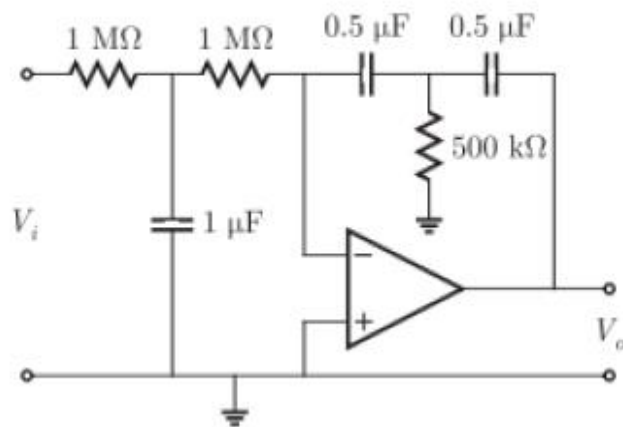


Options :

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

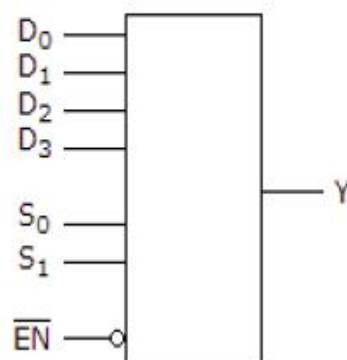
2. ✓ One input to many outputs

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

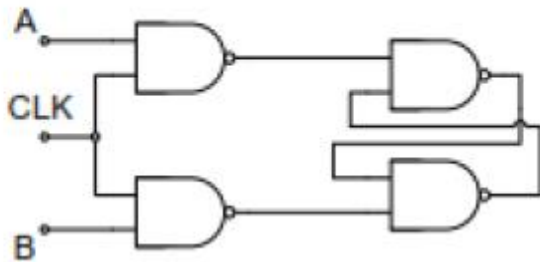
2. ✖ Number of clock pulses

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 : Yes Is Question**

**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

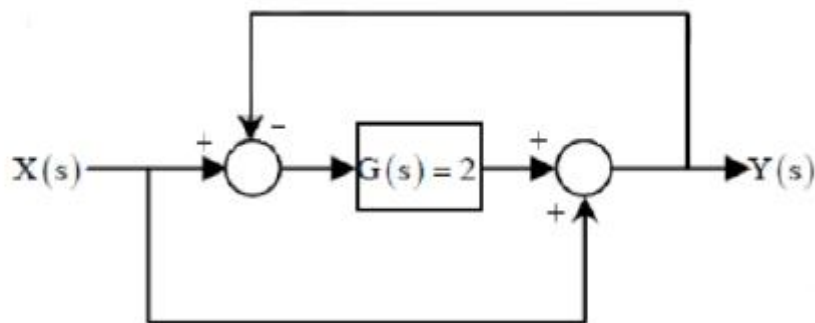
2. ✖ rectifier

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

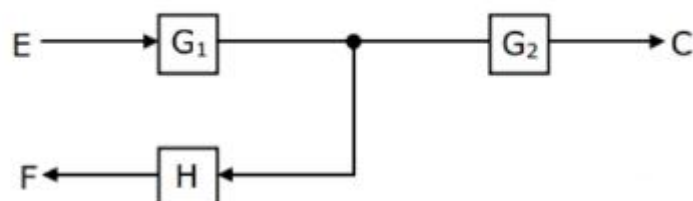
2. ✗ 2

3. ✗ 3

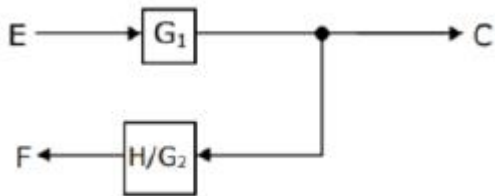
4. ✓ 4

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

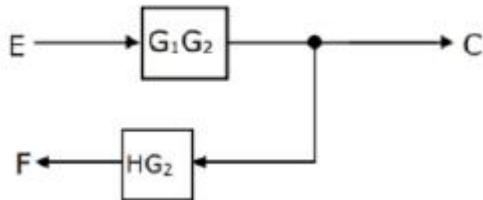
The equivalent of the block diagram in figure is given as



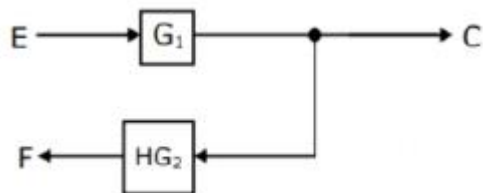
Options :



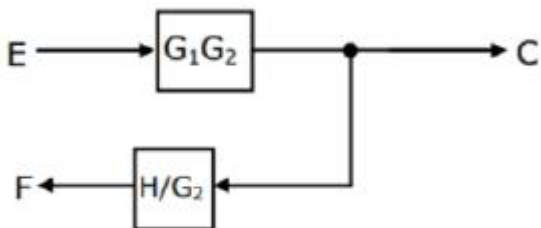
1. ✖



2. ✖



3. ✖



4. ✔

Question Number : 83 Question Id : 873718203 Display Question Number : Yes Is Question Mandatory : No

For a second order system, damping ratio ( $\xi$ ), is  $0 < \xi < 1$ , 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**

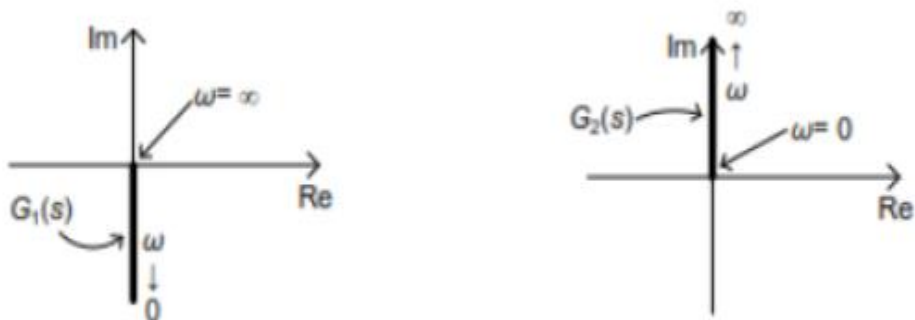
Let  $x(t)$  be the input to a linear, time-invariant system. The required output is  $4x(t-2)$ . The transfer function of the system should be

**Options :**

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

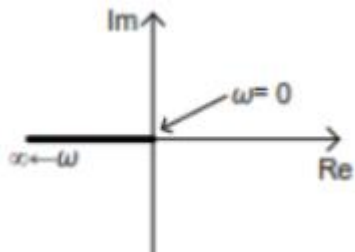
Question Number : 90 Question Id : 873718210 Display Question Number : Yes Is Question Mandatory : No

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

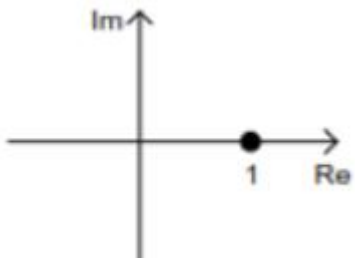


Nyquist plot of the product of  $G_1(s)$  and  $G_2(s)$  is

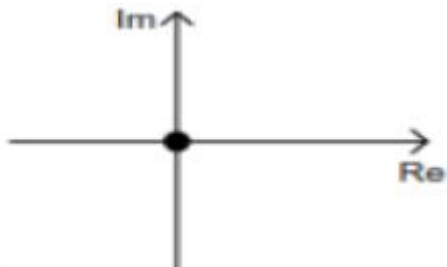
Options :



1. ✖

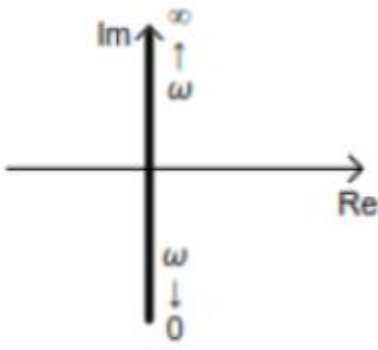


2. ✔



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