Andhra Pradesh State Council of Higher Education

Instrumentation Engineering (EI)

Group Number :   1
Group Id :   29996539
Group Maximum Duration :   0
Group Minimum Duration :   120
Show Attended Group? :   No
Edit Attended Group? :   No
Break time :   0
Group Marks :   120
Is this Group for Examiner? :   No
Revisit allowed for group Instructions? :   Yes
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Instrumentation Engineering (EI)

Section Id :   29996539
Section Number :   1
Mandatory or Optional :   Mandatory
Number of Questions :   120
Section Marks :   120
Display Number Panel :   Yes
Group All Questions :   Yes
Mark As Answered Required? :   Yes
Sub-Section Number :   1
Sub-Section Id :   29996539
Question Shuffling Allowed :   Yes

Question Number : 1 Question Id : 2999654561 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Suppose A is a 3×3 unitary matrix and $\frac{1}{\sqrt{2}}(a + i)$ is an eigenvalue of A, where a

is a real number. Then

Options :

1. $a = \pm 2$

2. $a = \pm 1$

3. $a = 0$

4. $a = \pm 3$

Question Number : 2 Question Id : 2999654562 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The value of the integral $\int_1^3 (x - [x]) [x] \, dx$ where $[x]$ denotes the integer part of x is _____.

Options :

1. $11/2$

2. 4

3. 0

4. $13/2$

Question Number : 3 Question Id : 2999654563 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

For a continuous function $f(x)$, $\int_0^x f(t) \, dt = x^2 + x \cos(2x)$. Then the value of $f(\frac{\pi}{4})$ is _____.

Options :

1. 1

2. -2π

3. π

4. 0

Question Number : 4 Question Id : 2999654564 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The particular integral of $\dfrac{d^2y}{dx^2} + \dfrac{dy}{dx} + y = (1-e^x)^2$ is

Options :

1. $1 + \dfrac{2}{3}e^x - \dfrac{e^{2x}}{7}$

2. $1 - \dfrac{2}{3}e^x + \dfrac{e^{2x}}{7}$

3. $1 - \dfrac{2}{3}e^x - \dfrac{e^{2x}}{7}$

4. $1 + \dfrac{2}{3}e^x + \dfrac{e^{2x}}{7}$

Question Number : 5 Question Id : 2999654565 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A solution for the differential equation $\dfrac{d^2y}{dx^2} - 5\dfrac{dy}{dx} + 6y = 0$ is ___.

Options :

1. $x = e^{2y} + e^{-3y}$

2. $x = e^{-2y} + e^{3y}$

3. $y = e^{2x} + e^{-3x}$

4. $y = e^{2x} + e^{3x}$

Question Number : 6 Question Id : 2999654566 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If C is the circle $|z| = 3$, $\oint \dfrac{e^{2z}}{(z+i)^4} dz = ?$

Options :

1. $\dfrac{4\pi i}{5e^2}$

2. $\dfrac{8\pi i}{5e^2}$

3. $\dfrac{8\pi i}{3e^2}$

4. $\dfrac{4\pi i}{3e^2}$

Question Number : 7 Question Id : 2999654567 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The probability density function of a random variable X is given by

$$f(x) = \begin{cases} \frac{1}{2}(x+1), & -1 \leq x < 1 \\ 0, & \text{elsewhere} \end{cases}, \quad \text{Then } E(X) \text{ is}$$

Options :

1. 1/3

2. 1/2

3. 1/4

4. 1/5

Question Number : 8 Question Id : 2999654568 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

When a pair of dice are thrown twice, what is the probability of scoring 7 points atleast once?

Options :

1. $\dfrac{11}{36}$

2. $\dfrac{5}{18}$

3. $\dfrac{1}{36}$

4. $\dfrac{25}{36}$

Question Number : 9 Question Id : 2999654569 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

What is the Newton – Raphson iterative formula to find $\dfrac{1}{N}$?

Options :

1. $x_{n+1} = x_n[2 - Nx_n]$

2. $x_{n+1} = x_n[2 - N/x_n]$

3. $x_{n+1} = x_n[2 + N/x_n]$

4. $x_{n+1} = x_n[2 + Nx_n]$

Question Number : 10 Question Id : 2999654570 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Find the solution $y(1.2)$ of the initial value problem

$$\frac{dy}{dx} = 2x + y^2, \quad y(1) = 1, \quad h = 0.2$$

Using Euler's method.

Options :

1. 1.3

2. 1.6

3. 1.4

4. 1.5

Question Number : 11 Question Id : 2999654571 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The limiting error of measurement of power consumed by the current passing through a resistance are ±1.5% and ±1% respectively. Then the limiting error of measurement of resistance will be

Options :

1. ±0.5%

2. ±1.0%

3. ±2.5%

4. ±3.5%

Question Number : 12 Question Id : 2999654572 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The Thevenin's equivalent of a circuit operating at $\omega = 5\,rad/s$, has $V_{oc} = 3.71\angle -15.9^0\,V$ and $Z_o = 2.38 - j0.667\Omega$. At this frequency, the minimal realization of the Thevenin's impedance will have a

Options :

1. Resistor and a capacitor and an inductor

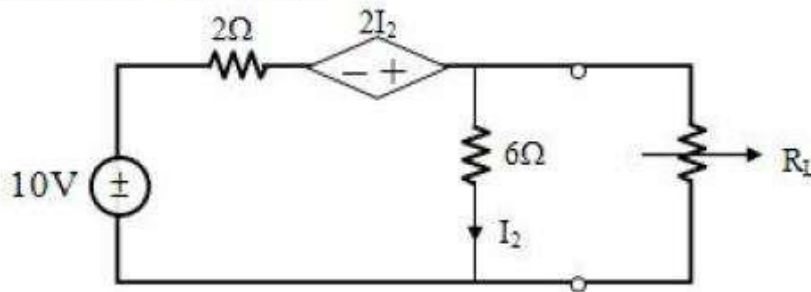2. Resistor and a capacitor

Resistor and an inductor

3.

Capacitor and an inductor

4.

Question Number : 13 Question Id : 2999654573 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the following network

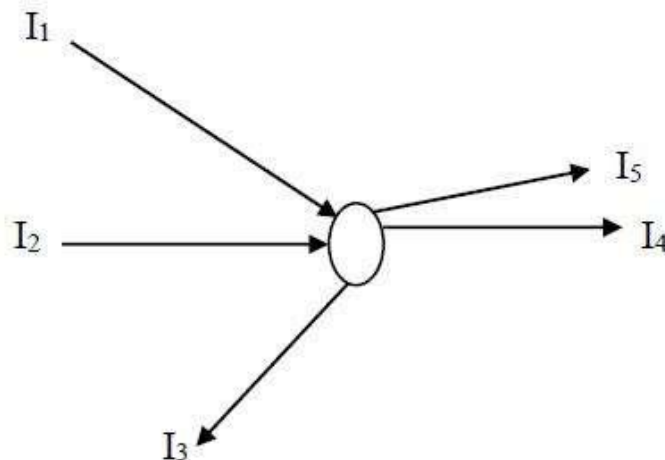The maximum power transferred to R_L is

Options :

1. 12.5 W

2. 25 W

3. 37.5 W

4. 62.5 W

Question Number : 14 Question Id : 2999654574 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Comment on the relation between the currents I_1, I_2, I_3, I_4, I_5.

Options :

1. $I_1 + I_2 - I_4 - I_5 - I_3 = 0$

2. $I_1 - I_2 - I_3 + I_4 + I_5 = 1$

3. $I_1 + I_2 - I_3 + I_4 - I_5 = -1$

4. $I_1 - I_2 - I_3 - I_4 - I_5 = 0$

Question Number : 15 Question Id : 2999654575 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

_____ defines the smallest measurable input change in order to produce a meaningful output.

Options :

1. Threshold

2. Resolution

3. Repeatability

4. Reproducibility

Question Number : 16 Question Id : 2999654576 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A K-type thermocouple with a sensitivity of 40 μV/°C produces a voltage which is measured by the potentiometer as 25 mV. Determine the temperature T when the reference junction of isothermal block is indicated by a thermistor as 20°C.

Options :

1. 625°C

2. 605°C

3. 525°C

645°C
4.

In a pH measurement, the reference and measuring electrodes were calomel and hydrogen electrodes respectively. The measured emf was 650 mV. If the oxidation potential of the standard calomel electrode is –0.246 V at the temperature, the pH of the solution is _____.

Options :

1. 6.84

2. 8.64

3. 4.68

4. 8.46

Pirani gauge is used for the measurement of pressure in the range of _____.

Options :

1. 10^{-1} mm to 10^{-3} mm of Hg

2. 10^{-1} mm to 10^{-6} mm of Hg

3. 10^{-1} mm to 10^{-9} mm of Hg

4. 10^{-1} mm to 10^{-12} mm of Hg

In an inductive transducer, the two secondary voltages

Options :

1. are dependent on the core position

2. vary equally depending on the core position

3. vary unequally depending on the core position

4. are always in phase quadrature

Question Number : 20 Question Id : 2999654580 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A Pirani gauge measuring vaccum pressure works on the principle of

Options :

1. Change in ionizing potential

2. Change in thermal conductivity

3. Deformation to elastic body

4. Change in self inductance

Question Number : 21 Question Id : 2999654581 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Piezo electric crystal can produce an emf when _____.

Options :

1. radiant energy stimulates the crystal

2. external magnetic field is applied

3. external mechanical force is applied to it

4. the junction of two such crystals are heated

Question Number : 22 Question Id : 2999654582 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Range of displacement of flapper required to change output pressure over the useful range is known as _____.

Options :

1. Cut-off displacement

2. Threshold value

3. Break value

4. Throttling range

Question Number : 23 Question Id : 2999654583 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A quartz crystal having a thickness of 2 mm and a voltage sensitivity of 0.05 Volt/Newton is subjected to a pressure of 15×10^5 N/m². The voltage developed by the piezo electric pick up is ____.

Options :

1. 250

2. 100

3. 150

4. 125

Question Number : 24 Question Id : 2999654584 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which of the following is correct in normal shock wave in one dimensional flow?

Options :

1. The entropy increases across the shock

2. The entropy decreases across the shock

3. The entropy remains constant

4. The velocity, pressure, and density increase across the shock _____.

Question Number : 25 Question Id : 2999654585 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The conventional way of expressing vibration is in terms of

Options :

1. Richter scale

2. acceleration due to gravity

3. speed of sound

4. atmospheric pressure

Question Number : 26 Question Id : 2999654586 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Contact devices used for the measurement of level are

Options :

1. more reliable than devices which does not make contact with the material

2. less reliable than devices which does not make contact with the material

3. more reliable than devices which makes contact with the material

4. less reliable than devices which makes contact with the material

Question Number : 27 Question Id : 2999654587 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which of the following conversion takes place in bourdon tubes?

Options :

1. Pressure to displacement

2. Pressure to voltage

Pressure to force
3.

Pressure to strain
4.

Question Number : 28 Question Id : 2999654588 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A resistance strain gauge with gauge factor of 2 is bonded to a steel member, which is subjected to a strain of 1×10^{-6}. The original resistance value of this strain gauge is 120 Ω. The change in resistance due to the applied strain is ____.

Options :

1. 60 Ω

2. $240 \times 10^{-6} \Omega$

3. 240 Ω

4. $60 \times 10^{-6} \Omega$

Question Number : 29 Question Id : 2999654589 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which of the following has the widest range of temperature measurement?

Options :

1. RTD

2. Thermistor

3. Thermocouple

4. Mercury thermometer

Question Number : 30 Question Id : 2999654590 Question Type : MCQ Display Question Number : Yes Is Question

The pressure drop across an orifice plate for a particular flow rate is 5 kg/m^2. If the flow rate is doubled then the corresponding pressure drop in kg/m^2 is _____.

Options :

1. 2.5

2. 5.0

3. 20.0

4. 25.0

Question Number : 31 Question Id : 2999654591 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A transducer has an output impedance of 1 KΩ and the load resistance is 1 MΩ, the transducer behaves as _____.

Options :

1. a constant current source

2. a constant voltage source

3. a constant impedance source

4. a constant power source

Question Number : 32 Question Id : 2999654592 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which of the following conversion is correct for load cell?

Options :

1. Force to strain

2. Force to displacement

3. Force to voltage

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4. Both force to strain and force to displacement

Question Number : 33 Question Id : 2999654593 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A Hall probe of thickness 0.002 m, carrying a current of 0.2 A is placed in a magnetic field of 0.5 T and produces a voltage of 0.4 V. The Hall coefficient is

Options :

1. 0.001

2. 0.008

3. 0.005

4. 0.04

Question Number : 34 Question Id : 2999654594 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which thermocouple pair that gives the maximum sensitivity around 273 K?

Options :

1. Platinum – Constantan

2. Nichrome – Constantan

3. Nickel – Constantan

4. Copper – Nickel

Question Number : 35 Question Id : 2999654595 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which is the most suitable thermocouple transducer for the measurement of temperature in the range of 1300°C to 1500°C?

Options :

1. Chromel – alumel

2. Platinum – rhodium

3. Iron – constantan

4. Chromel – constantan

Question Number : 36 Question Id : 2999654596 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

For a CE amplifier, dc load line is which one of the following plots?

Options :

1. I_B versus V_{BE} for a given value of $(R_C + R_E)$ and V_{CC}

2. I_C versus V_{CE} for a given value of $(R_C + R_E)$ and V_{CC}

3. I_B versus V_{CE} for a given value of I_B

4. I_C versus V_{CB} for a given value of I_E

Question Number : 37 Question Id : 2999654597 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A bipolar junction transistor with forward current transfer ratio $\alpha = 0.98$, when working in CE mode, provide current transfer ratio β as _____.
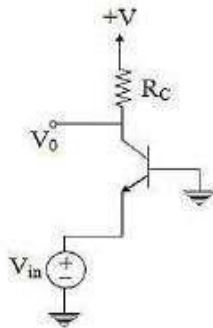
Options :

1. 98

2. 0. 02

3. 49

4. 0.49

Question Number : 38 Question Id : 2999654598 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

From the following diagram, calculate the voltage gain $\frac{V_o}{V_{in}}$ if the small signal parameter $g_m = \frac{i_c}{V_{be}}$
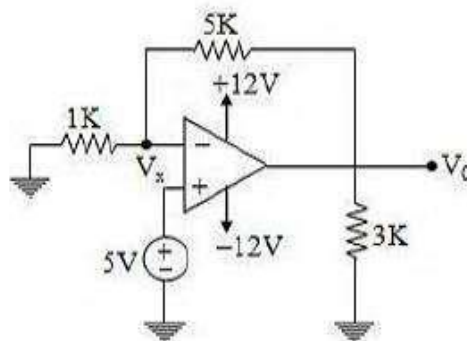

Options :

1. $\dfrac{R_C}{\frac{1}{g_m} + 1}$

2. $-gmR_C$

3. $-\dfrac{R_C}{\frac{1}{g_m} + 1}$

4. $+gmR_C$

Question Number : 39 Question Id : 2999654599 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Considering ideal Op-amp, from the following diagram, the voltage at the inverting terminal Vx is ___ volts.

Options :

1. 3

2. 5

3. 2

4. 1

Question Number : 40 Question Id : 2999654600 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In a sinusoidal oscillator, sustained oscillations will be produced only if the loop gain (at the oscillation frequency) is _____.

Options :

1. Less than unity but not zero

2. Zero

3. Unity

4. Greater than Unity

Question Number : 41 Question Id : 2999654601 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the following Sum of Products expression, $F = ABC + \bar{A}\bar{B}C + A\bar{B}C + \bar{A}BC + \bar{A}\bar{B}\bar{C}$. The equivalent Product of Sums expression is

Options :

1. $F = (A + \bar{B} + C)(\bar{A} + B + C)(\bar{A} + \bar{B} + C)$

2. $F = (A + \bar{B} + \bar{C})(A + B + C)(\bar{A} + \bar{B} + \bar{C})$

3. $F = (\bar{A} + B + \bar{C})(A + \bar{B} + \bar{C})(A + B + C)$

4. $F = (\bar{A} + \bar{B} + C)(A + B + \bar{C})(A + B + C)$

Question Number : 42 Question Id : 2999654602 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which one of the following is an universal gate?

Options :

1. AND

2. OR

3. NOT

4. NOR

Question Number : 43 Question Id : 2999654603 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The octal equivalent of the HEX number AB.CD is

Options :

1. 253.314

2. 253.632

3. 526.314

4. 526.632

Question Number : 44 Question Id : 2999654604 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The dual of the Boolean theorem $A(B + C) = AB + AC$ is

Options :

1. $A + (B + C) = AB + AC$

2. $A(B + C) = (A + B)(A + C)$

3. $A + BC = (A + B)(A + C)$

4. $A + (B + C) = (A + B)(A + C)$

The 7EH and 5FH are EX-ORed. The output is multiplied by 10H. The result is ___.

Options :

1. 2110H

2. 0210H

3. 2010H

4. 0211H

The output Y of a 2-bit comparator is logic 1 whenever the 2-bit input A is greater than the 2-bit input B. The number of combinations for which the output is logic 1, is _____.

Options :

1. 4

2. 6

3. 8

4. 10

The size of ROM that will accommodate the truth table for a BCD-to-Seven-segment decoder with an enable input is ___.

Options :

1. 16×7

2. 32×7

3. 1024×7

4. 2048×7

Question Number : 48 Question Id : 2999654608 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In standard TTL gates, the totem pole output stage is primarily used to _____.

Options :

1. increase the noise margin of the gate

2. decrease the output switching delay

3. facilitate a wired or logic connection

4. increase the output impedance of the circuit

Question Number : 49 Question Id : 2999654609 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In the CMOS inverter, the power dissipation is _____.

Options :

1. Low only when V_{in} is low

2. Low only when V_{in} is high

3. Low during dynamic operation

4. High during dynamic operation

Question Number : 50 Question Id : 2999654610 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The minterm expansion of $F(A, B, C) = AB + B\overline{C} + A\overline{C}$ is _____.

Options :

1. $m_2 + m_4 + m_6 + m_1$

2. $m_0 + m_1 + m_3 + m_5$

3. $m_7 + m_6 + m_2 + m_4$

4. $m_2 + m_3 + m_4 + m_5$

Question Number : 51 Question Id : 2999654611 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The impulse response of an initially relaxed linear system is $e^{-2t}u(t)$. To produce a response of $te^{-2t}u(t)$, the input must be equal to _____.

Options :

1. $2e^{-t}u(t)$

2. $\frac{1}{2}e^{-2t}u(t)$

3. $e^{-2t}u(t)$

4. $e^{-t}u(t)$

Question Number : 52 Question Id : 2999654612 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Find the period of function $f(t) = sin(3t) + sin(4t)$.

Options :

1. 2π

2. 3π

3. 5π

$$7\pi$$

4.

Question Number : 53 Question Id : 2999654613 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Given $x(t) = e^{-2t} u(t)$, the Inverse Laplace transform of $e^{-2s} X(3s)$ is _____.

Options :

1. $\frac{1}{3} e^{\frac{2(t-2)}{3}} u(t-2)$

2. $\frac{1}{3} e^{\frac{-2(t-2)}{3}} u(t-2)$

3. $\frac{1}{3} e^{\frac{-2(t+2)}{3}} u(t+2)$

4. $\frac{1}{3} e^{\frac{2(t+2)}{3}} u(t+2)$

Question Number : 54 Question Id : 2999654614 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In a Pulse Coded Modulated signal sampled at f_s and encoded into an n-bit code, the minimum bandwidth required for faithful reconstruction is _____.

Options :

1. $2nf_s$

2. $nf_s/2$

3. nf_s

4. f_s

Question Number : 55 Question Id : 2999654615 Question Type : MCQ Display Question Number : Yes Is Question

To generate _____, the input signal is sampled and converted to PAM.

Options :

1. PCM

2. PWM

3. PPM

4. PSK

Question Number : 56 Question Id : 2999654616 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If $x[n] = \left(\frac{1}{3}\right)^{|n|} - \left(\frac{1}{2}\right)^{n} u[n]$, then the region of convergence of it's z-transform in the z-plane is _____.

Options :

1. $\frac{1}{3} < |z| < 3$

2. $\frac{1}{3} < |z| < \frac{1}{2}$

3. $\frac{1}{2} < |z| < 3$

4. $\frac{1}{3} < |z| < 2$

Question Number : 57 Question Id : 2999654617 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The rms antenna current of an AM transmitter is 10 A when un-modulated and 12 A when sinusoidally modulated. What is the modulation index?

Options :

1. 0.43

2. 0.93

3. 0.57

4. 0.76

Question Number : 58 Question Id : 2999654618 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In IIR filter by the Bilinear transformation, the bilinear transformation is a mapping from _____.

Options :

1. Z-plane to S-plane

2. S-plane to Z-plane

3. S-plane to J-plane

4. J-plane to Z-plane

Question Number : 59 Question Id : 2999654619 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which of the following can not be the Fourier series expansion of periodic signal?

Options :

1. $x(t) = 2 \cos \pi t + 7 \cos t$

2. $x(t) = 2 \cos t + 3 \cos t$

3. $x(t) = \cos t + 0.5$

4. $x(t) = 2 \cos 1.5 \pi t + \sin 3.5 \pi t$

Question Number : 60 Question Id : 2999654620 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The total power P_t in the amplitude modulated signal is given in terms of carrier power P_c. Then

Options :

1. $P_t = P_c(1 + \frac{\mu^2}{2})$

2. $P_t = P_c(1 - 2\mu^2)$

3. $P_t = P_c(1 + 2\mu^2)$

4. $P_t = P_c(1 + \frac{3\mu^2}{2})$

Question Number : 61 Question Id : 2999654621 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In FM, modulation index m_f is equal to _____.

(where Δf is the frequency deviation, and f_m is the modulating signal frequency)

Options :

1. $\Delta f * f_m$

2. $\frac{f_m}{\Delta f}$

3. $\frac{\Delta f}{f_m}$

4. $\frac{1}{\Delta f * f_m}$

Question Number : 62 Question Id : 2999654622 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Circular convolution of two sequences in the time domain is equal to _____.

Options :

1. multiplication of two DFT's

2. addition of two input sequences

3. multiplication of two input sequences

4. addition of two DFT's

Question Number : 63 Question Id : 2999654623 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The signal to noise ratio of an FM discriminator is _____.

Options :

1. proportional to deviation

2. proportional to square of deviation

3. proportional to cube of deviation

4. inversely Proportional to deviation

Question Number : 64 Question Id : 2999654624 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In TDM, non-essential frequency components of the modulating signal are removed by

Options :

1. Sampler

2. Attenuator

3. Pre-alias filter

4. Modulator

Question Number : 65 Question Id : 2999654625 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In digital IIR filter, the present output depends on _____.

Options :

1. present and previous inputs only

2. present input and previous outputs only

3. present input only

4. present input, previous input and output

The disc of a house service energy meter of a 230 V, single phase, 5 A, 2400 rev/kwh creeps at 1 rev/min. The creep error (in percentage) of full load unity p.f. is

Options :

1. $+\frac{60}{2400} * 100$

2. $-\frac{60}{2400} * 100$

3. $+\frac{60}{115*2400} * 100$

4. $-\frac{60}{115*2400} * 100$

Sensitivity of potentiometer can be increased by _____.

Options :

1. increasing the length of potentiometer wire

2. decreasing the current in potentiometer wire

3. decreasing the resistance in the rheostat in series with battery

decreasing the length of potentiometer wire

4.

Question Number : 68 Question Id : 2999654628 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which one of the following techniques is suitable to measure a leakage resistance of the capacitor?

Options :

1. loss of charge method

2. Kelvin's double bridge

3. Ammeter- Voltmeter method

4. Wheatstone bridge

Question Number : 69 Question Id : 2999654629 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Iron losses in a magnetic specimen can be measured by using _____.

Options :

1. Campbell bridge method

2. Anderson bridge method

3. Hay bridge method

4. Schering bridge method

Question Number : 70 Question Id : 2999654630 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Why Kelvin bridge is used for measurement of low resistance?

Options :

1. Due to emf source used.

2. Due to a large current flow.

3. Due to contact and lead resistance.

4. Due to power dissipation across the circuit.

Question Number : 71 Question Id : 2999654631 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In a piezoelectric crystal oscillator, the oscillation or tuning frequency is linearly proportional to the _____.

Options :

1. mass of the crystal

2. square root of the mass of the crystal

3. square of the mass of the crystal

4. inverse of the square root of the mass of the crystal

Question Number : 72 Question Id : 2999654632 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
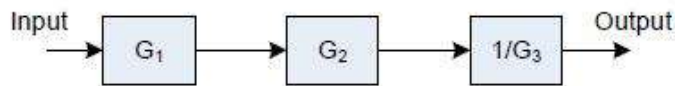
The measurement system shown in the figure uses three subsystems in cascade whose gains are specified as G_1, G_2 and $1/G_3$. The relative small errors associated with respective subsystem G_1, G_2 and G_3 are $\varepsilon_1, \varepsilon_2$ and ε_3. The error associate with the output is _____.

Input → G_1 → G_2 → $1/G_3$ → Output

Options :

1. $\varepsilon_1 - \varepsilon_2 + \varepsilon_3$

2. $\dfrac{\varepsilon_1 . \varepsilon_2}{\varepsilon_3}$

3. $\varepsilon_1 + \varepsilon_2 - \varepsilon_3$

$$\varepsilon_1 + \varepsilon_2 + \varepsilon_3$$

4.

Question Number : 73 Question Id : 2999654633 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

An integrator type DVM contains a 1 MΩ and 0.1 µF capacitor. How much input voltage is to be applied to the integrator so that output voltage of the integrator is 1 V after 1 sec?

Options :

1. 20 V

2. 10 V

3. 0.1 V

4. 1 V

Question Number : 74 Question Id : 2999654634 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The two watt meters are connected to measure a three phase power. The second wattmeter reading is $\frac{\sqrt{3}-1}{\sqrt{3}+1}$ times of first wattmeter reading. Calculate the phase angle between two wattmeter circuit.

Options :

1. 30°

2. 45°

3. 60°

4. 90°

Question Number : 75 Question Id : 2999654635 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

An astable multivibrator uses a resistance of 100 Ω and capacitance of 0.01 μF. The frequency of the square wave generated by it is _____.

Options :

1. 924 Hz

2. 593 Hz

3. 693 Hz

4. 110 Hz

Question Number : 76 Question Id : 2999654636 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In dc potentiometer measurements, a second reading is often taken after reversing the polarities of the dc supply and the unknown voltage, and the average of the two readings is taken. This is done with a view to eliminate the effects of _____.
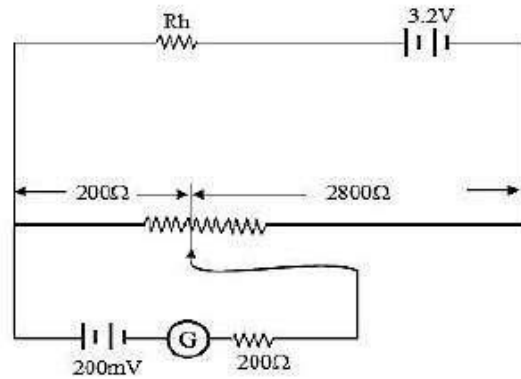
Options :

1. ripples in the DC supply

2. stray magnetic fields

3. stray thermal EMF's

4. erroneous standardization

Question Number : 77 Question Id : 2999654637 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In the potentiometer circuit shown in figure, balance is obtained. The value of Rh is _____ ohms.

Options :

1. 100

2. 200

3. 300

4. 400

Question Number : 78 Question Id : 2999654638 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The deflection of hot wire instrument depends on

Options :

1. voltage

2. RMS value of alternating current

3. average value of alternating current

4. instantaneous value of alternating current

Question Number : 79 Question Id : 2999654639 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A current transformer has a rating of 100/5 A. Its magnetizing and loss component of exciting current are 10 A and 0.6 A respectively and secondary winding burden is purely resistive. Its transformation ratio at rated current is _____.

Options :

1. 20.12

2. 20.2

3. 200.2

4. 200.12

Question Number : 80 Question Id : 2999654640 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The Q-meter works on the principle of _____.

Options :

1. Mutual inductance

2. Self-inductance

3. Series resonance

4. Parallel resonance

Question Number : 81 Question Id : 2999654641 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Current transformer are usually designed with _____.

Options :

1. low permeability and low magnetic materials

2. low permeability and high magnetic materials

3. high permeability and low magnetic materials

4. high permeability and high magnetic materials

Question Number : 82 Question Id : 2999654642 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In order to measure the value 10 KHz, which of the following bridge is suitable.

Options :

1. Wein's bridge

2. Hay's bridge

3. Wheatstone bridge

4. Heaviside's bridge

Question Number : 83 Question Id : 2999654643 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A 100 μA ammeter has an internal resistance of 100Ω. For extending it's range to measure 500 μA, the shunt resistance required is _____.

Options :

1. 20 Ω

2. 22.22 Ω

3. 25 Ω

4. 50 Ω

Question Number : 84 Question Id : 2999654644 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which is the fastest analog to digital converter?

Options :

1. Successive approximation

2. Dual slope type

3. Flash type

4. Ramp type

In a digital voltmeter, the oscillator frequency is 400 kHz. The ramp voltage falls from 8 V to 0 V in 20 ms. What is number of pulses counted by the counter?

Options :

1. 8000

2. 4000

3. 3200

4. 1600

In a closed loop system which of the following statement is true?

Options :

1. Input is independent on error.

2. Input is dependent on error.

3. Output is independent on error.

4. Both input and output is independent on error.

The root locus plot of the systems having loop transfer functions

$$G(s)H(s) = \frac{k}{s(s+4)(s^2+4s+5)} \text{ has}$$

Options :

1. no breakaway point

2. three real breakaway points

3. only one breakaway point

4. one real and two complex breakaway points

Question Number : 88 Question Id : 2999654648 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A system has the transfer function

$$G(s) = \frac{100(s+5)(s+50)}{s^4(s+10)(s^2+3s+10)}.$$

The type and order of the system are respectively.

Options :

1. 4 and 9

2. 4 and 7

3. 5 and 7

4. 7 and 5

Question Number : 89 Question Id : 2999654649 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The response of a first order measurement system to a unit step input is $1-e^{-0.5t}$, where t is in seconds. A ramp of 0.1 unit/sec is given as the input to this system. The error in the measured value after transients have died down is _____.

Options :

1. 0.02 unit

2. 0.1 unit

3. 0.2 unit

4. 1 unit

Question Number : 90 Question Id : 2999654650 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which of these devices is used for sequence control, tuning, counting and data calculation in a process?

Options :

1. SCADA

2. DCS

3. PLC

4. DDC

Question Number : 91 Question Id : 2999654651 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A closed loop system has the characteristic equation by $s^3 + ks^2 + (k + 2)s + 3 = 0$.

For this system to be stable, which one of the following conditions should be satisfied?

Options :

1. $k > 1$

2. $0 < k < 0.5$

3. $0.5 < k < 1$

4. $0 < k < 1$

Question Number : 92 Question Id : 2999654652 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The characteristic equation of a system is $Q(s) = 2s^5 + s^4 + 4s^3 + 2s^2 + 2s + 1$. Then the system is _____.

Options :

1. oscillatory

2. stable

3. marginally stable

4. unstable

Question Number : 93 Question Id : 2999654653 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Use Mason's gain formula to find the transfer function of the given signal flow graph.

Options :

1. $\dfrac{abd}{1-(ac)}$

2. $\dfrac{abdeg}{1-(bc+ef)+bcef}$

3. $\dfrac{abd}{1-(bc+ef)}$

4. $\dfrac{adcdef}{1-(bc+ef)+bcef}$

Question Number : 94 Question Id : 2999654654 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
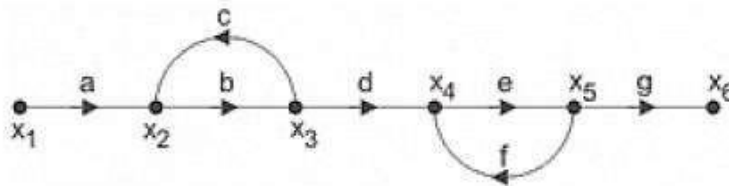
The phase cross-over frequency of the transfer function $G(s) = \dfrac{100}{(s+1)^3}$ in rad/s is

Options :

1. 3

2. $\sqrt{3}$

3. $\dfrac{1}{\sqrt{3}}$

4. $3\sqrt{3}$

Question Number : 95 Question Id : 2999654655 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider a system with transfer function $G(s) = \dfrac{S+5}{KS^2+S+5}$. Its damping ratio will be 0.5 when the values of K is ____ .

Options :

1. $2/5$

2. 1

3. $1/5$

4. 5

Question Number : 96 Question Id : 2999654656 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The dominant poles of a servo system are located at $s = (-2 \pm j2)$. The damping ratio of the system is _____ .

Options :

1. 1

2. 0.8

3. 0.707

4. 0.6

Question Number : 97 Question Id : 2999654657 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which one of the following is INCORRECT with reference to pneumatic system?

Options :

1. Leaks can create problems as well as fire hazards

2. They are insensitive to temperature changes

3. High compressibility of air results in longer time delays

4. Operating pressure is low compared to hydraulic system

Question Number : 98 Question Id : 2999654658 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the following statements for a PI compensator for a control system

I. It is equivalent to adding a zero at origin.
II. It reduces overshoot.
III. It improves order of the system by 1.
IV. It improves steady-state error of the system.

Which of the statements given above are correct?

Options :

1. I, II, III and IV

2. I, II, and III only

3. II, III and IV only

4. I and IV only

Question Number : 99 Question Id : 2999654659 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A unity feedback system has the transfer function $\dfrac{K(s+b)}{s^2(s+20)}$. The value of b for which the loci of all three roots of the closed-loop characteristic polynomial meet at a single point is

Options :

1. 10/9

2. 20/9

3. 30/9

4. 40/9

Question Number : 100 Question Id : 2999654660 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which formula is used to convert a state space model into a transfer function model?

Options :

1. $C(SI-A)^{-1}B+D$

2. $D(SI-A)B+C$

3. $(SI-A)^{-1}$

4. $(AI-S)^{-1}+B$

Question Number : 101 Question Id : 2999654661 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Servomechanism with step-displacement input is _____.

Options :

1. Type 0 system

2. Type 1 system

3. Type 2 system

4. Type 3 system

Question Number : 102 Question Id : 2999654662 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Root Locus starts from _____ and ends at _____.

Options :

1. open loop poles, open loop zeros

2. closed loop poles, closed loop zeros

3. open loop zeros, closed loop zeros

4. open loop zeros, closed loop poles

Question Number : 103 Question Id : 2999654663 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Introduction to integral action in the forward path of a unity feedback system results in a

Options :

1. marginally stability

2. system with increased stability margin

3. system with better speed of response

4. system with no steady state error

Question Number : 104 Question Id : 2999654664 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A synchro transmitter is used with a synchro repeater in control transformer for

_____.

Options :

1. impedance matching

2. remote sensing

3. addition

4. error detection

Question Number : 105 Question Id : 2999654665 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In cascade control system _____.

Options :

1. inner loop is slower than the outer loop

2. inner loop is faster than the outer loop

3. outer loop is independent of inner loop.

4. has only one loop

Question Number : 106 Question Id : 2999654666 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which of the following is not a type of ion detector used in mass spectrometers?

Options :

1. Electron multiplier

2. Faraday cup collector

3. Photographic plates

4. Flame emission detector

Question Number : 107 Question Id : 2999654667 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

_____ is the recording of the activity of the cerebrum or brain of human being.

Options :

1. ECG

2. EEG

3. EMG

4. NMR

Question Number : 108 Question Id : 2999654668 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The principle of pH measurement follows _____.

Options :

1. Beer Lambert law

2. Nernst equation

3. Stefan Boltzmann law

4. Napier law

Question Number : 109 Question Id : 2999654669 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which of the following is the most suitable for wavelength standard?

Options :

1. Cadmium 114

2. Krypton 86

3. Mercury 198

4. Any monochromatic light

Question Number : 110 Question Id : 2999654670 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

State Beer Lamberts Law. (A – absorbance, ξ – molar absorptivity, b – path length of the sample, c – concentration of the sample)

Options :

1. $A = \xi bc$

2. $A = \xi/bc$

3. $b = \xi/Ac$

4. $c = \xi Ab$

Question Number : 111 Question Id : 2999654671 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A psychrometric chart is used to determine _____.

Options :

1. pH

2. sound velocity in glasses

3. CO_2 concentration

4. relative humidity

Question Number : 112 Question Id : 2999654672 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

When X-rays emitted from molybdenum are allowed to pass through a zirconium filter, which of the following occurs?

Options :

1. It absorbs radiation of longer wavelength.

2. It absorbs radiation of shorter wavelength.

3. It allows radiation of shorter wavelength to pass through.

4. It allows radiation in a particular band to pass through.

Question Number : 113 Question Id : 2999654673 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In an electromagnetic blood flow meter, the induced voltage is directly proportional to the _____ .

Options :

1. blood flow rate

2. square root of the blood flow rate

3. square of the blood flow rate

4. logarithm of the blood flow rate

Question Number : 114 Question Id : 2999654674 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A mass spectrometer is to be used to resolve peaks corresponding to CO^+ and N_2^+. The atomic masses are C =12.0000, O = 15.9949 and N = 14.0031 amu. The resolving power of the mass spectrometer should be at least ____ .

Options :

1. 250

2. 350

3. 2500

4. 3500

Question Number : 115 Question Id : 2999654675 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

_____ is not preferred in IR and visible region spectrometers

Options :

1. Tungsten Lamp

2. Hydrogen Lamp

3. Deuterium discharge lamp

4. Argon Lamp

Question Number : 116 Question Id : 2999654676 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

'When nuclear radiations pass through, gas ionization is produced.' This is the principle of which of the following detectors?

Options :

1. Proportional counter

2. Flow counter

3. Scintillation counter

4. Geiger Muller counter

Question Number : 117 Question Id : 2999654677 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which of the following method is widely accepted to determine oxides of nitrogen in an automobile emission?

Options :

1. Orsat analysis

2. Gas-chromatorgraphy

3. Chemi-luminiscence

4. Flame-ionization detection

Question Number : 118 Question Id : 2999654678 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which one of the following is not a property of LASER?

Options :

1. Coherent

2. Dichromatic

3. Directional

4. Parallel

Question Number : 119 Question Id : 2999654679 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Epoxy material in fiber optics is intended for _____.

Options :

1. better optical properties

2. better sealing

3. better reflection

4. reducing noise

Question Number : 120 Question Id : 2999654680 Question Type : MCQ Display Question Number : Yes Is

Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The resistance of a photo resistive cell _____.

Options :

1. increases with increase in light intensity in a linear manner

2. decreases with increase in light intensity in an exponential manner

3. remains constant irrespective of the light intensity

4. increase with decrease in light intensity in an exponential manner