Questions	Choices
A phase shifting transformer is used in conjunction with	1. **Dryscale potentiometer** 2. Crompton potentiometer 3. AC coordinate potentiometer 4. DC slide wire potentiometer
Three phase four wire induction energy meter is used to measure	1. Energy in 3 phase balanced delta load 2. Energy in 3 phase unbalanced delta load 3**. Energy in 3 phase unbalanced load** 4. Energy in 3 phase balanced star load
Particular integral of the differential equation $(D^2+D+1)y=\sin 2x$ is	1. $-1/25(\sin 2x + 2\cos 2x)$ 2. $-1/25(3\sin 2x + 5\cos 2x)$ 3. $-1/25(3\sin 2x + 4\cos 2x)$ 4. $-1/25(2\sin 2x + 3\cos 2x)$
ure below shows a circuit for implementing an 8-bit Digital-to-Analog converter (DAC) using two identical 4-bit DACs with equal reference voltages. Assume that b_0 represents LSB, b_7 MSB and the op-amp is ideal. To obtain correct analog values corresponding to an 8-bit DAC at the output the value of resistor R is	1. 0.25 kΩ 2. 0.5 kΩ 3. 1 kΩ 4. 8 kΩ
Two Eigen values ofare 2 and 8 then the third eigen value is	1. 2 2. - 2 3. 3 4. - 3
I_{DSS} can be defined as	1. the maximum drain current with the source shorted 2.the maximum possible current with V_{GS} held at –4 V 3.the maximum possible current with V_{GS} held at 0 V

Questions	Choices
	4. the minimum possible drain current
The solution of	1. 2. 3. 4.
The value of the integral	1. 2. 3. 0 4.
Major disadvantage of Turning point algorithm is	1. Distortion time 2. Short term time distortion 3. Long term time distortion 4. No distortion
In a JFET common source amplifier using voltage divider biasing method with R1 = 17 kohms, R2 = 6 kohms and Vcc = 20V. Find the gate to source voltage?	1. 5.2 V 2. 4.2 V 3. 3.2 V 4. 2.2 V
Determine the order and degree of the differential equation,	1. Fourth order, first degree 2. Third order, first degree 3. First order, fourth degree 4. First order, third degree.

Questions	**Choices**
Which of the following equations are solutions to the partial differential equation?	1. 2. 3. 4.
Programmable DSP with …….can be used to implement digital filters	**1.** **MAC** 2. MAA 3. ADD 4. SUB
Information per source is called	1. sampling 2. quantization **3.** **entropy** 4.normalization
Stage 2 sleep is defined by the presence of	1. spikes and slow waves 2. **sleep spindles and K complexes** 3. rapid eye movements 4. 1 to 2-Hz delta frequencies
Roll-off factor is	1. Aliasing effect 2. The performance of the filter or device **3. The bandwidth occupied beyond the Nyquist Bandwidth of the filter** 4. Filter property
Radium decomposes at a rate proportional to the amount present. If the half of the original amount disappears after 1000 years, what is	**1. 6.70%** 2. 4.50%

Questions	Choices
the percentage lost in 100 years?	3. 4.30% 4. 5.35%
A piezoelectric crystal transducer of 0.5cm^2 area and 1mm thickness is connected to a charge amplifier having a charge sensitivity (d)=2pC/N. The crystal is subjected to a sinusoidal force of 30x10^{-3}sin150t N. Find out the peak to peak voltage of the crystal.	1. 0.135V 2. 0.54V 3. 0.25V 4. 0.27V
A linear displacement digital transducer generally uses	1. BCD 2. Hexadecimal code 3. Straight binary code **4. Gray code**
In a megger the controlling torque is provided by	1. Gravity 2. Eddy current **3. Coil** 4. Spring
In household energy meters the flux of series magnet is in phase with current but the flux of shunt magnet lags the voltage by 88°. The reading of energy meters	1. May have positive or negative error **2. Will have a negative error** 3. Will be correct 4. Will have a positive error
What is the magnetomotive force in a 150-turn coil of wire with 2 A flowing through it?	1. 13.33 mAt 2. 65 At 3. 152 At **4. 300 At**
A transformer is plugged into a 120 V rms source and has a primary current of 300 mA rms. The secondary is providing 18 V across a 10K ohm load. What is the efficiency of the transformer?	**1. 90%** 2. 95% 3. 88% 4. 92%
What is the turns ratio of the transformer needed to match a 1 k ohm source resistance to a 160 ohm load?	1. 16:1 2. 6.25:1 **3. 0.4:1** 4. 2.5:1
Two voltmeters 0-250 V each having resistances of 5 kΩ and 10 kΩ respectively and are connected in series. To ensure that neither of them goes beyond scale the total voltage which can be applied should be less than	1. 400 V 2. 250 V **3. 375 V** 4. 500 V
The solution of the differential equation is	1. 2. 3. 4.

Questions	Choices
Find the equation of the family of orthogonal trajectories of the system of parabolas $y^2 = 2x + C.$	1. $y = Ce^{-2x}$ 2. $y = Ce^{x}$ 3. $y = Ce^{2x}$ **4. $y = Ce^{-x}$**
circuit diagram of a standard TTL NOT gate is shown in the figure. When $V_i = 2.5V$, the modes of operation of the transistors will be:	**1.** **Q_1 :reverse active; Q_2 :normal active; Q_3:saturation; Q_4 :cut-off** 2. Q_1 :reverse active; Q_2 :saturation; Q_3:saturation; Q_4 :cut-off 3. Q_1 :normal active; Q_2 : cut-off; Q_3 : cut-off; Q_4 : saturation 4. Q_1 : saturation; Q_2 : saturation; Q_3:saturation; Q_4 :normal active
The equation $y^2 = cx$ is general solution of:	1. $y' = 2y / x$ **2. $y' = y / 2x$** 3. $y' = 2x / y$ 4. $y' = x / 2y$
If	1. 2. 3. 4 4. - 4
Failure of heat sink in an ECG apparatus may lead to _____ noise	1. High frequency 2. Baseline drift 3. EMG artifacts 4. low frequency
A variable reluctance type tachometer has number of teeth on rotor as 60. The counter records 3600 counts per second. Determine the speed in rpm.	1. 3500rpm 2. 800rpm **3. 3600rpm** 4. 600rpm
In an electrical pneumatic system analogy the current is considered analogous to	1. air flow 2. pressure **3. air flow rate**

Questions	Choices
	4. velocity
A variable reluctance tachogenerator consists of a ferromagnetic wheel with 22 teeth and rotating close to a bar magnet and coil. If the wheel is rotating at 6000 rpm what is the frequency of the a.c. voltage induced in the coil.	1. 220Hz 2. 200Hz 3. 2000Hz **4. 2200Hz**
Which of the following equations is an exact DE?	1. $2xy\,dx + (2 + x^2)\,dy = 0$ 2. $x\,dy + (3x - 2y)\,dx = 0$ 3. $(x^2 + 1)\,dx - xy\,dy = 0$ 4. $x^2y\,dy - y\,dx = 0$
Which of the following equations is a variable separable DE?	1. $(x + x^2 y)\,dy = (2x + xy^2)\,dx$ 2. $y^2dx + (2x - 3y)\,dy = 0$ 3. $(x + y)\,dx - 2y\,dy = 0$ 4. $2y\,dx = (x^2 + 1)\,dy$
Which of the following system is time variant?	1. $y(n) = x(n) + x(n-1)$ **2.** **$y(n) = x(-n)$** 3. $y(n)=x(n)$ 4. $y(n)=1/x(n)$
If $dy = x^2dx$; what is the equation of y in terms of x if the curve passes through (1, 1).	1. $x^3 + 3y^2 + 2 = 0$ 2. $2y + x^3 + 2 = 0$ **3. $x^3 - 3y + 2 = 0$** 4. $x^2 - 3y + 3 = 0$
Find the equation of the curve at every point of which the tangent line has a slope of 2x	1. $x = y^2 + C$ **2. $y = x^2 + C$** 3. $y = -x^2 + C$ 4. $x = -y^2 + C$
Solve $(\cos x \cos y - \cot x)\,dx - \sin x \sin y\,dy = 0$	1. $\sin x \cos y = -\ln (c \sin x)$ 2. $\sin x \cos y = -\ln (c \cos x)$ **3. $\sin x \cos y = \ln (c \sin x)$** 4. $\sin x \cos y = \ln (c \cos x)$
What is the solution of the first order differential equation $y(k + 1) =$	1. $y(k) = 4 - 5/k$

Questions	**Choices**
y(k) + 5.	**2. y(k) = 20 + 5k** 3. y(k) = C – k, where C is constant 4. The solution is non-existence for real values of y.
Solve $(y - \sqrt{(x^2 + y^2)})\, dx - x\, dy = 0$	1. $\sqrt{(x + y)} + y = C$ 2. $\sqrt{(x^2 + y^2 + y)} = C$ **3. $\sqrt{(x^2 + y^2)} + y = C$** 4. $\sqrt{(x^2 - y)} + y = C$
Find the differential equation whose general solution is $y = C_1x + C_2e^x$.	1. $(x + 1)\, y'' + xy' + y = 0$ 2. $(x + 1)\, y'' - xy + y = 0$ **3. $(x - 1)\, y'' - xy' + y = 0$** 4. $(x - 1)\, y'' + xy' + y = 0$
A platinum thermometer has a resistance of 100Ω at 25^0C. If the thermometer has resistance of 200 Ω, then calculate the temperature.	1. 275^0C 2.200^0C 3. 250^0C 4. 225^0C
A platinum resistance sensor has a resistance of 100 Ω at 0 °C and a temperature coefficient of resistance of $4x10^{-3}$°C^{-1}. The above sensor is incorporated into a bridge circuit which has $R_3/R_2 = 100$. Find the value of R_4such that $V_{OUT} = 0$ at 0 °C.	1. 100 Ω 2. 1KΩ 3. 14 KΩ 4. 10 KΩ
Find the general solution of $y' = y \sec x$	1. $y = C (\sec x \tan x)$ 2. $y = C (\sec x - \tan x)$ **3. y = C (sec x + tan x)** 4. $y = C (\sec^2 x + \tan x)$
A thermometer at room temperature 30^0C is dipped suddenly into a bath of boiling water of 100^0C. It takes 30 seconds to reach 96.5^0C. The time required to reach a temperature of 98^0C is	1. 35.6 s 2. 38.6 s 3. 34.6 s 4. 32.5 s
Solve $xy' (2y - 1) = y (1 - x)$	1. ln (xy) = 2 (x – y) + C 2. ln (xy) = x – 2y + C 3. ln (xy) = 2y – x + C **4.** **ln (xy) = x + 2y + C**

Questions	**Choices**
In a platinum resistance thermometer which is used to measure temperature, if the resistance temperature coefficient of platinum is 0.00392/^{0}C, then its sensitivity at room temperature will be	1.(0.00392/20) Ω/^{0}C 2.(0.00392/2) Ω/^{0}C **3.0.00392 Ω/^{0}C** 4.0.00784 Ω/^{0}C
Fundamental interval of platinum is	1.38.5^{o}C **2.0^{0}C** 3.100^{0}C 4.-38.5^{0}C
Solve (x + y) dy = (x – y) dx	1. $x^2 – 2xy – y^2 = C$ 2. $x^2 + 2xy + y^2 = C$ 3. $x^2 + y^2 = C$ **4. $x^2 – 2xy + y^2 = C$**
The resolution of a 4-bit counting ADC is 0.5V. For an analog input of 6.6V, the digital output of the ADC will be	1. 1101 **2. 1110** 3. 1011 4. 1100
For a copper constantan (Type T) thermocouple, the junction E(in μV) at θ^0C is given by: $E= 38.74\theta + 3.3X10^{-2}\theta^2 + 2.07X10^{-4}\theta^3 - 2.2X10^{-6}\theta^4$ + higher order terms, assuming the cold junction compensation. Find the sensitivity of the thermocouple at 100^{o}C.	**1.42.75 μV/^{0}C** 2. 38.74 μV/^{0}C 3. 0.06 μV/^{0}C 4. 45.35 μV/^{0}C
Solve the linear equation: $dy / dx + y / x = x^2$	1. $x^2y = x^4 / 4 + C$ **2. $xy = x^4 / 4 + C$** 3. $xy^2 = x^3 / 4 + C$ 4. $y = x^3 / 4 + C$
A linear thermocouple with a sensitivity of 0.04 mV/°C and resistance of 100 Ω is connected to a load with a resistance of 1 kΩ. Find the voltage across the load for a temperature of 250 °C	1. 9.09 mV 2. 9 mV **3. 9.09 V** 4. 9 V
In the case of I I R filter which of the following is true if the phase distortion is tolerable	1. More parameters for design 2. More memory requirement 3. Lower computational Complexity 4. Higher computational complexity
A thermocouple of AB with a constant of K_{AB}=35μV/^{0}C is used along with another thermocouple K_{BC}=25μV/^{0}C. The reference temperature is 25^{0}C and the measured temperature is 300^{0}C. The emf developed for AC thermocouple at the given temperature is	**1.16.5 mV** 2.2.75 mV 3. 19.5 mV 4. 3.25 mV
Find the differential equations of the family of lines passing through the origin.	1. y dx – x dy = 0 **2. x dy – y dx = 0** 3. x dx + y dy = 0

Questions	Choices
	4. y dx + x dy = 0
A thermistor has a resistance of 10KΩ at 25°C and 1KΩ at 100°C. The range of operation is 0 degrees to 150 degrees Celsius. The excitation voltage is 5V and a series resistor of 1kW is connected to the thermistor. The power dissipated in the thermistor is	1. 4mW **2. 4.7 mW** 3. 5.4 mW 4. 6.1 mW.
What is the differential equation of the family of parabolas having their vertices at the origin and their foci on the x-axis?	**1. 2x dy – y dx = 0** 2. x dy + y dx = 0 3. 2y dx – x dy = 0 4. dy / dx – x = 0
A thermistor is characterized by the relation $R_t = R_0 ae^{(b/T)}$ where, R_0 is resistance at ice point, R_t is the resistance at the absolute temperature T K, and a & b are constants. Determine the temperature indicated by such a thermistor , if R_t=1050Ω, R_0=4000Ω, a=300x10^{-6} and b=2850	**1. 420 K** 2.320 K 3. 150 K 4. 120 K
The number of comparators in a 5-bit flash ADC	1. 31 2. 33 3. 5 **4. 32**
Determine the differential equation of the family of lines passing through (h, k).	**1. (y – k) dx – (x – h) dy = 0** 2. (y – h) + (y – k) = dy / dx 3. (x – h) dx – (y – k) dy = 0 4. (x + h) dx – (y – k) dy = 0
Which of these is an NTC device	1.RTD 2.Thermocouple 3.Thermopile **4. Thermistor**
Determine the differential equation of the family of circles with center on the y-axis.	1. xy” – (y’)^3 – y’ = 0 2. (y’)^3 + (y”)^2 + xy = 0 3. y” – xyy” + y’ = 0 4. (y”)^3 – xy” + y’ = 0
Radium decomposes at a rate proportional to the amount at any instant. In 100 years, 100 mg of radium decomposes to 96 mg. How many mg will be left after 100 years?	1. 90.72 **2. 92.16** 3. 95.32 4. 88.60
A causal and stable I I R filter has	1. No Amplitude 2. Linear amplitude 3. Linear phase **4. No Linear phase**
For a 5-bit ladder D-A converter, the output voltage for a digital input of 11010 is (assume the minimum and maximum power supplies used	**1. 8.125** 2. 7.125

Questions	Choices
are 0V and 10 V)	3. 9.125 4. 10
In a sequential circuit, the output depends on	1. present states only 2. past states and present inputs 3. present states and present inputs **4. present states and past inputs**
Which of the following codes is a non-weighted code?	1. 6 3 2 1 0 2. 2 4 2 1 **3. excess 3** 4. 8 4 2 1
The length of instruction register of a 8085 micro processor is	1. 6 bits **2. 8 bits** 3. 12 bits 4. 16 bits
The population of a country doubles in 50 years. How many years will it be five times as much? Assume that the rate of increase is proportional to the number inhabitants.	1. 100 years **2. 116 years** 3. 120 years 4. 98 years
Even after Reset operation, which of the following interrupt remains enabled?	**1. TRAP** 2. RST 7.5 3. RST 5.5 4. INTR
Out of the given I I R filters the following filter is the efficient one	1. Circular filter 2. Elliptical filter 3. Rectangular filter **4. Chebyshev filter**
Two D flip-flops are connected as a synchronous counter that goes through the following Q_BQ_A sequence 00 →11→01→10→00→… The combination to the inputs D_A and D_B are	1. D_A = Q_B; $D_B = Q_A$ 2. D_A = Q_A'; $D_B = Q_B$' **3. $D_A = (Q_AQ_B +$ $(Q_AQ_B)')$; $D_B = Q_B$'** 4. $D_A = (Q_AQ_B' +$ $Q_A'Q_B)$; $D_B = Q_A$'
Classify the region	1. Closed region 2. Connected Open region

Questions	Choices
	3. Closed bounded region 4. Unconnected region
The output voltage of a LVDT is 1.5 V at maximum displacement. At a load of 0.5MΩ, the deviation from linearity is maximum and it is 0.003 V from a straight line through origin. The linearity at the given load is	1. 0.2 % **2. 0.3%** 3. 0.25 % 4. 0.1 %
The Boolean expression Y = A' B' C' D + A' B C D' + A B' C' D can be minimized to	1. Y = A'BCD' + B'C'D + ABC'D' **2. Y = A'BCD' + B'C'D + AB'C'D** 3. Y = A'B'C'D + B C D' + AB'C'D 4. Y = A'B'C'D + A'BC' + AC'D
Minimum number of flip-flops used to build a Mod-19 counter	**1. 5** 2. 7 3. 6 4. 4
Find the perimeter of the curve	1. 2. 3. 4.
Find the derivative of	1. 30 2. 3. 1 4. 30/5
The following is true for the following partial differential equation used in nonlinear mechanics known as the Korteweg-de Vries equation.	1. linear; 3rd order **2.** **nonlinear; 3rd order**

Questions	Choices
	3. linear; 1st order 4. nonlinear; 1st order
The minimum number of NAND gates required to implement sum operation of a half adder is	1. 4 2. 2 **3. 5** 4. 3
Wired AND connection must not be used with totempole driver because	1. Fan out decreases 2. Noise increases **3. Transient current spikes occur** 4. Delay is increased
For a 10-bit A/D converters, the quantization error is (in %)	1. 2 2. 1 3. 0.2 **4. 0.1**
Gray code representation of decimal 6 is	**1. 101** 2. 1100 3. 1111 4. 1010
What is the disadvantage of impulse invariant method	1. warping 2. anti aliasing **3. Aliasing** 4. one to one mapping
the output F to be 1 in the logic circuit shown, the input combination should be	1. A = 1, B= 1, C = 0 2. A = 1, B= 0,C = 0 3. A = 0, B= 1, C = 0 **4.** **A = 0, B= 0, C = 1**
uming that flip-flops are in reset condition initially, the count sequence observed at Q_A in the circuit shown is	1. 0010111… 2. 0001011… 3. 0101111… **4.**

Questions	Choices
	0110100…
A continuous image is digitised at _____ points.	1. vertex 2. Random **3. sampling** 4. contour
At resonance, the term bandwidth includes all frequencies that allow what percentage of maximum current to flow?	1. 50 **2. 70.7** 3. 95.3 4. 62.3
Functions that combines to produce $f(x,y)$	1. illumination and frequency 2. intensity and reflectance 3. illumination and radiance **4. illumination and reflectance**
A zener diode is used as …….	1. an amplifier 2. a multivibrator **3. a voltage regulator** 4. a rectifier
A no-load condition means that	1. The output terminals are open **2. Both (a) and (c)** 3. The load has zero resistance 4. The load has infinite resistance
Which of the following statement is true	1.Gamma radiations are highly focused 2.**Gamma radiations can be detected directly in a scintillating material** 3.Gamma radiations cannot be detected directly in a scintillating material 4.Gamma photon can be bent by using lens
The value of a complex number with $\|z\|=1.414$ and $\arg(z) = 3\pi/4$ is:	1. 1+i 2. -1+i 3. 1-i 4. -1-i
A third-order filter will have a roll-off rate of	1. –40 dB/decade **2. –60 dB/decade** 3. –30 dB/decade

Questions	Choices
	4. –20 dB/decade
The attenuation of the three-section RC feedback phase-shift oscillator is	1. 1/9 2. 1/30 3. 1/3 **4. 1/29**
Which of the following is required for oscillation?	1. The phase shift around the feedback network must be 180º 2. $\beta A \leq 1$ 3. $\beta A > 1$ 4. Both $\beta A > 1$ and the phase shift around the feedback network must be 180º
The lead-lag circuit in the Wien-bridge oscillator has a resonant frequency at which the attenuation is	1. 1/2 **2. 1/3** 3. 1/4 4. 1/5
Voltage to current converter is also called as	**1. Current series negative feedback amplifier** 2. Voltage series positive feedback amplifier 3. Voltage series negative feedback amplifier 4. Current series positive feedback amplifier
An op-amp clamper circuit is also referred as	1. DC leveller 2. DC cutter 3. DC lifter **4. DC inserter**
Another name for a unity gain amplifier is:	1. difference amplifier 2. single ended 3. Comparator **4. voltage follower**
A noninverting closed-loop op-amp circuit generally has a gain factor	1.

Questions	Choices
	of zero 2. less than one 3. equal to one **4. greater than one**
Which transistor bias circuit provides good Q-point stability with a single-polarity supply voltage?	1. base bias **2. voltage-divider bias** 3. collector-feedback bias 4. emitter bias
Which of the following material is sensitive to light?	1. Photosensitive **2. Photoresist** 3. Light sensitive 4. Maser
When transistors are used in digital circuits they usually operate in the	**1. saturation and cutoff regions** 2. breakdown region 3. active region 4. linear region
The power of He-Ne laser utilized in laser Doppler blood flowmeter is	1. 50MW 2. 500mW **3. 5mW** 4. 50mW
In the pulse height analyser, ----------gives an output pulse only when there is an impulse in only one of the input channels.	**1. anti-coincidence circuit** 2. Schmitt trigger circuit 3.lower discriminator circuit 4. upper discriminator circuit
An object nearer to a converging lens than its focal point always has a/an _____ image.	1. Inverted **2. Virtual** 3. Smaller size 4. Same in size
Three different Q points are shown on a dc load line. The upper Q point represents the:	1. minimum current

Questions	Choices
	gain 2. intermediate current gain **3. maximum current gain** 4. cutoff point
In analytical instruments, ---------- has higher sensitivity but more susceptible to interfering reactions with other substances.	1. GDH **2. GOD** 3. Ferricyanide 4. GDH-FAD
In a C-E configuration, an emitter resistor is used for:	1. higher gain 2. ac signal bypass 3. collector bias **4. Stabilization**
The ends of a load line drawn on a family of curves determine:	1. the amplification factor 2**.** **saturation and cutoff** 3. the operating point 4. the power curve
Which one of the following is not used in colorimeter?	1. Colored filters **2. Dialyzer** 3. lens 4. Cuvette
Zener diodes with breakdown voltages less than 5 V operate predominantly in what type of breakdown?	**1. Zener** 2. avalanche 3. Varactor 4. Schottky
One eV is equal to _____ J.	1. 1.66×10^{-24} 2. 6.25×10^{18} 3. 6.02×10^{23} **4.** $\mathbf{1.6 \times 10^{-19}}$
The first instrument to be inserted during a laparoscopy procedure is	1. Insufflator

Questions	Choices
_____	**2. Trocar** 3. Veress needle 4. Cannula
The Op-amp can amplify	1. a.c. signals only 2. d.c. signals only 3. neither d.c. nor a.c. signals **4. both a.c. and d.c. signals**
The _____scissor is especially useful for cutting secured duct or artery in laparoscopic surgery.	1.Straight type 2. Serrated type 3. Micro-tip type **4. Hook type**
LVDS technology provides data rate upto_____.	1. 480 Mbps 2. 580 Mbps 3. 800 Mbps **4.600Mbps**
Lap choly refers to removal of _____	1. Ovarian cysts **2. Gall Bladder** 3. Pancreas 4.Endometriosis
The PIV rating of each diode in a bridge rectifier is …… that of the equivalent centre-tap rectifier	**1. one-half** 2. the same as 3. twice 4. four times
First Order Runge Kutta method is	1. Modified Euler's Method **2. Euler's Method** 3. Taylor's Method 4. Finite difference Method.
Which of the following characteristics does not necessarily apply to an op-amp?	1. High gain **2. Low power** 3. High input impedance 4. Low output impedance
Since Gamma photons cannot be bent by using lenses, ---------- --- is used to selectively absorb unwanted radiation.	**1.Collimator** 2. Position localization circuitry 3. Correction circuitry 4. PMT
Which of the following is the fastest light sensor?	**1.PIN Photodiode** 2. Avalanche photodiode 3. Photovoltaic diode 4. Photo transistor
Which component is considered to be an "OFF" device?	1.Transistor 2. JFET 3.D-MOSFET **4.E-MOSFET**
The total internal energy change in a bomb calorimeter is	1. 0 **2. $-C_v \Delta T$**

Questions	Choices
	3. $\Delta H_c/-C_v$ 4. $\Delta H_c/\Delta T$
To operate properly, a transistor's base-emitter junction must be forward biased with reverse bias applied to which junction?	1. collector-emitter 2.base-collector 3.base-emitter **4. collector-base**
The major difference between ground and virtual ground is that virtual ground is only a	1. difference reference 2. current reference **3. voltage reference** 4. power reference
In order for an output to swing above and below a zero reference, the op-amp circuit requires	1.zero offset **2.a negative and positive supply** 3.a resistive feedback network 4.a wide bandwidth
The maximum power delivered by a short wave diathermy machine is _____.	1. 250 W 2. 750W **3. 500W** 4. 125W
If the spirometer is used for time-dependant parameters, then it must have a flat frequency response of upto _____.	1. 72 Hz 2. 200 Hz **3. 12 Hz** 4. 80 Hz
Which of these pnuemotachometers use a light emitting diode for measurement of sample air flow? _____	1. Fleisch type 2. Lily type 3. Venturi type **4.Turbine type**
Polarogram is used for the analysis of _____	1. CO_2 2. N_2O **3. O_2** 4. CO
When the radio frequency output is applied to the pads of a short wave diathermy unit, _____ is manifested as heat.	1. Magnetic frequency **2. dielectric losses of capacitor** 3.absorption in the tissue 4. resonance
Largest amount of air that we can breathe in or out in one inspiration/expiration is called the _____	1. Tidal Volume **2. Vital capacity** 3.Residual Volume 4. Functional residual capacity
_____ is insensitive to turbulent flow of gases	1. Hot wire anemometer 2. Turbine pneumotachometer 3. Lily type pneumotachometer **4. Fleish type pneumotachometer**
The tone signal derived from the counter at 250Hz, facilitates the	**1. Haemostasis**

Questions	**Choices**
identification of _____	2. Coagulation 3. Cutting 4.Fulgration
_____ of infrared gas analyzer allows the energy to pass alternately through the reference and sample tubes.	**1. Coaxial chopper** 2.Magnetic pole pieces. 3. Collimator 4. Filter
Inspiration : Expiration ratio of a ventilator is usually set at _____ ratio	1. 2:1 **2. 1:2** 3. 3:1 4. 1:1
A breath that has a greater volume than the preset V_T - _____	1. PEEP 2. Tidal Volume 3. PIP **4. Sigh**
At what pressure is the oxygen maintained at E tanks?	1. 1800PSI 2. 1200PSI 3. 745PSI **4. 2200PSI**
Proportioning systems automatically intercedes to maintain the concentration of O_2 and N_2O in the ratio of	**1. 3:1** 2. 1:3 3. 1:1 4. 2:3
High frequency response of doppler ultrasonic blood flowmeter results in	1. vascularartifact 2. sound induced artefact 3. wall motion arefacts **4.Non-linearity into the i/p o/p calibration curve**
_____ target angle is the most common angle of the rotating anode in x-ray machine.	**1. 12°** 2. 21° 3. 45° 4. >45°
A glucose measurement in whole blood is _____ the glucose levels in plasma	1.Higher than **2. lower than** 3. equal to 4. double
In x-ray machine, the quantity of electrons controlled by the filament temperature determines ____	**1. kVp** 2.V/mv 3.Micro V 4.mA
---------- analyzer has the advantage of being programmed to perform only those tests which are requested	1. circular 2. Continuous flow 3. Centrifugal **4. Discrete sample**
In which procedure, the needle-point electrodes are stuck into the tissue and kept steady?	**1. Dessication** 2.Fulguration 3. Haemostasis 4. Coagulation

Questions	**Choices**
The repetition frequency of the burst in Coagulation mode is _____	1. 15 MHz 2.15 Hz **3.15 KHz** 4.300 Hz
In microwave diathermy, the conduction in the triode takes place during _____ phase of the cycle	1.alternative 2.both the phase 3.negative 4. **Positive**
The value of the Gamma rays associated with Pet scanning is _____	1.512keV **2.511keV** 3.215kev 4.151keV
The position localization circuitry of gamma camera is part of which functional component?	1.Count rate meter 2.Pulse Height Analyzer 3.Camera Electronics **4.Detector**
Silver chloride tip is present in ------	**1. reference electrode** 2.Glass electrode 3. combination electrode 4. B and C
The figure is a logic circuit with inputs A and B and the output Y. Vss = 5 V.The circuit is of type	1. NOR 2. **AND** 3. OR 4. NAND
The function of anti-coincidence logic of Multi-crystal gamma cameras is to _____ two signals arising simultaneously	1.Add 2.Receives **3.Rejects** 4. Merge
The average value of full-wave rectified voltage with a peak value of 75 V is	**1. 47.8 V** 2. 23.9 V 3. 37.5 V 4. 53 V
In a certain voltage-divider biased *npn* transistor, V_B is 2.95 V. The dc emitter voltage is	1. 0.7 V 2. 3.65 V 3. 2.95 V **4. 2.25 V**
A JFET is set up as source follower. Given, μ=200, r_d=100 k and source load resistance R_L=1k. The output resistance R_0 is approximated by	1. 333 Ω 2. 666 Ω 3. 500 Ω

Questions	Choices
	4. 100 Ω
8255 chip is interfaced to an 8085 microprocessor system as an I/O mapped I/O as shown in the figure. The address lines A_0 and A_1 of the 8085 are used by the 8255 chip to decode internally its three ports and the Control register. The address lines A3 to A7 as well as the IO/ M' signal are used for address decoding. The range of addresses for which the 8255 chip would get selected is:	1. F8H - FBH 2. F8H – FCH **3.** **F8H - FFH** 4. F0H – F7H
If $\alpha = 0.98$, $I_{CO} = 6\ \mu A$, and $I_\beta = 100\ \mu A$ for a transistor, then the value of I_C will be	1. 3.1 mA 2. 2.3 mA 3. 4.6 mA **4. 5.2 mA**
An n-channel JFET having a pinch-off voltage (V_p) of -5 V shows a transconductance (g_m) of 1 mA/V, when the applied gate-to-source voltage (V_{GS}) is -3 V. Its maximum transconductance (in mA/V) will be	1. 1.5 2. 2.5 3. 3.0 4. 2.0
In class A direct coupled (series fed) power amplifier, maximum dissipation capacity of the transistor is 2.5 watt. When delivering maximum ac power, the dc power in the load is	1. 5 watts 2. 8 watts 3. 0.625 watts 4. 2.5 watts
An npn transistor (with C=0.3 pF) has a unity gain cut-off frequency f_T of 400 MHz at a dc bias current I_C=1 mA. The value of its C_μ is approximately (V_T=26 mV)	**1. 15pF** 2. 96pF 3. 30pF 4. 50pF
For a class B amplifier providing a 20 V peak signal to 16 Ω load and a power supply of V_{cc}=30 V, the efficiency (%) will be	**1. 52.3** 2. 75 3. 25.65 4. 78.6
A class-A transformer coupled, transistor power amplifier is required to deliver a power output of 10 watts. The maximum power rating of the transistor should not be less than	**1. 20 W** 2. 740 W 3. 10 W 4. 5 W
If an amplifier with gain of -1000 and feedback of b = -0.1 had a gain change of 20% due to temperature, the change in gain of the feedback amplifier would be	1. 10% 2. 0.2% 3. 0.01% 4. 5%
An amplifier has an open loop gain of 100, an input impedance of 1 kΩ, and an output impedance of 100 Ω, and an output impedance of 100 Ω. A feedback network with a feedback factor of 0.99 is connected in a voltage series feedback mode. The new input and	1. 10 Ω and 1 Ω 2. 10 Ω and 10 kΩ **3. 100 kΩ and 1 Ω** 4. 100 kΩ and 10 kΩ

Questions	Choices
output impedance are	
An amplifier with mid-band gain |A| = 500 has negative feedback |b| = 1/100. If the upper cut-off without feedback were at 60 Hz, then with feedback it would become	**1. 360 kHz** 2. 300 kHz 3. 12 kHz 4. 10 kHz
A differential amplifier has a differential gain of 20,000. CMRR = 80 dB. The common mode gain is given by	1. 1 **2. 2** 3. 0 4. .5
The output voltage of an OPAMP for input voltage of V_{i1} = 150 μV, V_{i2} = 140 μV if the amplifier has a differential gain of A_d = 4000 and the value of CMRR is 100, is	1. 40.006 mV 2. 145 μV 3. 10μV **4. 45.8 mV**
If I_C is 50 times larger than I_B, then β_{dc} is	**1. 50** 2. 100 3. 0.02 4. 500
If a certain zener diode has a zener voltage of 3.6V, it operates in	1. Regulated breakdown **2. Zener breakdown** 3. Avalanche breakdown 4. Forward conduction
An average amplifier has 5 inputs. The ratio of Rf / Ri must be	1. 5 2. 1 **3. 0.2** 4. 4
The output of a particular op-amp increases 8V in 12 μs. The slew rate is	**1. 0.67 V/μs** 2. 2.5 V/μs 3. 96 V/μs 4. 1.5 V/μs
A certain op-amp has bias currents of 50μA and 49.3μA. The input offset current is	**1. 700 nA** 2. 90 nA 3. 49.7μA 4. 99.3μA
Digitizing image intensity amplitude is called	1. framing 2. blurring 3. sampling **4. quantization**
The bandwidth of an ac amplifier having a lower critical frequency of 1 kHz and an upper critical frequency of 10 kHz is	1. 10 kHz **2. 9 kHz** 3. 11 kHz 4. 1 kHz
When negative feedback is used, the gain-bandwidth product of an	1. stays the same

Questions	Choices
op-amp	2. increases 3. decreases 4. fluctuates
If a certain op-amp has a closed-loop gain of 20 and an upper critical frequency of 10 MHz, the gain-bandwidth product is	**1. answers (a) and (c)** 2. the unity-gain frequency 3. 10 MHz 4. 200 MHz
If the power level of an amplifier reduces to half, the dB gain will fall by …….	**1. 3 dB** 2. 10 dB 3. 5 dB 4. 2 dB
The total gain of a multistage amplifier is less than the product of the gains of individual stages due to ……	1. Power loss in the coupling device 2. The use of many transistors 3. The use of many capacitors **4. Loading effect of the next stage**
If a three-stage amplifier has individual stage gains of 10 db, 5 db and 12 db, then total gain in db is …….	1. 600 dB 2. 24 dB 3. 14 dB **4. 27 dB**
A certain noninverting amplifier has R_i of 1 kΩ and R_f of 100 kΩ. The closed-loop voltage gain is ……	1. 100 **2. 101** 3. 1000 4. 100,000
Determine the nominal voltage for the Zener diode at a temperature of 120° C if the nominal voltage is 5.1 volts at 25° C and the temperature coefficient is 0.05%/° C.	1. 4.86 V **2. 5.34 V** 3. 5.1 V 4. 4.6 V
Calculate the power dissipation of a silicon diode having I_D = 40 mA.	1. Undefined **2. 28 mW** 3. 280 mW 4. 28 W
At what kind of operating frequency diffusion or transition is a capacitor represented in parallel with the ideal diode?	1. Low frequency 2. Moderate frequency 3. Mid frequency **4. Very high frequency**
The diffused impurities with _____ valence electrons are called donor atoms.	1. 4 2. 0 **3. 5** 4. 3
Which capacitance dominates in the reverse-bias region of a diode?	**1. depletion** 2. conversion 3. Oxide capacitance 4. Diffusion

Questions	Choices
What does a high resistance reading in both forward- and reverse-bias directions indicate?	**1. An open diode** 2. A defective ohmmeter 3. A shorted diode 4. A good diode
A half-wave rectifier has an input voltage of 240 V r.m.s. If the step-down transformer has a turns ratio of 8:1, what is the peak load voltage? Ignore diode drop	1. 86.5 V **2. 42.5 V** 3. 30 V 4. 27.5 V
What is the transconductance of an FET when I_D = 1 mA and V_{GS} = 1 V?	1. 1 kΩ 2. 1 mΩ **3. 1 mS** 4. 1 kS
A collector characteristic curve is a graph showing:	1.collector current (I_C) versus collector-emitter voltage (V_{CC}) with (V_{BB}) base bias voltage held constant **2.collector current (I_C) versus collector-emitter voltage (V_{CE}) with (V_{BB}) base bias voltage held constant** 3.emitter current (I_E) versus collector-emitter voltage (V_{CE}) with (V_{BB}) base bias voltage held constant 4.collector current (I_C) versus collector-emitter voltage (V_C) with (V_{BB}) base bias voltage held constant
A differential amplifier is invariably used in the input stage of all OPAMP's. This is done basically to provide the OPAMP's with a very high	1. bandwidth 2. open-loop gain 3. CMRR **4. slew rate**
A change in the value of the emitter resistance R_e in a differential amplifier	1. affects the difference mode gain A_d 2. affects both A_d and Ac 3. affects the common mode gain A_c **4. does not affect either A_d and A_c**
An OPAMP has a slew rate of 5 V/μs. The largest sine wave output	**1. 5/2π V**

Questions	Choices
voltage possible at a frequency of 1 MHz is	2. 5 V 3. 10π V 4. 5/π V
The mobility of an electron in a conductor is expressed in terms of	**1. cm/V-s** 2. cm^2/s 3. cm^2/V-s 4. cm^2/V
A maximally flat frequency response is known as	1. Colpitts 2. Chebyshev **3. Butterworth** 4. Bessel
Which one of the following statements is true of phase-shift type and Wein-bridge type RC oscillators?	1. Both uses positive feedback **2. The former uses positive feedback only whereas later uses both positive and negative feedback** 3. Both uses negative feedback 4. The former uses both positive and negative feedback whereas later uses positive feedback only
In a common emitter amplifier, the unbypassed emitter resistance provides	1. current-series feedback 2. negative-voltage feedback 3. positive-current feedback **4. voltage-shunt feedback**
Class AB operation is often used in power (large signal) amplifiers in order to	1**. remove even harmonics** 2. get maximum efficiency 3. overcome a cross-over distortion 4. reduce collector dissipation
A signal may have frequency components which lie in the range of 0.001 Hz to 10 Hz. Which one of the following types of coupling should be chosen in a multistage amplifier designed to amplify this signal?	1. RC coupling 2. Double-tuned coupling 3. Transformer coupling **4. Direct coupling**
The gain bandwidth product of a two stage CE amplifier is	**1. the product of the two gain bandwidth products of each stage** 2. less than that of one stage 3. the same as that of one stage 4. greater than that of one stage
As the temperature is increased, the voltage across a diode carrying a diode carrying a constant current	**1. increases** 2. may increase or decrease depending upon the doping levels in the junction 3. decreases

Questions	Choices
	4. remains constant
The MOSFET switch in its on-state may be considered equivalent to	1. resistor 2. capacitor 3. battery **4. inductor**
The threshold voltage of an n-channel MOSFET can be increased by	1. reducing the channel length **2. decreasing the channel doping concentration** 3. reducing gate oxide thickness 4. increasing the channel doping concentration
The breakdown voltage of a transistor with its base open is BV_{CEO} and that with emitter open is BV_{CBO}, then	1. $BV_{CEO} > BV_{CBO}$ **2. $BV_{CEO} < BV_{CBO}$** 3. $BV_{CEO} = BV_{CBO}$ 4. both voltages are unrelated
The early effect in a bipolar junction transistor is caused by	1. large emitter base forward bias 2. fast turn-OFF **3. large collector-base reverse bias** 4. fast turn-ON
In an FET as V_{GS} is changed from zero to increasing reverse bias, the value of g_m	1. remains constant 2. increased **3. decreased** 4. falls suddenly to zero
An oscillator whose frequency is changed by a variable dc voltage is known as	1. a piezoelectric device 2. an Armstrong oscillator **3. a VCO** 4. a crystal oscillator
Sallen-Key filters are	1. single-pole filters 2. Butterworth filters **3. second-order filters** 4. band-pass filters
Instrumentation amplifiers are used primarily in	**1. high-noise environments** 2. test instruments 3. medical equipment 4. filter circuits
A certain op-amp has bias currents of 50μA and 49.3μA. The input bias current is	**1. 700 nA** 2. 90 nA 3. 49.7μA 4. 99.3μA
In the midrange of an amplifier's bandwidth, the peak output voltage is 6 V. At the lower critical frequency, the peak output voltage is	1. 3.82 V 2. 3 V **3. 4.24 V** 4. 8.48 V
Ideally, a dc load line is a straight line drawn on the collector	1. the Q-point and cutoff

Questions	**Choices**
characteristic curves between	2. the Q-point and saturation 3. $I_B=0$ and $I_B=I_C/\beta_{DC}$ **4. $V_{CE(cutoff)}$ and $I_{C(sat)}$**
If the base-emitter junction is open, the collector voltage is	1. floating **2. V_{cc}** 3. 0.2 V 4. 0 V
If a certain zener diode has a zener voltage of 65 V, it operates in	1. forward conduction 2. zener breakdown 3. regulated breakdown 4. avalance breakdown
If one diodes in bridge full-wave rectifier opens, the output is	**1. a half-wave rectified voltage** 2. 0 V 3. One-fourth the amplitude of the input voltage 4. a 120 Hz voltage
A commercial use of Image Subtraction is _____.	1. X-Ray 2. CT scan 3. MRI scan 4**. Mask mode radiography**
Which of the following is a commonly used metastable radionuclide?	1. Thallium -201 2.Technetium -99m **3.Iodine -131** 4.Gallium -67
High pass filters promotes	1.low intensity components 2. mid intensity components 3**.high intensity components** 4. dimming
The considerable interference produced by the microwave diathermy machine necessitates the use of _____	1.Delay circuit **2.500mA fuse** 3.automatic selection of control range 4. large self-inductance coils
In an endoscope, differential measurement between two samples of	1.CMOS **2. All the above.**

Questions	**Choices**
each pixel is done by_____	3.CDS 4. CCD
_____ gas is commonly used for insufflating the abdominal cavity for laparoscopy.	1.Helium **2.Carbon-di-oxide** 3.Oxygen 4. All the above
The cell counter considers_____ as the normal range of white blood cell in male.	1. 4.5-11M 2.15K – 150k **3. 4.5-11 K** 4. 150-350 K
Which of these does not belong to the Low pressure system of Anaesthesia machine	**1.Flow meters** 2.Vaporizer mounting device 3. Oxygen failure device 4.Common gas outlet
If is the upper half of the circle	1. 10 2. 0 3. 30 4. 20
Filters used to reject the 50Hz noise picked up from power lines are called	1. Low pass filters 2. High pass filters 3. Band pass filters **4.Notch Filters**
Which amplifier rejects any common mode signal that appears simultaneously at both amplifier input terminals?	1. Ac coupled amplifier 2.DC amplifier **3.Differential amplifier** 4. Carrier amplifier
Light beam oscilloscope recorders use _____ amplifiers	1. Ac coupled **2. Chopper stabilized dc** 3.DC bridge 4.Carrier
Gain of instrumentation amplifier is calculated using_____	1.R_2/R_1 2.$(1+2R_g)$ /R 3.1+ $(2R/R_g)$ **4.1+ $(2R_g/R)$**
The filter which has a figure of merit, _____ has the	**1. Q=20**

Questions	Choices
narrowest band pass.	2.Q=5 3. Q=1 4. Q=10
The nominal pressure value in the pulmonary system is	**1. 6-25 mmHg** 2.5-15 mmHg 3. 80-120 mmHg 4.30-300 mmHg
The fluid for flushing system in a blood pressure monitoring, should not exceed the rate of _____ for adults.	1. 3 ml/hr **2. 6 ml/hr** 3.0.5 ml/hr 4. 300 ml/hr
_____ is characterized by the electric arcs which are intentionally generated deeper between the coagulation electrode and the tissue.	1. Spray Coagulation 2. All the above **3.Forced Coagulation** 4.Soft Coagulation
---------- states that the concentration of a solute is proportional to the absorbance	1. Henry's law 2. Plank's law **3. Beer-Lambert law** 4. Max's law
The minimum breakdown voltage for a pressure transducer in a medical transducer is _____	1. 4000 Vdc 2. 1000 Vdc 3.6000 Vdc 4. 10000 Vdc
V4 of unipolar chest lead is positioned at _____	1. same level as V3 2.fourth intercostals space at left sternal margin **3. fifth intercostal space at mid-clavicular line** 4.fourth intercostal space at mid-clavicular line
The artifact caused due to the slow establishment of electrochemical equilibrium at the electrode-skin interface is _____	1.Interference from the power line 2**.shifting of the baseline** 3.noise 4.muscle tremor
The 3rd sound of a phonocardiogram recording corresponds to _____	1. Pulmonary valve closure 2.Aortic Valve closure 3. Mitral valve closure **4. termination of ventricular filling**
The monostable multivibrator which provides the refractory delay to the gate of atrial synchronous pacemaker provides a delay of _____.	1. 80ms **2.500ms** 3. 120ms 4.2ms

Questions	**Choices**
How many electrodes are present in 10/20 electrode placement system of EEG machine?	1. 11 **2. 21** 3. 20 4.10
The writing part of an EEG machine is usually _____.	1.Direct writing galvanometer 2.Potentiometric recorder 3.inkjet recording system 4. Thermal array recorder
What is the frequency component of alpha waves?	1. Over 13 Hz 2.upto 4 Hz 3.4.1 – 8 Hz 4**.8.1- 13 Hz**
The proportioning pumps of a dialysis machine delivers concentrate and water in the ratio of	1. 3.5:1 **2. 1:35** 3. 1:3.5 4.35:1
Which is the majority component of dialysate solution?	**1.Sodium** 2.Calcium 3.Potassium 4. Chlo ride
Which is the preferred electrode placement location for EMG?	1.parallel to muscle fibers **2.positioned on the outer edge of muscle** 3. Oriented on the motor point 4.near the tendon
The blood leak level, for normal operation, is set at _____ of hb / litre of dialysate.	1. 65 mg 2.35 mg 3.38 mg **4. 25 mg**
The dialyzer used with portable kidney machines is of _____ type	1.coil type 2.hollow fibre type 3.All the above 4. Parallel plate
The contact impedance shown by the ECG electrodes is of the order of _____	**1. 50kΩ** 2. 200kΩ 3. above 1000kΩ 4. 100 kΩ
EMG and EEG recorders use _____ amplifiers	1.Dc bridge **2.Ac coupled** 3.Chopper stabilized dc 4. Carrier
How many resistors are present in an instrumentation amplifier?	**1. 7** 2. 3

Questions	Choices
	3.13 4. 10
Which amplifier uses a minimum number of components and is cost-effective?	1.Capacitively coupled 2. transformer isolated **3. Optically isolated** 4.Push-Pull Amplifier
Which recorder is independent of signal amplitude and number of channels?	1.potentiometric recorders 2.Cathode ray oscilloscopes **3. Electrostatic recorders** 4.Ultra-violet recorders
Dark current in light detectors is caused by _____	1.its imperfection 2. thermally generated carriers in the diode **3.Absence of light input** 4.small leakage current
_____ sound of the PCG occurs at the closure of aortic and pulmonary valve.	1.Third and fourth **2.Second** 3.Diastolic 4. First
On the Argand diagram, the cube roots of unity lie on	**1. Equilateral triangle** 2. right angled triangle 3. isosceles triangle 4. straight line
What is the unit of responsivity?	1. Ampere/volt 2. Volts/ampere **3. Ampere/Watt** 4. Watt/ampere
The preamplifiers used in EEG must have _____	1.Low gain and low CMRR 2.High gain and Low CMRR **3.High gain and high CMRR** 4.Low gain and high CMRR
Odd numbers of the EEG montage refer to _____	1.Midline electrodes 2. Right side of the head 3.isoground **4. Left side of the head**
The nominal pressure value in the arterial system is_____	1.5-15 mmHg 2.80-120 mmHg 3.6-25 mmHg **4. 30-300mmHg**
The source of fluid for flushing system of BP monitoring unit is a bag of _____	1.600ml at pressure 600mmHg 2.300ml at pressure 300mmHg **3.600ml at pressure 300mmHg** 4. 300ml at pressure 600mmHg
Which non-invasive method of BP measurement is an accurate	1.Korotkoff

Questions	Choices
method?	2.Oscillometric **3.Differential Auscultatory** 4.Rheographic
Minute volume refers to _____	**1.Tidal volume/ Number of respirations** 2.Tidal volume x 60 3. Tidal Volume x Number of respirations 4.Tidal volume x 30
Which of these is a non-technical problem with electrodes and leads of pacemaker?	1.**Exit block** 2.Broken conductors 3.Poor interface with pulse generator 4.Broken Insulation
If a 16μF capacitor is used, then for the full output of 400 Watt to be available, the capacitor should be charged to _____.	**1. 7000V** 2.700V 3. 0.007V 4.70V
If f(z)=u+iv is an analytic function with $u=x^2-y^2+y$, then the Re[$f'(z)$] is:	1. 2y-1 2. 2x-1 **3. 2x** 4. -2x
What is the dimension of the titanium mesh patch used with pacemaker leads?	1. 4cmx6cm **2.6cmx9cm** 3.8cmx6cm 4.16cmx19cm
Commercially available implantable defibrillators all utilize _____ cells.	1. Lithium Iodide 2. Lithium Vanadium oxide **3.Lithium silver vanadium oxide** 4.Lithium Iodide vanadium oxide
_____ number of pumps are present in conventional Heart-Lung machine.	1.7 2. 6 **3. 5** 4. 2
Which of the statement concerned with KIIL dialyzer is true?	**1. It is not disposable** 2. It provides greater clearance of urea 3.It is disposable 4.It provides greater clearance of creatinine
Which of these has the least permeability through flat membrane of hemodialysis?	**1.Vitamin B12** 2. Creatinine 3.Raffinose

Questions	Choices
	4. Urea
What is the wavelength of the LED used in the membrane leak detector of hemodialysis machine?	1. 660nm **2.560nm** 3.960nm 4.260nm
Which type of the effluent pump is not preferred in hemodialysis machine?	1.AC coupled 2.Gear type 3**. Diaphragm type** 4.Magnetically coupled
The light from a laser source is monochromatic because all the photons____	1. have same amplitude 2.Are in phase 3**.have same energy** 4.are in same direction
_____ contains information from all angles about a particular slice, with the information from each angle in its own row.	1.Ray sum 2.Data Points 3.Projection **4.Sinogram**
If $f(x,y)=2x-3x^2+ky^2$ is a harmonic function, then the value of k is:	1. 1 2. 2 **3. 3** 4. 4
In Computed tomography Sagittal images are produced by _____	1. Y-Z plane 2. X-Y plane 3. Z-Y Plane **4. X-Z plane**
If	1. Sinu 2. Sin2u 3. 0 4. Cos2u
Which of the following is most commonly used in single photon nuclear imaging:	1.Converging hole collimator 2.Pin hole collimator **3.Parallel hole collimator** 4.Diverging hole collimator
Larmor frequency of Hydrogen nuclei (proton) in an external magnetic field of 3.0 Tesla is:	1. 63.9 MHz **2.128 MHz** 3.21.3 MHz 4.42.6 MHz

Questions	Choices
The ability to detect a small discontinuity or flaw is called Radiographic _____	**1.sensitivity** 2.resolution 3.density 4.contrast
The transformation which maps the angular domain 0<amp(z)< **π** /4 of the z-plane onto the upper half of the w- plane is:<amp(z)< **π**="" 4="" of="" the="" z-plane="" onto="" upper="" half="" w-="" plane="" is:<="" p="" style="box-sizing: border-box;"></amp(z)<>	1. $w=iz^4$ 2. $w=z^4$ 3. $w=iz^2$ 4. $w=z^2$
A control system with excessive noise, is likely to suffer from	1. oscillations **2. saturation in amplifying stages** 3. loss of gain 4. vibrations
Zero initial condition for a system means	1. input reference signal is zero 2. zero stored energy 3. no initial movement of moving parts **4. system is at rest and no energy is stored in any of its components**
Transfer function of a system is used to calculate which of the following?	1. The time constant **2. The output for any given input** 3. The order of the system 4. The steady state gain
The band width, in a feedback amplifier	**1. increases by the same amount as the gain decrease** 2. decreases by the same amount as the gain decrease 3. decreases by the same amount as the gain increase 4. remains unaffected
The curves u(x,y) =a and v(x,y)=b are orthogonal if	1. u+v is an analytic function 2. u-v is an analytic function 3. u+iv is an analytic function 4. u and v are complex functions
On which of the following factors does the sensitivity of a closed loop system to gain changes and load disturbances depend?	1. Forward gain, Frequency 2. Loop gain, Forward gain **3. Frequency, Loop gain, Forward gain** 4. Frequency, Loop gain
In an open loop control system	1. Output is dependent on control input 2. System parameters do not

Questions	Choices
	have effect on the control output **3. Output is independent of control input** 4. Only system parameters have effect on the control output
For an open loop control system which of the following statements is incorrect?	1. Errors are caused by disturbances 2. Less expensive **3. Recalibration is not required for maintaining the required quality of the output** 4. Construction is simple and maintenance easy
A control system in which the control action is somehow dependent on the output is known as	**1. Closed loop system** 2. Extreme system 3. Open system 4. Semi closed loop system
In closed loop control system, with positive value of feedback gain, the overall gain of the system	1. is unaffected **2. increases** 3. decreases 4. is maximum
Which of the following is an open loop control system?	1. Metadyne 2. Stroboscope 3. Ward Leonard control **4. Field controlled D.C. motor**
Which of the following statements is not necessarily correct for open control system?	1. Generally free from problems of nonlinearities 2. Less expensive **3. Presence of nonlinearities causes malfunctioning** 4. Input command is the sole factor responsible for providing the control action
In an open loop system	**1. the control action is independent of the output** 2. the control action depends on system variables 3. the control action depends on the size of the system 4. the control action depends on the input signal
_____ has tendency to oscillate.	1. Extreme system **2. Closed loop system** 3. Feedforward system 4. Open loop system

Questions	**Choices**
The only function that is analytic from the following is:	1. Re(iz) 2. Im(z) **3. sin z** 4. z!
Determine the frequency of oscillation of an astable multivibrator using timer with RA = 100 ohms, RB = 500 ohms, and C = 10uF.	1. **131 Hz** 2. 262 Hz 3. 2.62 kHz 4. 1.31 kHz
A good control system has all the following features except	1. sufficient power handling capacity 2. good stability 3. good accuracy **4. slow response**
A car is running at a constant speed of 50 km/hr, which of the following is the feedback element for the driver?	1. Steering wheel 2. Clutch 3**. Needle of the speedometer** 4. Eyes
A control system working under unknown random actions is called	1. digital data system 2. adaptive control system 3. computer control system **4. stochastic control system**
The initial response when the output is not equal to input is called	**1. Transient response** 2. Dynamic response 3. Error response 4. Either of the above
An automatic toaster is a _____ loop control system.	1. closed 2. partially closed **3. open** 4. partially open
The harmonic conjugate of the function $u(x,y)=x^3-3xy^2$ is:	1. x^3-y^3+c 2. $3(x^2y-y^3)+c$ 3. x^3+3xy^2+c 4. $3x^2y-y^3+c$
If a sinewave of 1V, 1 kHz is applied to the input of voltage buffer using op-amp, the output would be a	**1.** **Sinewave** 2. square wave 3.

Questions	Choices
	+15V 4. -15V
Any externally introduced signal affecting the controlled output is called a	**1. stimulus** 2. feedback 3. signal 4. gain control
A closed loop system is distinguished from open loop system by which of the following?	1. Input pattern **2. Feedback** 3. Servomechanism 4. Output pattern
_____is a part of the human temperature control system.	1. Digestive system 2. Leg movement 3. Ear **4. Perspiration system**
While evaluating the real integral	1. 2. 3. 4.
The function u(x,y)= is said to be harmonic if	1. $u_{xx}=u_{yy}$ 2. $u_{xx}=-u_{yy}$ 3. $u_{x}=u_{y}$ 4. $u_{x}+u_{y=0}$
Which of the following should be done to make an unstable system stable?	**1. The gain of the system should be increased** 2. The gain of the system should be decreased 3. The number of poles to the loop transfer function should be increased 4. The number of zeros to the loop transfer function should be increased
If the function f(z)=x-2ay+i(bx-cy) is an analytic function, then:	**1. b=2a** 2. b=-2a 3. b=a 4. a=-1
_____ increases the steady state accuracy.	1. Phase lead compensator **2. Integrator** 3. Differentiator

Questions	Choices
	4. Phase lag compensator
In a fixed bias transistor circuit with a supply voltage of 12V, RB = 226 kohms, Rc = 1.2 Kohms and Vc = 6V. Find the value of base current?	1. 53 uA 2. 50 uA 3. 50 mA 4. 53 mA
A.C. servomotor resembles	1. three phase induction motor **2. two phase induction motor** 3. universal motor 4. direct current series motor
As a result of introduction of negative feedback which of the following will not decrease?	**1. Band width** 2. Distortion 3. Overall gain 4. Instability
Regenerative feedback implies feedback with	1. oscillations 2. step input 3. negative sign 4**. positive sign**
The family $u(x,y)=x^2-y^2=c$ represent level curves to an analytic function f(z)=u+iv, then the slope of the level curve v(x,y)=k at the point (1,-2) is:	1. 1 2. -1 3. -2 4. 2
The transient response, with feedback system,	**1. decays quickly** 2. rises slowly 3. rises quickly 4. decays slowly
The second derivative input signals modify which of the following?	1. The time constant of the system 2. Damping of the system **3. The time constant and suppress the oscillations** 4. The gain of the system
Which of the following statements is correct for any closed loop system?	1. All the coefficients are always nonzero 2. All the coefficients can have zero value **3. Only one of the static error coefficients has a finite nonzero value** 4. All the coefficients have

Questions	Choices
	negative value
Which of the following statements is correct for a system with gain margin close to unity or a phase margin close to zero?	1. The system is highly stable 2. The system is at rest 3. The system is relatively stable **4. The system is highly oscillatory**
Due to which of the following reasons excessive bandwidth in control systems should be avoided?	1. It leads to low relative stability 2. It leads to slow speed of response **3. Noise is proportional to band width** 4. It leads to oscillations
The current gain for the Darlington connection is	1. $\beta_1 . (\beta_2/2)$ **2.** **$\beta_1 . \beta_2$** 3. β_1 / β_2 4. $\beta_1 . (\beta_2 - 1)$
For a common emitter transistor circuit using voltage divider bias technique with Vcc = 20V, R1 = 22 kohms, R2 = 5 kohms, Rc = 2.5 k ohms, Re = 500 ohms and current gain = 100. Find the value of emitter current?	1. 2 mA 2. 4 mA 3. 5 mA 4. 6 mA
Where as	1. 2. 3. 4.
The frequency at which the open loop gain is equal to 1 is called	1. the upper critical frequency 2. cut off frequency 3. the notch frequency

Questions	Choices
	4. **unity gain frequency**
In a common source amplifier, the output voltage is	1. **180 degrees out of phase with the input** 2. In phase with the input 3. taken at the source 4. taken at the gate
If , where *c* is a constant, then	1. 2. 3. 0 4.
If the base - emitter junction is open, the collector voltage is	**1.** **Vcc** 2. 0 V 3. floating 4. 0.2 V
In saturation of a transistor circuit, Vce is equal to	1. 0.7 V 2. Vcc **3.** **0.2 V** 4. 0 V
For a certain 12 V zener diode, a 10 mA change in zener current produces a 0.1 V change in zener voltage. The zener impedance for this current range is	1. 1 ohm 2.

Questions	Choices
	100 ohm **3.** **10 ohm** 4. 0.1 ohm
Gauss-Seidel iteration method converges only if the Coefficient matrix is	**1. Diagonally dominant** 2. Skew-symmetric 3. Symmetric 4. Square matrix
A necessary and sufficient condition that the line integral	1. 2. 3. 4.
Using Newton-Raphson method, find a root correct to three decimal places of the equation $x^3 - 3x - 5 = 0$	1. 2.275 **2. 2.279** 3. 2.2355 4. 2.222
In the Gauss elimination method for solving a system of linear algebraic equations,triangularzation leads to	1. Singular matrix **2. Upper triangular matrix** 3. Lower triangular matrix 4. Diagonal matrix
Motion of fast moving systems may be timed and studied by means of a	1. Electronic timer **2. Piezoelectric crystal** 3. Photovoltaic cell 4. Stroboscope
If $\Delta f(x) = f(x+h) - f(x)$, then a constant k, Δk equals	1. 1 2**. 0** 3. f(k)- f(0) 4. f(x + k) - f(x)
Which effect is useful in measuring rapidly varying forces	1. Change of capacitance 2. Strain gauge 3. Photovoltaic **4. Piezoelectric**
Double (Repeated) root of $4x^3 - 8x^2 - 3x + 9 = 0$ by Newton-Raphson method is	1. 1.55 2. 1.6 **3. 1.5** 4. 1.4

Questions	**Choices**
Which of the following device is used as a standard for calibrating pressure gauges?	1. Bellows 2. Diaphragm 3. Manometer **4. Dead weight tester**
In iterative method we get	1. Exact solution 2. Periodic solution **3. Approximate solution** 4. No solution
The order of convergence in Newton-Raphson method	**1. 2** 2. 1 3. 0 4. 3
In Secant method the formula requires the initial approximations for finding the root as	1. 1 **2. 2** 3. 3 4. 4
The following formula is used for unequal intervals of x values	**1. Newton's forward formula** 2. Lagrange's formula 3. Gauss formula 4. Newton's backward formula
The convergence of which of the following method is sensitive to starting value?	1. False position 2. Gauss seidal method 3**.** **Newton-Raphson method** 4. Secant Method
Newton-Raphson method is used to find the root of the equation x^2 - 2 If iterations are started from - 1, then iterations will be	1. converge to -1 2. converge to $\sqrt{2}$ 3. no coverage 4. converge to -$\sqrt{2}$
Which of the following statements applies to the bisection method used for finding roots of functions?	1. Is faster than the Newton-Raphson method **2. Guaranteed to work for all continuous functions** 3. Converges within a few iterations 4. Requires that there be no error in determining the sign of the function
We wish to solve x^2 - 2 = 0 by Newton Raphson technique. If initial guess is x_0 = 1.0, Subsequent estimate of x (i.e. x_1) will be	1. 2.5 2. 2.0

Questions	Choices
	3. 1.5 4. 1.414
Using Bisection method, negative root of $x^3 - 4x + 9 = 0$ correct to three decimal places is	1. - 2.406 2. 3.7576 3. -2.506 **4. -2.706**
Hysteresis error in Bourdon tube can be minimized by	**1. Using it well within the designed pressure range** 2. Using proper tube material 3. selecting proper diameter and thickness of tube 4. Avoiding temperature cycling
Which type of device is suitable for dynamic force measurement:	1. Lever balance 2. Proving ring **3. Piezoelectric transducer** 4. Spring balance
Thermal expansion of a solid is employed in:	1. Thermocouple 2. Resistance thermometer 3. Bulb thermometer **4. Bimetal element**
Pick up false statement about pressure measurements	1. Low pressure is normally measured by manometers 2. Medium and high pressures are measured by Bourdon gauge 3. Medium pressure is generaly measured by diaphragms or bellows **4. Absolute pressure is measured by piezoelectric crystal**
Local velocity is measured by a_____	1. Venturi tube 2. Orifice plate **3. Pitot tube** 4. Nozzle
For measuring air flow, _____ is used	**1. Vane type anemometer** 2. Electromagnetic flowmeter 3. Ultrasonic flowmeter 4. Vortex shedding meter
Paramagnetic analyser is used to measure the following gas sample in air	1. Nitrogen 2. Carbon 3. Hydrocarbons 4**. Oxygen**
The error caused in vibration measuring equipment due to non-compliance of bond made between sensor and the surface it is	1. Subject loading by sensor 2. Influence error

Questions	Choices
mounted is called:	**3. Coupling compliance** 4. Cross-coupling
Newton-Raphson method is applicable to the solution of	**1. Both algebraic and transcendental Equations** 2. Both algebraic and transcendental and also used when the roots are complex 3. Algebraic equations only 4. Transcendental equations only
Chromatographic analyser is used to measure the_____	1. CO content in a sample 2. Oxygen content in a sample 3. CO_2 content in a sample **4. Amount of individual gases in a sample**
In which of the following methods proper choice of initial value is very important?	1**. Newton-Raphson** 2. False position 3. Bisection method 4. Bairsto method
All pH measurements are made with a	1. Redox electrode 2. Liquid ion exchange electrode 3. Solid state electrode **4. Glass electrode**
Using Newton-Raphson method, find a root correct to three decimal places of the equation sin x = 1 - x	1**.** **0.511** 2. 0.500 3. 0.555 4. 1.6545
Determine the wavelength of ultrasound travelling in water with a velocity of 1480m/s and a frequency of 1MHz	**1. 1.48** 2. 1.34 3. 1.58 4. 1.62
Consider a 1cm thick specimen in which the acoustic power emerging is one half of that entering. Determine the attenuation coefficient of the medium	1. -3.98dB/cm 2. -3.7dB/cm 3. -4dB/cm **4. -3.01dB/cm**
In which of the following method, we approximate the curve of solution by the tangent in each interval.	**1. Euler's method** 2. Newton's method 3. Runge Kutta method 4. Picard's method
In the Gauss elimination method for solving a system of linear	1. Singular matrix

Questions	Choices
algebraic equations,triangularzation leads to	**2. Upper triangular matrix** 3. Lower triangular matrix 4. Diagonal matrix
If the velocities of ultrasound in sot tissue and bone are 1500 and 1400m/s, respectively, the critical angle of incidence is given by	1. 38 deg 2. 28 deg 3. 30 deg **4. 22 deg**
Mercury in rubber strain gauge was wrapped around the forearm of a subject and it covers 6 cm of length. Venous occlusion was applied at time t=0 and the circumference of the forearm was increased by 0.5 cm in 64 secs. The initial limb circumference was 25.3 cm. the perfusion is _____ mL/min per 100mL of tissue.	1. 4 2. 3 3. 4.5 4. 3.7
If 25 g of a liquid occupies 20 cm^3 in a measuring cylinder, what is the density of the liquid?	**1. 1.25 g cm^{-3}** 2. 0.8 g cm^{-3} 3. 0.25 g cm^{-3} 4.5 g cm^{-3}
Order of convergence of Regula-Falsi method is	1**. 1.618** 2. 1.321 3. 2.231 4. 2.312
What is the concentration of a 0.5 % (w/v) solution when expressed as mg mL^{-1}?	1. 0.05 mg mL^{-1} **2. 5 mg mL^{-1}** 3. 0.5 mg mL^{-1} 4. 0.4 mg mL^{-1}
Which of the following liquid dosage forms requires a sterile formulation?	1. Oral syrup 2. Spray applied to skin 3. Shampoo **4. Eye drops**
The flow meter which is replacing the differential pressure meters in its applications is	**1. Vortex-shedding flow meter** 2. Electromagnetic flow meters 3. Ultrasonic flow meters 4. Rotary piston meter
In ultrasonic level gauge, the ultrasonic source is placed at the	**1.Bottom of the vessel containing the liquid** 2.Far from the vessel containing the liquid 3. Top of the vessel containing the liquid 4. Middle of the vessel containing the liquid
In radiation methods, the level detector system is located at	1. The top of the liquid filled tank

Questions	Choices
	2. The bottom of liquid filled tank 3. Middle of the liquid filled tank **4. Outside a liquid filled tank**
A vibrating level sensor consists of	1. Four piezoelectric oscillators 2.Three piezoelectric oscillators **3.Two piezoelectric oscillators** 4. One piezoelectric oscillators
Which of the following alter name for method of false position	**1. Regula falsi method** 2. Method of tangents 3. Method of bisection 4. Method of Chords
To produce a change in deflection of 1.5 mm of the galvanometer of Wheatstone bridge, a change of 5Ω in the unknown arm of bridge is required. The sensitivity is	1. 0.5 mm/ Ω 2. 0.4 mm/ Ω 3. 0.2 mm/ Ω **4. 0.3 mm/ Ω**
The process of calculating the derivative of a function at some particular value of the independent variable by means of a set of given values of that function is	1. Numerical Value 2. Numerical integration 3. Quadrature **4. Numerical differentiation**
The smallest change which can be measured by the transducer of the range of 0 to 150 N force and resolution of 0.1% of full scale is	1. 0.35 N 2. 0.3 N 3. 0.1 N 4**. 0.15 N**
Which of the following methods does not require starting values	1. Multi step methods 2. Adam's method 3. Euler's method 4. Milne's method
Which of the following formulas is a particular case of Runge Kutta formula of the second order	1. Taylor's series **2. Euler's modified** 3. Picard's formula 4. Milne's method.
-------- number of starting values required for Adam's method	1. 1 2. 2 **3. 3** 4. 4
In a resistance thermometer, a metal wire shows a resistance of 500 Ω at ice point and 550 Ω at steam point, calculate temperature that corresponds to resistance of 535 Ω.	1. 75 °C 2**. 70 °C** 3. 65 °C 4. 60 °C
A car covers a distance of 5 km in 5 mins, its average speed is equal	1. 25 km⁄h 2. 1 km⁄h

Questions	Choices
to	3. 50 km/h 4**. 60 km⁄h**
By applying the finite difference method, find y (0.5) from y”+y+1=0 with Y(0)=y(1)=0 taking h=0.5.	1. 0.02568 2. 0.24031 **3. 0.14031** 4. 0.06254
From the following which one gives the more accurate value	1**. RK method** 2. Newton’s method. 3. Modified Euler’s method 4. Euler’s method
Which of the following method is called step by step method	1. Taylor’s method 2. RK method 3. Milne’s method 4. Newton’s method.
$y_{n+1}= y_n + h f (x_n, y_n)$ is the iterative formula for	1. Milne’s method **2. Euler’s method** 3. RK method 4. Taylor’s method
In which of following medium, speed of sound is the least?	**1. Air** 2. Liquid 3. Solid 4. Vacuum
A predictor formula is used to predict the value of y at	**1. x** 2. x_i 3. y_i 4. y
Compressions are formed where air pressure is	1.Zero 2.Equal to atmospheric pressure 3.Lower than the atmospheric pressure **4.Higher than the atmospheric pressure**
Runge Kutta method is self-starting method	1. Occasionally false **2. Always false** 3. Occasionally true 4. Always true
Average angular velocity of body rotating at angle of 30° during time interval 5 seconds will be	1. 10 $^{rad}/_{s}$ 2. 8 $^{rad}/_{s}$ 3. 7 $^{rad}/_{s}$ **4. 6** $^{rad}/_{s}$
Predictor corrector methods are self-starting methods	1. Always true 2. Occasionally true **3. Always false** 4. Occasionally false
A girl with a mass of 40 kg wears heels with an area of 1 cm^2 in	**1. 4 x 10^5**

Questions	Choices
contact with ground, pressure on ground is (take earth's gravitational field strength)	2. 4×10^{4} 3. 40×10^{5} 4. 4×10^{-5}
Taylor's series method will be useful to give some------- of Milne's method	1. No values 2. Middle values 3. Ending values 4. Starting values
In sound, reflection coefficient of 1 is interpreted as	1.All of the incident energy is transmitted 2. 1% of energy is transmitted **3.None of the incident energy is transmitted** 4. 1% of energy is reflected
_____ is a reference electrode	1.Platinum electrode 2.Glass electrode **3.Hydrogen electrode** 4.Calomel electrode
As soon as a new value of a variable is found by iteration, it is used immediately in the following equation, this method is called.	1. Jacobi's Method. **2. Gauss-Seidel Method** 3. Gauss-Jordan Method. 4. Relaxation Method.
Which of the statements is not true about the characteristics a glass electrode	**1.Dependent on oxidation and reduction potential** 2.Equilibrium is reached rapidly 3.Can be used in coloured and turbid solutions 4.Gives accurate values in buffered solutions
In solving simultaneous equations by Gauss Jordan method , the coefficient matrix is reduced to ---------- matrix.	**1. Diagonal matrix** 2. Rectangular matrix 3. Square 4. Tridiagonal matrix
By applying the fourth order Runge – Kutta method find y(1.1) from $y'=y^2+xy$, $y(1)=1$ taking $h = 0.1$.	1. 3.24149 2. 2.24149 3. 0.24149 **4. 1.24149**
A resistance potentiometer has a total resistance of 10000Ω and is rated 4W. If the range of potentiometer is 0 to 100 mm, then its sensitivity in V/mm is	**1. 2** 2. 25 3. 2.5 4. 1
Consider the Boolean function $F(w,x,y,z) = w\,y + x\,y + w'\,x\,y\,z + w'\,x'\,y + x\,z + x'\,y'\,z'$. Which one of the following is the complete set of essential prime implicants?	**1. y, $x\,z$, $x'\,z'$** 2. y, $x'\,y'\,z'$ 3. w, y, $x\,z$ 4. w, y, $x\,z$, $x'z'$

Questions	**Choices**
The commonly used unit for conductivity is_____	1.Mho 2.m ohm/cm 3**. n mho/cm** 4.ohm/m
Given two numbers *A* and *B* in sign magnitude representation in an eight bit format A = 00011110 B = 10011100. The corresponding decimal numbers are	**1. 30 and -100** 2. 14 and -12 3. 30 and 156 4. -28 and 30
Two binary signals A, B are to be compared. The output expression when the two signals are equal is	1. *AB* 2. *AB +A'B'* **3. *AB' + A'B*** 4. *A'B'*
Intel 8080 microprocessor has an instruction set of 91 instructions. The minimum length of the op-code to implement this instruction set is	1. 8 bit 2**. 7 bit** 3. 91 bit 4. 5 bit
An electronic watch has a clock of 32 kHz. To divide this frequency down to 1 Hz, it is necessary to have	1. Two decade counters, one two-bit binary counter and a T flip-flop **2. Three decade counters, one four-bit binary counter and a T flip-flop** 3. One decade counter, one four-bit binary counter and a T flip-flop 4. one decade counter and four four-bit binary counters
In a resistive potentiometer, the non-linearity	1.Is not dependent upon load to potentiometer resistance (R_m/R_p) 2. Increases with increase of load of potentiometer resistance (R_m/R_p **3.Decreases with increase of load to potentiometer resistance (R_m/R_p)** 4. Increases with increase of load of potentiometer resistance (R_p/R_m)
The most widely used Bipolar Technology for digital ICs is	1. DTL **2. TTL** 3. ECL 4. RTL
A potentiometer displacement sensor has a supply voltage of 15V and a resistance of 50KΩ. The fractional displacement of the wiper is	1. 4V **2. 4.5V** 3. 5V

Questions	**Choices**
0.3. The thévenin voltage of the circuit is:	4. 5.5V
A bulb in a staircase has two switches, one switch being at the ground floor and the other one at the first floor. The bulb can be turned ON and also can be turned OFF by any one of the switches irrespective of the state of the other switch. The logic of switching of the bulb resembles	1. AND gate 2. OR gate 3. NAND gate **4. XOR gate**
The output Y of a two-bit comparator is logic 1 whenever the two-bit input A is greater than the 2-bit input B. The number of combinations for which the output is logic 1 is	1. 8 **2. 6** 3. 4 4. 10
Which of the following circuit exhibits memory	1. Astable multivibrator 2. Bistable multivibrators 3. NAND gate 4. XOR gate
The simplified form of Boolean function F(X,Y,Z) = (X' +Y' +Z') (X + Y' + Z) (X + Y + Z)	**1.** **X' Y Z'** 2. X 3. X + Y'Z 4. XY + Z'
The fastest Bipolar logic family is	1. DTL 2. TTL **3. ECL** 4. RTL
The maximum conversion time of a 10-bit counter type A-D converter driven by 1 MHz clock is	1. 1.42 μs 2. 10.54 μs 3. 0.46 μs 4. 1.024 μs
If T is the clock period, a n-stage register results in a delay of	1. nT/2 2. (n-1)T 3. 2nT 4. n^2T
The bit distance between all odd numbered columns in the K-map is	1. not fixed 2. Always 2 3. Always 1 **4. Always 4**
A potentiometer has a supply voltage of 10 V, a resistance of 10 kΩ and a length of 10 cm. A recorder of resistance 10 kΩ is connected across the potentiometer. The recorder voltage for each of the wiper displacement of 2 cm is:	**1. 1.72V** 2. 4V 3. 0.4V 4. 17.2V

Questions	**Choices**
The excess 3 code for number 3 is	1. 0011 **2. 0110** 3. 1001 4. 0001
An ideal or unloaded potentiometer used as a displacement transducer has a stroke of 100 mm and its resistance over this length is 1000 Ω. The overall sensitivity of the transducer is 0.1V/mm. Power dissipated by the coil is	**1. 0.1W** 2. 1W 3. 0.5W 4. 5W
The binary fraction 0.0111 in decimal form is	1. 0.1105 2. 0.8325 **3. 0.4375** 4. 0.6225
A strain gauge has a nominal resistance of 600 Ω and a gauge factor of 2.5. The strain gauge is connected in a DC bridge with three other resistances of 600 Ω each. The bridge is excited by a 4V battery. If the strain gauge is subjected to a strain of 100 mm/m, the magnitude of the bridge output will be	1. Zero 2. 500µV 3. 750µV **4. 250µV**
A wheatstone bridge has R_3=R_4=100Ω, galvanometer resistance of 50 Ω, strain gauge R_1=120Ω. The value of R_2 is adjusted for zero strain of gauge factor equals 2. Battery voltage is 4V. For a strain of 400 microstrain, galvanometer current will be	1. 10µA 2. 20µA. 3. 5µA 4. 15µA
The gauge factor of the material of strain gauge is such that the resistance changes from 1000 Ω to 1009 Ω subjected to a strain of 0.0015. The poisson's ratio for the material of the gauge wire is	1. 1.75 2. 2 **3. 2.5** 4. 6
A strain gauge of resistance 120 Ω and gauge factor 2.0 is at zero strain condition. A 200 kΩ fixed resistance is connected in parallel to it. Then its combination will represent an equivalent strain of	1. **-300 µm/m** 2. 290 µm/m 3. zero 4. -123.8 µm/m
An N type semiconductor strain gauge has a nominal resistance of 1000 Ω and gage factor of -100. The resistance of the gage when a compressive strain of 100µm/m is	**1.1010 Ω** 2.990 Ω 3.900 Ω 4.1100 Ω
A parallel plate air spaced capacitor has an effective plate area of 6.5 x 10^{-4} m^2 and the distance between the plates is 1 mm. The displacement sensitivity of the device, if air has a relative permittivity of unity.	1. 17.55 x 10^{-10} F/m 2. 47.55 x 10^{-10} F/m 3. 37.55 x 10^{-10} F/m **4. 57.55 x 10^{-10} F/m**
DT has	1.Two primary coils connected in phase and a secondary coil 2.Two primary coils connected in opposition and a secondary coil

Questions	Choices
	3.One primary coil and two secondary coils connected in phase 4.One primary coil and two secondary coils connected in opposition
The output F of the digital circuit shown in figure below is	**1.** ***F = X'YZ + XY'Z*** 2. *F = X'YZ + XY'Z'* 3. *F = X'Y'Z + XYZ* 4. *F = X'Y'Z' + XYZ*
Digital camera and DVD players make use of	1. IDTFT 2. DCT 3. DTFT **4. FFT**
A differential push pull type capacitive displacement sensor (nominal capacitance C_0=0.01 μF) is connected in two adjacent arms of an a.c bridge in such a way that the output voltage of the bridge is independent of the frequency of the supply voltage. Supply to the bridge is 1V at 1 kHz and two equal resistances (R=3.9 kΩ) are placed in the other two arms of the bridge. The bridge sensitivity is	1.**0.05 mv/pF** 2.0.1 mv/pF 3.0.5 mv/pF 4.0.001 mv/pF
Solve the differential equation dy – x dx = 0, if the curve passes through (1, 0).	1. $x^2 – 2y – 1 = 0$ 2. $2x^2 + 2y – 2 = 0$ 3. $2y^2 + x^2 – 1 = 0$ 4. $3x^2 + 2y – 3 = 0$
at is the correct definition of a pseudoplastic liquid?	1. A liquid which becomes more viscous over time when a constant shear stress is applied **2.** **A liquid which becomes less viscous as the rate of shear increases** 3. A liquid which becomes more viscous as the rate of shear

Questions	Choices
	increases 4. A liquid which becomes less viscous over time when a constant shear stress is applied
According to Newton's law of cooling, the rate at which a substance cools in air is directly proportional to the difference between the temperatures of the substance and that of air. If the temperature of the air is 30° and the substance cools from 100° to 70° in 15 minutes, how long will it take to cool 100° to 50°?According to Newton's law of cooling, the rate at which a substance cools in air is directly proportional to the difference between the temperatures of the substance and that of air. If the temperature of the air is 30° and the substance cools from 100° to 70° in 15 minutes, how long will it take to cool 100° to 50°?	**1. 33. 59 min** 2. 43.60 min 3. 35.39 min 4. 45.30 min
en the output Y in the circuit below is '1', it implies that data has	1. **changed from 0 to 1** 2. changed from 1 to 0 3. changed in either direction 4. not changed
logic function implemented by the circuit below is (ground implies logic 0)	1. F = AND(P,Q) 2. F = OR(P,Q) 3. F = XNOR (P,Q) **4.** **F = XOR(P,Q)**
The transition between continuous values of the image function and its digital equivalent is called _____	1. Restoration 2. Sampling 3. Saturation **4. Quantisation**
An object falls from rest in a medium offering a resistance. The velocity of the object before the object reaches the ground is given by the differential equation dV / dt + V / 10 = 32, ft/sec. What is the velocity of the object one second after if falls?	1. 34.12 ft/sec **2. 30.45 ft/sec** 3. 40.54 ft/sec 4. 38.65 ft/se

Questions	**Choices**
Images quantised with insufficient brightness levels will lead to the occurrence of _____	**1. False Contours** 2. Pixilation 3. Saturation 4. Blurring
The type of Interpolation where for each new location the intensity of the immediate pixel is assigned is _____	1. cubic interpolation **2. Nearest neighbour interpolation** 3. bilinear interpolation 4. bicubic interpolation
In a tank are 100 liters of brine containing 50 kg. total of dissolved salt. Pure water is allowed to run into the tank at the rate of 3 liters a minute. Brine runs out of the tank at the rate of 2 liters a minute. The instantaneous concentration in the tank is kept uniform by stirring. How much salt is in the tank at the end of one hour?	**1. 19.53 kg** 2. 20.62 kg 3. 12.62 kg 4. 15.45 kg
For the circuit shown, the counter state (Q_1Q_0) follows the sequence	1. 00,01, 10, 11, 00, … 2. 00, 01, 10, 00, 01… **3.** **00, 01, 11, 00, 01….** 4. 00, 10, 11, 00, 10…
If the nominal interest rate is 3%, how much is P5, 000 worth in 10 years in a continuous compounded account?	1. P 5,750 **2. P6,750** 3. P7,500 4. P6,350
If y_1=cos2x, y_2=sin2x are solutions of homogeneous differential equation of 2nd order then, the Wronskian is	1. 4 2. 1 3. 2 4. 3
digital circuit shown below uses two negative edge triggered D flip flops. Assuming initial conditions of Q_1 and Q_0 as zero, the output Q_1Q_0 of the circuit is	1. 00, 01, 10, 11, 00….. **2.** **00, 01, 11, 10, 00….** 3. 00, 11, 10, 01, 00…. 4. 00, 11,11, 11, 00…
If $y_1 = e^x$, $y_2 = xe^x$ are solutions of homogeneous 2nd order differential equation, then the Wronskian is	1. e^{-x} 2. e^x 3. e^{3x}

Questions	Choices
	4. e^{2x}
The complimentary function of $(D^4 - a^4)y=0$ is	1. $y=c_1e^{ax} + c_2e^{-ax} + c_3\cos ax + c_4\sec ax$ 2. **$y=(c_1+c_2x)\, e^{ax} + c_3\cos ax + c_4\sin ax$** 3. $y=(c_1+c_2x)\, e^{-ax} + c_3\cos ax + c_4\sin ax$ 4. $y=c_1e^{ax} + c_2e^{-ax} + c_3\cos ax + c_4\sin ax$
output Y in the circuit below is always '1' when	1. two or more of the inputs P,Q,R are '0' 2. **two or more of the inputs P,Q,R are '1'** 3. any odd number of the inputs P,Q,R is '0' 4. any odd number of the inputs P,Q,R is '1'
following binary values were applied to the X and Y inputs of the NAND latch shown in the figure in the sequence indicated below: X Y = 0 1; X Y = 0 0 X Y = 1 1. The corresponding stable P, Q outputs will be:	1.P = 1, Q = 0; P = 1, Q = 0; P = 1, Q = 0 or P = 0, Q = 1 2.P = 1, Q = 0; P = 0, Q = 1; or P = 0, Q = 1; P = 0, Q = 1 **3.P = 1, Q = 0; P = 1, Q = 1; P = 1, Q = 0 or P = 0, Q = 1** 4.P = 1, Q = 0; P = 1, Q = 1; P = 1, Q = 1
Particular integral of the differential equation $(D^2 + D)y = x^2 + 2x + 4$ is	1. $x^2/3 + 4x$ 2. $x^3/3 + 4x$ 3. $x^2/3 + 4$ 4. $x^3/3 + 4x^2$
tch the logic gates in Column A with their equivalents in Column B	1. P–2, Q-4, R-1, S-3 2. P-4, Q-2, R-1, S-3 3. P–2, Q-4, R-3, S-1 **4.**

Questions	Choices
	P-4, Q-2, R-3, S-1
The subtraction of a binary number Y from another binary number X, done by adding 2's compliment of Y to X results in a binary number without overflow. This implies that the result is	1. negative and is in normal form 2. positive and is in normal form 3. positive and is in 2's compliment from **4. negative and is in 2's compliment from**
The particular integral of $(D^2 -2D +2)y =$ xcosx is	1. $((x^2e^x)/2)\sin x$ 2. $((xe^x)/2)\cos x$ 3. $((xe^x)/2)\sin x$ 4. $(e^x/2)\sin x$
The Wronskian of two functions $y_1=e^x$ and $y_2=e^{-x}$ is	1. 2 2. 3 3. -2 4. -3
If V_{IN} increases, I_Z will	**1.** **increase** 2. decrease 3. remain the same 4. reduce to zero
The partial differential equation is classified as	**1.** **Elliptic** 2. parabolic 3. hyperbolic 4. triangular
Dynamic range of imaging system is a ratio where the upper limit is determined by	1. Contrast 2. Brightness 3. Noise **4. Saturation**
Quantitatively, spatial resolution cannot be represented in which of the following ways	1. dots 2. line pairs 3. pixels **4. Square**
Region of Interest (ROI) operations is commonly called as _____.	1**. Masking** 2. Dilation

Questions	Choices
	3. Saturation 4. Shading correction
Image processing approaches operating directly on pixels of input image work directly in _____.	1. time-frequency Domain 2. Inverse transformation **3. Spatial domain** 4. Transform domain
Solve the differential equation: x(y – 1) dx + (x + 1) dy = 0. If y = 2 when x = 1.	1. 1.80 2. 1.48 3. 1.63 **4.** **1.55**
The partial differential equation is classified as	1. elliptic **2.** **parabolic** 3. hyperbolic 4. triangular
With feedback _____ increases.	**1. system stability** 2. effects of disturbing signals 3. sensitivity 4. gain
The differential equation whose auxiliary equation has the roots 0, -1, -1 is	1. 2. 3. 4.
Particular integral of the differential equation is	1. 2. 3.

Questions	Choices
	4.
Complimentary function of is	1. 2. 3. 4.
In a stable control system backlash can cause which of the following?	**1. Low level oscillations** 2. Underdamping 3. Overdamping 4. Poor stability at reduced values of open loop gain
In an automatic control system which of the following elements is not used?	1. Sensor 2. Final control element 3. Error detector **4. Oscillator**
In a control system the output of the controller is given to	**1. final control element** 2. comparator 3. amplifier 4. sensor
A controller essentially is a:	**1.Comparator** 2.Sensor 3.Clipper 4.Amplfier
Which of the following is the input to a controller?	1. Servo signal 2. Desired variable value 3. Sensed signal **4. Error signal**
The capacitance, in force current analogy, is analogous to	1. velocity 2. momentum 3. displacement **4. mass**
Which of the following is the solution of	1. 2. 3. 4.
The temperature, under thermal and electrical system analogy, is considered analogous to	1. capacitance 2. charge

Questions	Choices
	3. current **4. voltage**
In liquid level and electrical system analogy, voltage is considered analogous to	1. velocity 2. liquid flow rate **3. head** 4. liquid flow
The viscous friction coefficient, in forcevoltage analogy, is analogous to	1. reciprocal of conductance 2. reciprocal of inductance 3. charge 4**. resistance**
is the general solution of the differential equation	1. 2. 3. 4.
In force voltage analogy, velocity is analogous to	1. capacitance **2. current** 3. inductance 4. charge
In thermalelectrical analogy, charge is considered analogous to	1. reciprocal of temperature 2. reciprocal of heat flow **3. temperature** 4. heat flow
Mass, in force voltage analogy, is analogous to	1. resistance **2. inductance** 3. current 4. charge
The transient response of a system is mainly due to:	1.**Stored energy** 2.Inertia forces 3.Friction 4.Internal forces
_____ signal will become zero when the feedback signal and reference signals are equal.	1. Feedback 2. Reference 3**. Actuating** 4. Input
In case of type1 system steady state acceleration is _____.	**1. infinity** 2. zero 3. unity 4. ten
The transfer function is applicable to which of the following?	**1. Linear and time invariant systems**

Questions	Choices
	2. Nonlinear systems 3. Linear systems 4. Linear and time variant systems
From which of the following transfer function can be obtained?	1. Output input ratio 2. Standard block system 3. Analogous table **4. Signal flow graph**
_____ is the reference input minus the primary feedback.	**1. Actuating signal** 2. Manipulated variable 3. Primary feedback 4. Zero sequence
The term backlash is associated with_____	1. servomotors 2. thermistors 3. induction relays **4. gear trains**
The solution of the initial value problem	1. 2. 3. 4.
The solution of the boundary value problem	1. 2. 3. 4.
Which of the following is the best method for determining the stability and transient response?	1. Bode plot 2. Gantt chart **3. Root locus** 4. Nyquist plot
Phase margin of a system is used to specify which of the following?	1. Time response 2. Frequency response 3. Absolute stability **4. Relative stability**
Addition of zeros in transfer function causes which of the following?	1. No compensation 2. Lead compensation 3. Lead lag compensation 4. **Lag compensation**

Questions	Choices
_____ technique is not applicable to nonlinear system?	1. Quasi linearization **2. Nyquist Criterion** 3. Functional analysis 4. Phase plane representation
By which of the following, the system response can be tested better?	1**. Unit impulse input signal** 2. Ramp input signal 3. Exponentially decaying signal 4. Sinusoidal input signal
In a system low friction coefficient facilitates _____	1. increased speed of response 2. reduced time constant of the system 3. increased velocity lag error **4. reduced velocity lag error**
Hydraulic torque transmission system is analog of _____	**1. motor generator set** 2. amplifier set 3. capacitance set 4. resistance set
Spring constant in force voltage analogy is analogous to	**1. reciprocal of capacitance** 2. capacitance 3. current 4. resistance
The frequency and time domain are related through which of the following?	**1. Laplace Transform and Fourier Integral** 2. Fourier Transform 3. Laplace Transform 4. Fourier Integral
An increase in gain, in most systems, leads to _____.	1. larger damping ratio 2. constant damping ratio **3. smaller damping ratio** 4. unity damping ratio
A conditionally stable system exhibits poor stability at _____.	1. low frequencies 2. increased values of open loop gain **3. reduced values of open loop gain** 4. high frequencies
The type 0 system has _____ at the origin.	1. simple pole 2. net pole **3. no pole** 4. two poles
Current *I* in an *LCR* circuit is given by the equation .	1. 2.

Questions	Choices
	3. 4.
The type 1 system has _____ at the origin.	1. two poles 2. no pole **3. simple pole** 4. net pole
The type 2 system has _____ at the origin.	1. no net pole **2. two poles** 3. net pole 4. simple pole
The position and velocity errors of a type2 system are _____ and _____ respectively.	1. constant, constant 2. zero, constant 3. constant, infinity **4. zero, zero**
Velocity error constant of a system is measured when the input to the system is unit ____ function.	1. impulse **2. ramp** 3. step 4. parabolic
In pneumatic control systems the control valve used as final control element converts _____.	1. position change to pressure signal **2. pressure signal to position change** 3. pressure signal to electric signal 4. electric signal to pressure signal
Pressure error can be measured by which of the following?	1. Selsyn 2. Strain gauge and potentiometer **3. Differential bellows and strain gauge** 4. Strain gauge
Which of the following devices is used for conversion of coordinates?	**1. Synchro resolver** 2. Synchro transformer 3. Microsyn 4. Selsyn
The effect of error damping is to _____.	1. provide larger settling lime 2. increase steady state error **3. reduce steady state error** 4. delay the response
In order to increase the damping of a badly underdamped system which of following compensators may be used?	1. Lag 2. Lead **3. Phase lead**

Questions	Choices
	4. Phase lag
The phase lag produced by transportation relays	1. decreases linearly with frequency 2. is inversely proportional to frequency 3. is independent of frequency **4. increases linearly with frequency**
In a stable control system saturation can cause which of the following?	1. Overdamping **2. Conditional stability** 3. Low level oscillations 4. High level oscillations
Which of the following can be measured by the use of a tachogenerator?	1. Acceleration 2. Speed and acceleration **3. Speed** 4. Displacement
_____ is not a final control element.	1. Control valve **2. Potentiometer** 3. Electro pneumatic converter 4. Servomotor
Which of the following can be measured by LVDT?	1. Temperature 2. Pressure 3. Force **4. Acceleration**
A phase lag lead network introduces in the output _____.	1. lag at high frequencies 2. lag at high frequencies and lead at low frequencies 3. lag at low frequencies **4. lag at low frequencies and lead at high frequencies**
Which of the following is the nonlinearity caused by servomotor?	**1. Saturation** 2. Static friction 3. Resistance 4. Backlash
When the initial conditions of a system are specified to be zero it implies that the system is _____.	**1. at rest without any energy stored in it** 2. at rest but stores energy 3. working normally with zero reference input 4. working normally with reference input
Which of the following is an electro mechanical device?	1. Strain gauge 2. Induction relay **3. LVDT** 4. Thermocouple

Questions	Choices
A differentiator is usually not a part of a control system because it _____.	1. reduces damping 2. increases error **3. increases input noise** 4. reduces the gain margin
If the gain of the critical damped system is increased it will behave as _____.	**1. oscillatory** 2. overdamped 3. underdamped 4. critically damped
In a control system integral error compensation _____ steady state error.	**1. minimizes** 2. does not have any effect on 3. increases 4. maximizes
With feedback _____ reduces.	**1. system gain** 2. system output 3. system stability and gain 4. system stability
_____ directly converts temperature into voltage.	1. LVDT 2. Potentiometer **3. Thermocouple** 4. Gear train
A.C. servomotor is basically a	1. three phase induction motor 2. universal motor **3. two phase induction motor** 4. single phase induction motor
Which of the following is the output of a thermocouple?	**1. D.C. voltage** 2. Direct current 3. A.C. voltage 4. Alternating current
The first order control system, which is well designed, has a _____.	1. small bandwidth 2. negative time constant 3. large bandwidth **4. large negative transfer function pole**
Which of the following is exhibited by Root locus diagrams?	1. The bandwidth of the system 2. The frequency response of a system **3. The poles of the transfer function for a set of parameter values** 4. The response of a system to a step input
Which of these is NOT in four neighbors of pixel (x,y)?	1. (x-1,y) 2. (x+1,y) **3. (x+1, y+1)** 4. (x, y+1)

Questions	**Choices**
The colormap array of the indexed image is always of class	1. logical 2. uint16 3. uint8 **4. double**
What is the basis for numerous spatial domain processing techniques?	**1. Histogram** 2. Sampling 3. Scaling 4. Transformations
In _____ image we notice that the components of histogram are concentrated on the low side on intensity scale.	1. bright **2. dark** 3. colourful 4. histogram
What is Histogram Equalisation also called as?	1. Histogram Subtraction **2. Histogram linearization** 3. Image Enhancement 4. Histogram Matching
The on off controller is a _____ system.	1. linear **2. discontinuous** 3. digital 4. nonlinear
2's compliment representation of 16-bit number (1 sign bit and 15 magnitude bits) if FFFF. Its magnitude in decimal representation is	**1. 1** 2. 65535 3. 32767 4. 0
An equivalent 2's compliment representation of the 2's compliment number 1101	1. 110111 2. 001101 **3. 111101** 4. 110100
The 2's compliment representation of -17 is	1. 101110 2. 110001 **3. 101111** 4. 111110
4-bit 2's compliment representation of a decimal number 1000. The number is	**1. -8** 2. 0 3. +8 4. -7
The range of a signed decimal numbers that can be represented by 6-bit 1's compliment number is	1. -32 to +31 2. -63 to +63 **3. -31 to +31** 4. -64 to +63
The number of bytes required to represent the decimal number 1856357 in packed BCD (Binary Coded Decimal) form is ……..	**1. 4** 2. 8 3. 6 4. 11

Questions	**Choices**
Histogram Equalisation is mainly used for _____.	1. Image Transformation 2. Blurring 3**. Contrast adjustment** 4. Image enhancement
Decimal 43 in Hexadecimal and BCD number system is respectively	1. 2B, 00110100 2. B2, 01000011 **3. 2B, 01000011** 4. B2, 01000100
1101, 1001 and 111001 correspond to the 2's compliment representation of which one the following sets of number	1. -25, -9 and -57 2. -6, -6 and -6 3. 25, 9 and 57 4**. -7, -7 and -7**
To reduce computation if one utilises non-overlapping regions, it usually produces _____ effect	1. Dark 2. Blurred 3. Dimming **4. Blocky**
A new Binary Coded Pentary (BCP) number system is proposed in which every digit of a base-5 number is represented by its corresponding 3-bit binary code. For example, the base-5 number 24 will be represented by its BCP code 010100. In this numbering system, the BCP code 100010011001 corresponds to the following number in base-5 system	1. 423 2. 2201 **3. 4231** 4. 1324
X= 01110 and Y= 11001 are two 5-bit binary numbers represented in 2's compliment format. The sum of X and Y represented in 2's compliment format using 6 bits is	1. 100111 2. 101001 3. 001000 **4. 000111**
The type of Histogram Processing in which pixels are modified based on the intensity distribution of the image is called _____.	**1. Global** 2. Local 3. Intensive 4. Random
The two numbers represented in signed 2's complement form are P= 11101101 and Q= 11100110. If Q is subtracted from P, the value obtained in signed 2's complement form is	1. 100000111 **2. 00000111** 3. 11111001 4. 111111001
Which of the following image processing operations can be used for 3D rendering of a Cat Scan?	**1. image enhancement** 2. image restoration 3. image compression 4. image analysis
For an n-variable Boolean function, the maximum number of prime implicants is	**1.** 2^n 2. n/2 3. 2(n-1) 4. $2^{(n-1)}$
Which of the following is not a Geometric Transformation?	1. Image rotation **2. Histogram**

Questions	Choices
	3. Scaling 4. Image translation
The number of distinct Boolean expressions of 4 variables is	1. 1024 2. 16 3. 256 **4. 65536**
Indicate which of the following logic gates can be used to realized all possible combinational logic functions	1. EX-OR 2. OR **3. NAND** 4. NOT
The output of a logic gate is 1 when all it's a inputs are at logic 0. The gate is either	1. a AND or an EX-OR gate 2. a NAND or an EX-OR gate **3. a NOR or an EX-NOR gate** 4. a OR or an EX-NOR gate
A ring oscillator consist of 5 inverters running at a frequency of 1.OMhz. The propagation delay per gate is _____ns	**1. 100** 2. 200 3. 25 4. 50
The minimum number of 2-to-1 multiplexers required to realize a 4-to-1 multiplexer is	1. 1 **2. 3** 3. 4 4. 2

No of bits to store image is denoted by formula	1. b = MxN **2. b = MxNxK** 3. b = MxK 4. b = NxK
Intensity levels in 8bit image are	1. 255 **2. 256** 3. 245 4. 244
If pixels are reconstructed without error mapping is said to be	1. irreversible 2. temporal 3. facsimile **4. Reversible**
A 4-bit modulo- 16 ripple counter uses J-K flip flops. If the propagation delay of each FF is 50ns, the maximum clock frequency that can be used is equal to	1. 20MHz **2. 5MHz** 3. 10MHz 4. 4MHz
A switch-tail ring counter is made by using a single D flip-flop. The resulting circuit is a	1. SR flip-flop 2. JK flip-flop **3. T flip-flop** 4. D flip-flop
An R-S latch is	1. synchronous sequential circuit 2. combinatorial circuit 3. one clock delay element 4. one bit memory element
Among the digital IC- families ECL, TTL and CMOS	1. TTL has the largest fan out 2. TTL has the lowest power consumption **3. ECL has the least propagation delay** 4. CMOS has the biggest noise margin
Compresses image can be recovered back by	1. Image contrast 2. Image enhancement **3. Image decompression** 4. Image equalization
In standard TTL the 'totem pole' stage refers to	1. the phase splitter **2. the output buffer** 3. the multi emitter input stage 4. open collector output stage
Simple way of image compression is removing	1. information **2. Superfluous data** 3. meaningful data

	4. Data
The number of comparators in a 4-bit flash ADC	1.4 2.5 **3.15** 4.16
Low pass filters promotes	1. high intensity components 2. mid intensity components 3. dimming **4. low intensity components**
Smoothing filters are mostly used in	**1. blurring** 2. dark 3. contrast 4. brightness
For the 4 bit DAC shown in figure, the output voltage V_0 is	1. 10V **2.** **5V** 3. 4V 4. 8V
Name that does not relates to spatial filters	1. templates 2. kernels 3. spatial masks **4. PDF**
Spatial filtering method uses	**1. spatial filter** 2. low pass filter 3. high pass filter 4. bandpass filter
In the figure, the J and K inputs of all the four Flip-flops are made high frequency of the signal at output Y is	1. 0.833kHz **2.** **1.0kHz** 3. 0.91kHz 4. 0.77kHz
Smallest element of an image is called	1. Coordinate 2. Dot **3. Pixel** 4. Digits
Figure shows a mod-K counter, Here K is equal to	1. 1 2.

	2 **3.** **3** 4. 4
The Boolean expression for the truth table shown is	**1.** **B(A+C)(A'+C')** 2. B(A+C')(A'+C) 3. B'(A+C')(A'+C) 4. B'(A+C)(A'+C')
Which of the following is best suited for I I R filter when compared with the FIR filter	1. No sidelobes in stopband 2. Lower sidelobes in Passband 3. Higher Sidelobes in stopband 4. Lower sidelobes in stopband
Which of the I I R Filter design method is antialiasing method?	**1. Bilinear transformation** 2. Impulse invariant method 3. The method of mapping of differentials 4. Matched Z - transformation technique
An image is a two dimensional function where x and y are	1. time coordinates 2. frequency coordinates **3. spatial coordinates** 4. real coordinates
Transforming difference between adjacent pixels is called	1. image watermarking **2. mapping** 3. image compression 4. image equalization
The Boolean function f implemented in figure using two input multiplexers is	**1.** **AB'C +ABC'** 2. ABC + AB'C' 3. A'BC +A'B'C' 4. A'B'C +A'BC'
Digital video is sequence of	**1. frames** 2. matrix

	3. pixels 4. coordinates
1024 x 1024 image has resolution of	1. 1348576 2. 1248576 **3. 1048576** 4. 1148576
DPI stands for	1. dots per image 2. dots per intensity **3. dots per inches** 4. diameter per inches
Image having gradient pixels is called	**1. gradient image** 2. blur image 3. sharp image 4. binary image
Simplest image processing technique is	1. domain transformation 2. coordinates transformation 3. spatial transformation **4. intensity transformation**
The number of product term in the minimized sum-of-product expression obtained through the following K-map is (where ‘d’ denotes don’t care state)	**1.** **2** 2. 3 3. 4 4.5 5
Low pass filters are used for image	1. resizing **2. blurring** 3. sharpening 4. contrast
High pass filters are used for image	1. resizing **2. sharpening** 3. contrast 4. blurring
For the logic circuit shown in the figure, the required input condition (A, B, C) to make the output (X) = 1 is	1. 1, 0, 1 2. 0, 0, 1 3. 1, 1, 1 **4.** **0, 1, 1**

The minimum number of NAND gates required to implement the Boolean function A+ AB'+AB'C is equal to	**1.** **0** 2. 1 3. 4 4. 7
Histogram equalization refers to image	1. sampling 2. quantization **3. normalization** 4. framing
Histogram equalization make image intensity changes	**1. visible** 2. invisible 3. high 4. low
Luminance is measured in	1. chromens 2. degree 3. steradian **4. lumens**
The inductive transducers working on the principle of change of self-inductance L, are connected in push pull arrangement. If the change in inductance of transducers is ΔL the change of inductance exhibited at the output terminals is	1. zero 2. 2ΔL **3. -2ΔL** 4. ΔL
Changing overall sensitivity of image is called	**1. brightness adaption** 2. illumination adaption 3. brightness 4. illumination
Image linear interpolation is given by formula	1. v(x,y) = ax+by+d 2. v(x,y) = ax+by+cxy **3. v(x,y) = ax+by+cxy+d** 4. v(x,y) = by+cxy+d
Boolean expression for the output of XNOR (equivalence) logic gate with inputs A and B is	1. AB'+A'B **2.** **A'B'+AB** 3. (A'+B)(A+B') 4. (A'+B')(A'+B)

Frequency of sleep spindles:	1. 20 to 80 Hz 2. 0.5 to 4 Hz **3. 10 to 14 Hz** 4. 4 to 7 Hz
For the circuit shown below the output F is given by	1. 1 **2.** **0** 3. X 4. X'
Find the value of the resistor, where the colours of a, b and c are white, grey and red.	1. 98000 **2. 9800** 3. 980 4. 0.0098
EEG pattern in REM sleep is:	1. High amplitude, slow waves 2. Low amplitude, rapid waves **3. High amplitude, rapid waves** 4. Low amplitude, slow waves
For the efficient usage of adaptive filters	1. The noise should be correlated with the reference signal 2. The noise should be periodic **3. The desired signal should be correlated with the reference signal** 4. The noise should be deterministic
After the filter adapts itself, the output of the system y(n) is the estimate of _____	**1. Desired signal** 2. Reference signal 3. Noise signal 4. Primary signal
Find the value of the resistor, where the colours of a, b and c are yellow, grey and blue	1. 4820 **2. 48000000** 3. 486 4. 4800
_____ are also called Wiener Filter	**1. LMS filters** 2. recursive filters 3. Optimal filters 4. Adaptive filters
Find the value of the resistor, where the colours of a, b and c are violet, orange and black	1. 730 2. 0.0073 **3. 73** 4. 750
The Boolean expression AC+BC' is equivalent to	1.

	A'C+BC'+AC 2. B'C+AC+BC'+A'CB' 3. AC+B'C+BC'+ABC **4.** **ABC+A'BC'+ABC'+AB'C**
Maximum power in a circuit can be found by _____	1. $4V_{oc}^2 / R_{Th}$ 2. $4V_{oc} / 4R_{Th}^2$ **3. $V_{oc}^2 / 4R_{Th}$** 4. $V_{oc} / 4R_{Th}$
What is the applied voltage for a series RLC circuit when I_T = 3 mA, V_L = 30 V, V_C = 18 V, and R = 1000 ohms?	1. 34.98 V 2. 48.00 V **3. 12.37V** 4. 3.00 V
If the functions W, X, Y and Z are as follows	1. W=Z, X=Z' 2. W=Z, X=Y 3. W=Y 4. W=Y=Z'
The value of the integral	1. 2. 3. 4.
The minimized form of the logical expression (A'B'C'+A'BC'+A'BC+ABC') is	**1.** **A'C'+BC'+A'B** 2. AC'+B'C'+A'B 3. A'C+B'C+A'B 4. AC'+B'C+AB'
Improper fixation of electrodes during the ECG	1. High frequency

acquisition leads to _____ noise	**2. low frequency** 3. EMG artifacts 4. Baseline drift
How much current will flow in a 100 Hz series RLC circuit if V_s = 20 V, R_T = 66 ohms, and X_T = 47 ohms?	1. 1.05 A 2. 303 mA 3. 107 mA **4. 247mA**
What is the Q (Quality factor) of a series circuit that resonates at 6 kHz, has equal reactance of 4 kilo-ohms each, and a resistor value of 50 ohms?	**1. 80** 2. 50 3. 0.001 4. 4.0
To detect the duration of QRS complex one has to use _____ methods	1. Template matching 2. Derivative based operators **3. Pan – Tompkins** 4. RLS
The expression Y = A+A'B	1. Y=AB 2. Y=A'B 3. Y=A'+B 4. **Y=A+B**
The K-map for a Boolean function is shown in figure. The number of essential prime implicants for this function is	**1.** **4** 2. 5 3. 6 4. 8
_____ is a recursive filter	1. Butterworth 2. Adaptive **3. RLS filter** 4. Chebeyshev
Maternal ECG and Fetal ECG can be separated using	1. Notch filter 2. Optimal filter **3. Adaptive noise canceller** 4. Comb filter
In the sum of products function f(X,Y,Z) = sum of (2,3,4,5), the prime implicants are	**1.** **X'Y, YX'** 2.

	X'Y, XY'Z', XY'Z 3. X'YZ', X'YZ, X'Y' 4. X'YZ', X'YZ, XY'Z', XY'Z
Power line noise can be removed from ECG signal using	1. Optimal filter 2. Smoothing filter 3. Derivative filter **4. RLS filter**
A data reduction algorithm must also represent the data with acceptable	1. Mean **2. Fidelity** 3. Reproducibility 4. Variance
Residual signal means	1. Original signal 2. difference between the primary signal and the original signal 3. difference between the noise signal and the original signal **4. difference between the reconstructed signal and the original signal**
AZTEC post processing needs _____ filter to remove its jagged appearance	1**. Low pass filter** 2. Median filter 3. High pass filter 4. notch filter
The CORTES algorithm is a hybrid of the	1. AZTEC and LMS 2. TP and RLS 3. LMS and TP 4. TP and AZTEC algorithms
Which algorithm produces better signal fidelity for the same reduction ratio	1. TP 2. AZTEC 3. Fan 4. CORTES
The reconstruction process of Huffman coding recovers the _____ original data	**1. Perfectly** 2. Partially 3. Fully 4. Half
Which algorithm is called as lossless algorithm	**1. Huffman** 2. CORTES 3. TP 4. AZTEC
_____algorithm make use of translational table	**1. Huffman** 2. CORTES 3. TP

	4. AZTEC
MAC operation represents	1. Modulated array code 2. multiple addition code 3. memory access code **4. Multiply-accumulate**
What is the condition for linear phase in FIR filters?	**1. coefficients are symmetrical around the center coefficient** 2. coefficients are symmetrical around the last coefficient 3. coefficients are non-symmetrical around the center coefficient 4. coefficients are symmetry around the last coefficient
How do you scale the gain of a FIR filter?	1. Multiply all coefficients **2. Multiply all coefficients by scale factor** 3. Multiply all coefficients by its centre coefficients 4. Multiply all coefficients by its last coefficient
Hilbert transformer is also called as	**1. Special type of FIR filters** 2. Special filters 3. High pass filter 4. Special type of IIR filters
I I R digital filters are of the following nature	**1. Recursive** 2. Non Recursive 3. Reversive 4. Non Reversive
In I I R digital filter the present output depends on	1. Present and previous Inputs only 2. Present input and previous outputs only **3. Present Input, Previous input and output** 4. Present input only
The most common technique for the design of I I R Digital filter is	1. Recursive method 2. non recursive method **3. In direct method** 4. Direct Method
In practical applications, battery voltage:	1. will be reduced to zero as power is drawn 2. is restored as soon as disconnect occurs 3. may be stored indefinitely

	4. is lowered as the load increases
The I I R filter design method thatovercomes the limitation of applicability to only Lowpass filter and a limited class of bandpass filters is	1. Approximation of derivatives 2. Bilinear Transformation 3. Frequency sampling **4. Impulse Invariance**
If 40 C of charge flow past a point in 20 s, what is the current?	**1. 2 A** 2. 20A 3. 0.5 A 4. 40A
What happens to total resistance in a circuit with parallel resistors if one of them opens?	1. It decreases **2. It increases** 3. It halves 4. It remains the same
The value of a complex number z with	1. 1+i 2. -1+i 3. 1-i 4. -1-i
Newton-Raphson method fails when	1. f'(x) is negative **2.** **f'(x) is zero** 3. f'(x) is too large 4. f"(x)=1
sin ix=	1. sinh x 2. sin x 3. i sinh x 4. -i sinh x
When parallel resistors are of three different values, which has the greatest power loss?	1. The largest resistance **2. The smallest resistance** 3. They have the same power loss

	4. Voltage and resistance values are needed
If two parallel-connected resistors dissipate 6 watts and 10 watts of power, then what is the total power loss?	1. 4 Watts **2. 16 Watts** 3. 60 Watts 4. 3.75 watts
If a 1 KΩ and a 2 KΩ resistor are parallel-connected across a 12 V supply, how much current is received by the 2 KΩ resistor?	1. 12mA **2. 6mA** 3. 4 mA 4. 8 mA
In both induction and synchronous ac motors	1. the stator magnetic field is stationary 2. the "squirrel cage" forms the rotor **3. the stator magnetic field rotates** 4. the operating speed is very steady
A half-cycle average voltage of 12 V is equal to what rms voltage?	1. 8.48 V 2. 7.64 V 3. 18.84 V **4. 13.33 V**
What is the instantaneous peak voltage at 250° on a 6 V peak sine wave?	**1. -5.64 V** 2. -26.13 V 3. +26.13 V 4. +5.64 V
Permeability is the inverse equivalent of which electrical term?	**1. resistance** 2. Voltage 3. Current 4. Conductance
What is the flux density of a magnetic field whose flux is 3000 μWb and cross-sectional area is 0.25 m^2?	**1. 12,000 μT** 2. 83,300 T 3. 50T 4. 0 T
If	1. 1 2. 2 3. 3 4. 4
If	1. 2.

	3. 4.
The point	1. 2. 3. 4.
Given that	1. purely imaginary 2. zero 3. constant 4. function of alone
The principal value of the complex number is:	1. 2. - 3. 4.
Which of the following symbol is called forward difference operator	1. 2. 3. 4.
The value of satisfying the equation	1. 2.

	3. 4.
If	1. 0 2. 3. 4.
The complex representation of a straight line path from	1. 2. 3. 4.
The Cauchy–Riemann equations for	1. 2. 3. 4.
The Polar form of Cauchy Riemann equations are:	1. 2. 3. 4.
Find the value of	1. 1 2. 2 3. 3 4.

	0
What is the condition for the convergence of Iterative method?	1. 2. 3. 4.
Which one of the following is a pole of the function	1. -1 2. i 3. 4.
If	1. asin(ax+by+cz) 2. acos(ax+by+cz) 3. sin(ax+by+cz) 4. cos(ax+by+cz)
If	1. 1 2. -1 3. 2 4. -2
The residue at simple pole of the function	1. 9/49 2. 9 3. - 9/49 4.

	- 9
The sum of the residues at poles of	1. 2. 3. 4.
The real integral	1. 2. 3. 4.
If is the real part of an analytic function	1. 2. 3. 4.
If	1. 2. 3. 4.
What is the trace of the matrix *A* with eigenvalues and 1, 1/2, - 2/3	**1. 5/6** 2. 1/6 3. -5/6 4. -1/6
The value of	1. -1 2. 1 3. 2

	4. 0
Find the determinant of the matrix with eigenvalues 1, -2, 3 and 0.	1. 3 2. -2 3. 0 4. 1
If	1. 2. 3. 4. 0
If	1. 5/9 2. 4/9 3. 1/9 4. 1/3
If respectively are poles of order	1. 6 and 4 2. 2 and 3 3. 3 and 4 4. 4 and 6
The period of cos(3x) is	1. 2 2. π 3. 2π 4. 2π /3
The radius of convergence of the power series	1. 2 2. 3 3.

	2/3 4. 3/2
If a function	1. 2. 0 3. - 4.
When the function	1. 2. 3. 4.
The characteristic equation of	1. 2. 3. 4.
The coefficient of	1. 4 2. -4 3. 1 4. 1/4
Which of the following is a valid region in which the function	1. 2. 3.

	4.
If 0,3 and 15 are the Eigen values of the Quadratic form then the rank of the Quadratic form is	1. 0 2. 1 3. 3 4. 2
The constant term in the Laurent's series expansion of the function	1. 2. - 3. 4. -
For the function	1. a pole of order 3 2. a pole of order 4 3. simple pole 4. a pole of order 2
The radius of convergence of the power series	1. 0 2. 3. 1 4.
If	1. The real axis 2. The straight line 3. The straight line 4. A circle passing through origin
The value of the real integral	1.

	2. 2 3. /2 4. - /2
If	1. 0 2. 3. 4.
If	1. 0 2. 1 3. 2 4. 3
If	1. 2.0 3. 1 4. r
For any closed surface *S* ,	1. 0 2. 3. 4.
The value of	1. 2/3 2. 4/3 3. 1

	4. 0
If	1. xy 2. 3. 4.
If the surfaces	1. 5/2 , 1 2. 1, 1 3. 1, 5/2 4. 0,0
is a homogeneous function of degree	1. No degree 2. 1 3. 0 4. 2
The stationary points	1. (1,1) 2. (-1,-1) 3. (12,13) 4. (0,1)
The mean value of	1. 2. 1/2 3.

	1 **4.**
curl(grad) =	1. grad 2. **3.** **0** 4.
If	1. - 2 2. 2 3. 1 4. - 1
The minimum value	1. 2. 3a 3. a 4. 0
Find the shortest distance from origin to the surface	1. -3 2. 2 3. -2 4. 3
If is a surface then	1. Normal to 2. Tangent to 3.

	Binormal to 4. Scalar
If	1. 2 2. - 2 3. 4. -
The stationary point for	1. (0,0) 2. (a,a) 3. (0,0) & (a,a) 4. (-1,-1)
If	1. Solenoidal vector 2. Irrotational vector 3. Scalar 4. Solenoidal & irrotational vector
If	1. Irrotational 2. constant vector 3. scalar 4. solenoidal
In the fourier series expansion of	1. 2 2.

	- 1 3. 0 4. 1
Fourier expansion of an even function *f(x)*	1. sine 2. No terms 3. One term 4. cosine
The period of	1. 2 2. 3. /2 4. 0
If	1. 2. 3. 4.
The value of *x* so that	1. 9 / 4 2. 3 / 4 3. 1 / 4 4. 1 / 2
The value of *c* of Rolle's throrem for the	1.

	2. / 2 3. / 4 4. / 3
The Newton’s iterative formula is	**1.** 2. 3. 4.
Vector quantization is also called as _____ quantization	1. Partial 2. Perfect 3. Serial **4. Block**
Speech information compression is carried out by	1. FFT 2. IDCT **3. DCT** 4. DTFT
DCT converts an image or audio block into its equivalent	1. Time coefficients 2. phase coefficients **3. frequency coefficients** 4. step coefficients
Lossy data compression is done using	1. Vector quantization 2. Wavelet 3. IDCT **4. DCT**
Which transform is similar to PCA	**1. KLT** 2. DCT 3. . IDFT 4. Wavelet
Which method has the low computational burden	1. FFT 2. IDCT 3. DCT 4. VQ
Decorrelate property significant for	1. Wavelet 2. IDFT 3. KLT 4. DCT
Clustering can be done using	1. FFT **2. VQ**

	3. KLT 4. DCT
Signal detection and estimation can be done using	1. . IDFT 2. DCT 3. Wavelet 4. KLT
The speech signal is obtained after	**1. Digital to analog conversion** 2. Analog to digital conversion 3. Modulation 4. Quantization
The similarity between the Fourier transform and the z transform is that	1. Both convert analog signal to digital signal **2. Both convert discrete time domain to frequency spectrum domain** 3. Both convert frequency spectrum domain to discrete time domain 4. Both convert digital signal to analog signal
Which among the following represent/s the characteristic/s of an ideal filter?	1. non linear frequency response **2. Constant gain in passband** 3. constant gain in stop band 4. non Linear Phase Response
Schering bridge is used to measure	1. Mutual inductance 2. Capacitance and dielectric loss 3. Resistance 4. Inductance
A capacitance transducer has two plates each of area 5 mm^2. The coil gap is 2 mm. Displacement sensitivity due to change in gap length is	**1. 11.1 pF/cm** 2. 44.2 pF/cm 3. 66.3 pF/cm 4. 52.3 pF/cm
The resistance of a 125 Ω strain gauge changes by 1 ohm for 4000 micro strain. The gauge factor is	1. 2.5 2. 3 **3. 2** 4. 1.5
In an Anderson bridge the unknown inductance is measured in terms of	1. Known inductance and resistance 2. Known inductance **3. Known capacitance and resistance** 4. Known capacitance
Which of the following statement is correct for two wattmeters method of power measurement in 3 phase circuit?	1. When power factor is 1, one of the wattmeters readings is zero 2. Power can be measured by this method only for star connected loads 3. When two wattmeters have equal

	readings power factor is 0.5 **4. When the two wattmeter read equal and opposite, p.f. is zero**
Induction wattmeter can be used in	**1. ac circuit only** 2. both ac and dc circuit 3. ac 3 phase only 4. dc circuit only
In two wattmeter method of 3 phase power measurement, when does one wattmeter read negative	1. When power factor is less than 0.5 lagging **2. When power factor is less than 0.5** 3. When power factor is unity 4. When power factor is greater than 0.5 lagging
In a single phase power factor meter the phase difference between currents in the two pressure coils is	1. Approximate 0° 2. Approximate 90° 3. Exactly 0° **4. Exactly 90°**
The torque in induction wattmeters due to	1. Electrostatic effect 2. Hall effect **3. Eddy currents** 4. Capacitive current
Which of these instrument does not have a control spring?	1. Moving iron ammeter 2. PMMC ammeter 3. Electrostatic voltmeters **4. Power factor meter**
In 3 phase power measurement by two wattmeter method, the reading of one wattmeter is zero. The power factor of load is	1. 0.8 2. 1 3. 0 **4. 0.5**
Two voltmeters are each 0-300 V range. Their internal resistances are 10 kΩ and 20 kΩ. They are connected is series and a voltage of 400 V is applied. Their readings respectively will be	1. 100 and 300 V 2. 266.6 and 133.3 V **3. 133.3 and 266.6 V** 4. 200 V each
A digital voltmeter has a read out range from 0 to 999 counts. If the full scale reading is 9.999 V, the resolution is	1. 1 V 2. 0.01 V **3. 1 mV** 4. 1 μV
A 3-digit voltmeter having a resolution of 100 mV can be used to measure a maximum of	1. 1000 V 2. 200 V 3. 5000 V **4. 100 V**
A digital voltmeter can count from 0 to 9999. If full scale reading is 9.999 V, the resolution of full scale reading is	1. 1000 2. 2 digit 3. 0.001

	4. 1 mV
In low power factor wattmeter, the compensating coil is connected	1. In series with current coil **2. In series with pressure coil** 3. In parallel with pressure coil 4. In parallel with current coil
Which bridge can be used to measure frequency?	1. Schering 2. Maxwell **3. Wein** 4. Kelvin
In Weston frequency meter, the magnetic axes of the two fixed coils are	1. Inclined at 60° 2. Inclined at 15° 3. Parallel **4. Perpendicular**
In a vibrating reed frequency meter the natural frequency of two adjacent reeds have a difference of	1. 1.25 Hz 2. 1 Hz **3. 0.5 Hz** 4. 0.25 Hz
Harmonic distortion analyser	1. Measures RMS value of fundamental frequency component 2. Measures amplitude of each harmonic 3. Displays RMS value of each harmonic on screen of CRO **4. Measures RMS value of all harmonics except fundamental frequency**
The Lissajous pattern observed on screen of CRO is a straight line inclined at 45° to x axis. If X-plate input is 2 sin ωt, the Y-plate input is	1. 2 sin (ωt + 45°) 2. 22 sin ωt + 45°) 3. 2 sin (ωt - 45°) **4. 2 sin ωt**
A sinusoidal signal is measured by CRO. The scale is set at 4 mV/cm. If vertical distance between positive and negative peaks is 6 cm, the peak value of ac signal is	1. 3 mV 2. 24 mV 3. 6 mV 4. 12 mV
The Y plates of a CRO are excited by a voltage 2 sin 100 t and the X plates are not connected. The display would be	**1. A vertical line** 2. A horizontal line 3. Slant line 4. Sine wave
The time base generator in a CRO gives an output which is	1. Low frequency sinusoidal **2. High frequency sawtooth** 3. High frequency sinusoidal 4. Low frequency rectangular
A data signal having frequency components from dc to 50 Hz is to be sent through pulse code modulation using an 8 digit code. The minimum carrier channel bandwidth is	1. 1 kHz 2. 8 kHz 3. 2 kHz **4. 4 kHz**

The channel required for FM telemetry is	1. 10 times that required for AM telemetry 2. Smaller than that required by AM telemetry 3. Same as required for AM telemetry **4. 100 times that required for AM telemetry**
A land line telemetry system is suitable for distance upto	1. About 10 km only 2. About 50 km only **3. About 1 km only** 4. About 100 km only
Wagner earthing device eliminates	1. Mutual coupling between components 2. All stray capacitance in the circuit **3. Stray capacitance between detector terminal and ground** 4. Stray capacitances between components
The instrument used to check insulation of household wiring is	1. Ohmmeter **2. Megger** 3. Multimeter 4. High resistance voltmeter
A resistance is measured by voltmeter-ammeter method. The voltmeter is 0-250V, ± 1% accuracy and ammeter is 0-5 A, ± 1 % accuracy. The readings of voltmeter and ammeter are 100 V and 2 A respectively. The error in the measured resistance can be	1. ± 1% 2. ± 10% **3. ± 5%** 4. ± 2%
A rectifier voltmeter using bridge rectifier and PMMC meter is calibrated to read rms value of sine wave. A triangular wave is applied to it and it reads 6.82 V. The rms value of triangular wave is	**1. About 7.1 V** 2. About 10 V 3. About 6.5 V 4. About 6.82 V
Kelvin's double bridge is used to measure low resistances because	1. It has high sensitivity 2. Resistance variation due to temperature 3. There is no thermoelectric emf 4. Effect of contact and lead resistances is eliminated
A single element strain gauge bridge has two fixed resistances R1 and R1 of 120 Ω each and a variable resistance which gives full deflection at 120 Ω for zero strain and 120.6 Ω for strain. If gauge factor is 2, strain is	1. 0.0035 2. 0.005 3. 0.0075 4. 0.0025
A sinusoidal ac voltage of amplitude 100 V is applied to a rectifying device which offers 10 Ω resistance in forward direction and infinite resistance in backward direction. A	1. 5 A 2. 10 A **3. 3.185 A**

moving coil ammeter is also connected in the circuit. The reading of ammeter will be	4. 14.14 A
A moving coil instrument has a resistance of 0.5 Ω and a full scale deflection of 0.1 A. To convert it into an ammeter of 0-10 A the shunt resistance should be	**1. 0.005 Ω** 2. 0.004 Ω 3. 0.1 Ω 4. 0.05 Ω
The area of the cardioid	1. $3a$ 2. $-3a$ 3. 4.
A 3 mm thick quartz piezoelectric crystal having a voltage sensitivity of 0.06 V-m/N is subjected to a pressure of 1.8MN/m^2 and the permittivity of quartz is 40.6X10^{-12}F/m. Determine the voltage output.	1. 0.234 V 2. 0.324 V **3. 324 V** 4.234 V
For signal conditioning of the piezoelectric type transducer, we require	1. A trans conductance amplifier 2. A differential amplifier **3.A charge amplifier** 4. An instrumentation amplifier
Which of the system is causal?	1. y(n) = |x(3n)| 2. y(n) = |x(n^3)| 3. y(n) = |x(2n)| **4.** **y(n) = x(n) + [1/x(n-1)]**
Which of the following system is time variant?	1. y(n) = x(n) + x(n-1) **2.** **y(n) = x(-n)** 3. y(n)=x(n)

	4. y(n)=1/x(n)
Input sequence is {1,2,1,2} and the impulse response is {3,2,1,2} then the output is	1. {3,8,8,12,9,4,4} 2. {9,7,12,8,12} 3. {12,12,12,12} 4. {-3,-8,8,-12,9,4,4}
Which of the given system is linear?	1. y(n) = x(n) + [1/x(n-1)] 2. y(n) = x(n)+B 3. y(n) = n x(n) **4.** **y(n) = x2(n)**
Which of the given system is non linear?	1. y(n) = x(n) + x(n-1) 2. y(n) = x2(n) **3.** **y(n) = n x(n)** 4. y(n) = x(n)
y(n) = 1 for n ≥ 0 and it is = 0 for n < 0. This way of	1.

representing a signal is called as	Graphical 2. Sequential **3.** **Functional** 4. Parallel
Coefficient symmetry is important in FIR filters because it provides	1. a smaller transition bandwidth 2. less passband ripple 3. less stopband ripple **4.** **a linear phase response**
If a linear phase filter has a phase response of 40 degrees at 200 Hz, what will its phase response be at a frequency of 400 Hz (assuming that both frequencies are in the passband of the filter)?	1. 35 degrees 2. 40 degrees **3.** **80 degrees** 4. 45 degrees
Sampling theorem	1. fm<fs 2.

	fs>fm 3. fs>=2fm **4.** **fs=2fm**
TMS320C50 is based on	1. Harvard architecture 2. Von Neumann architecture **3.** **VLIW Architecture** 4. VLSI design
Which is not the property of FIR filter?	1. A realizable filter can always be obtained 2. FIR is always stable **3.** **FIR filter has a linear magnitude response** 4. FIR filter has a linear phase response
The output of two digital filters can be added. Or, the same effect can be achieved by	1. subtracting their coefficients 2.

	adding their coefficients 3. averaging their coefficients and then using a Blackman window 4. convolving their coefficients
Z transform is evaluated on a unit _____ corresponds to the Fourier transform.	1. Impulse 2. Sequence 3. Circle 4. scale
Decreased performance is the disadvantage of _____	**1. Von Neumann architecture** 2. VLIW Architecture 3. Harvard architecture 4. VLSI architecture

The factor that influence the selection of the processor	1. Word length **2.** **Manufacturer** **3.** **None of the above** 4. Logics involved in processing
IIR filters:	1. Can oscillate even if properly designed 2. uses only feed forward **3.** **Use feedback** 4. Are sometimes called non recursive filters
Two digital filters can be operated in cascade. Or, the same effect can be achieved by	1. adding their coefficients 2. subtracting their coefficients **3.**

	convolving their coefficients 4. averaging their coefficients and then using a rectangular window
DSP stands for?	1. Digital signal processor 2. Double signal processor 3. Digital signal processing **4.** **Discrete signal processing**
Determine the convolution sum of two sequences x(n) = {3, 2, 1, 2} and h(n) = {1, 2, 1, 2}	1. y(n) = {3,8,3,12,9,4,4} **2.** **y(n) = {3,8,8,12,9,4,4}** 3. y(n) = {3,8,8,12,9,1,4} 4. y(n) = {3,8,8,1,9,4,4}
Condition for aliasing problem:	**1.** **fs<2fm** 2. fs=fm 3.

	deviating from ncquist theorem 4. fs<fm< td="" style="box-sizing: border-box;"></fm<>
DFT stands as	1. Discrete function transformation **2.** **Discrete Fourier transform** 3. digital function transform 4. digital frequency transform
Calculate DFT of x (n) = {1, 0, 1, 0}	1. x (k) = {2, 0, 1, 0} 2. x (k) = {2, 2, 0, 0} 3. x (k) = {1, 0, 1, 0} **4.** **x (k) = {2, 0, 2, 0}**
Calculate DFT of x (n)= δ(n	**1.** **1** 2. 2 3. 0 4. 3
The FFT algorithms:	1. enable the redundant

	calculation and redundant to analyze the spectral properties of a signal 2. eliminate to analyze the spectral properties of a signal. **3.** **eliminate the redundant calculation and enable to analyze the spectral properties of a signal.** 4. redundant to analyze the spectral properties of a signal
Correlation	1. accounts the statistical property of signal **2.** **It gives a measure of similarity between two data sequences.** 3. It gives a measure of dis-similarity between two data sequences 4. accounts the dismatch that exists between signals
IIR filters:	1. Can oscillate even if properly designed 2. uses only feed forward

	3. **Use feedback** 4. Are sometimes called non recursive filters
The output of two digital filters can be added. Or, the same be achieved by	1. subtracting their coefficients **2.** **adding their coefficients** effect can 3. averaging their coefficients and then using a Blackman window 4. convolving their coefficients
The inverse Fourier transform	**1.** **converts from the frequency domain to the time domain** 2. converts from the time domain to the frequency domain 3. converts from the phasor domain to the magnitude domain

	4. is used to make real-time spectrum analyzers
Two digital filters can be operated in cascade. Or, the same effect can be achieved by	1. adding their coefficients 2. subtracting their coefficients **3.** **convolving their coefficients** 4. averaging their coefficients and then using a rectangular window
Truncation or rounding of the data results in	1. grow power 2. increase system performance **3.** **degradation of system performance** 4. increase memory requirement
Used to increase the sampling rate by an integer factor	**1.**

	Up-sampler 2. down sampler 3. rounding off 4. truncation
filters have ……., and IIR filters	1. Zeros, poles & zeros 2. poles & zeros, Zeros 3. Zeros, zeros 4. Zero alone
A quartz piezo-electric type pressure sensor has a built in charge amplifier. The sensor has a sensitivity of 1 μV/Pa. It is subjected to a constant pressure of 120 kPa. The output of the transducer at steady state is	1. 100 μV 2. 120 mV **3. 0 mV** 4. 120 μV
Used to decrease the sampling rate by an integer factor	1. truncation 2. rounding off **3.** **down sampler** 4. Up-sampler
From the sampling theorem it is known that a the sampling rate of a critically sampled discrete-time signal with a spectrum occupying the full Nyquist range cannot be reduced any further since such a reduction will introduce……..	**1.** **aliasing** 2. quantizated 3. ncquist

	4. error
The basic process that's going on inside a DSP chip is	1. quantization **2.** **MAC** 3.logarithmic transformation 4. vector calculations
A variation of the direct FIR model is called the transposed FIR filter. It can be constructed from the direct form FIR filter by set and one step includes,	**1.** **Inverting the direction of feed forward path** 2. Not changing the input and output of process 3. Changing the coefficient values 4. Changing summing points to branching points
A signal can be restored to a higher sampling frequency by the processes of…….	**1.** **up sampling & interpolation** 2. down sampling & decimation 3. upsampling & decimation 4. down sampling & interpolation
Finite Impulse Response (FIR) is a	1.

	feedforward filter 2. feedback filter 3. always a second order system **4.** **always oscillating filter**
The direct form FIR filter needs ..... between the adders to reduce the delay of the adder tree and to achieve high throughput.	**1.** **extra pipeline registers** 2. less pipeline registers 3. non volatile memory 4. volatile memory
In MxN, M is no of	1. intensity levels 2. colors **3.** **rows** 4. columns
High pass filters are used for image	1. contrast **2.** **sharpening** 3. blurring 4. resizing
Digital function's derivatives are defined as	**1.**

	differences 2. multiplication 3. addition 4. division
Continuous generalized slowing consists of polymorphic delta activity that is continuous or near-continuous (>80% of the record) and reactive is suggestive of	1. Seizure disorder **2.** **Diffuse encephalopathy** 3. Sleep disorders 4. Increased intracranial pressure
Digital images are displayed as a discrete set of	1. values 2. numbers 3. frequencies **4.** **intensities**
A variable reluctance type proximity inductance transducer has an inductance of 3 mH. When the target made of ferromagnetic material is 1 mm away, then calculate the value of inductance when a displacement of 0.05 mm is applied to the target in a direction opposite to the core.	**1. 3.14 mH** 2. 2.86 mH 3. 3.28 mH 4. 2.72 mH
Air cored inductive transducers are suitable for use at	1.At equal frequencies as are employed for iron core transducers 2. At lower frequencies 3. At lower frequencies as are employed for iron core transducers **4. At higher frequencies**
The conventional way of expressing vibrations is in terms of	1. Speed of sound **2. Richter scale** 3. Atmospheric pressure

	4. Acceleration due to gravity
In a series R, L circuit, voltage across resistor and inductor are 3 V and 4 V respectively, then what is the applied voltage?	**1.** **5 V** 2. 7 V 3. 4 V 4. 3 V
In ac RC series circuit total voltage is 10V and voltage across resistor is 6V, then what is voltage across capacitor?	1. 4V **2.** **8V** 3. 10V 4. 15V
In series RLC circuit, voltage across resistor, inductor and capacitor are 5V, 2V and 2V respectively. Find total voltage?	1. 9V 2. 2V 3. 3V **4.** **5V**
If a resistor is connected across the voltage source and the frequency of voltage and current wave form is 50Hz, then what is frequency of instantaneous power	1. 60 Hz **2.** **100 Hz** 3. 50 Hz 4. 120 Hz
In RLC parallel circuit current through resistor, inductor and capacitor are 10A, 5A and 5A respectively. What is the total current in the circuit?	1. 20A **2.** **10A** 3.

	5A 4. 4A
When power factor angle is constant, then shape of the current locus is	1. CIRCLE 2.SQUARE 3. TRIANGLE **4.STRAIGHT LINE**
In a series resonance circuit if bandwidth is 1 MHz and inductance is 1 mH, then what is the resistance value?	**1.1 KΩ** 2.1 MΩ 3.100Ω 4. 1Ω
A variable reluctance tachogenerator consists of a ferromagnetic gear wheel with 22 teeth rotating close to a magnet and coil assembly. The total flux *N* linked by the coil is given by: $N(\theta) = 4.0 + 1.5 \cos 22\theta$ milliwebers where θ is the angular position of the wheel relative to the axis of the magnet. What is the amplitude of the output signal when the angular velocity of the wheel is 1000 r.p.m.	1. 34.6mV 2. 3.46mV **3. 3.46V** 4. 34.6V
Magnetic flux can be measured by	1. Capacitive pick up 2.Inductive pick up **3. Hall effect pick up** 4.Resistance pick up
circuit below shows an up/down counter, working with a decoder and a flip-flop. Preset and Clear of the flip-flop are asynchronous active-low inputs. Assuming that the initial value of counter output (Q_2 Q_1 Q_0) as zero, the counter outputs in decimal for 12 clock cycles are	1. 0, 1, 2, 3, 4, 4, 3, 2, 1, 1, 2, 3, 4 2. 0,1,2,3,4,5,5,4,3,2,1,0,1 3. 0,1,2,3,4,5,0,1,2,3,4,5,0 4. 0,1,2,3,4,5,4,3,2,1,0,1,2
The value of definite integral	1. 0 2.

	a 3. a^2 4. 2 *a*
Which of the following is not an analytic function in the finite complex plane?	1. sinz 2. z' 3. e^z 4. cosz
An amplifier receives 0.1 W of input signal and delivers 15 W of signal power. What is the power gain in dB?	1. 6 dB 2. 5 dB **3. 8 dB** 4. 4 dB
The ratio of platinum and iridium in the electrode of sutureless leads of pacemaker is respectively_____	1.60% and 40% **2. 70% and 30%** 3.40% and 60%4.30% and 70%
Which of the following is the fastest memory cell	1. Core memory **2. Semiconductor memory** 3. Double memory 4. Super conductor memory
The glomerular filtrate consists of _____	1.Protein 2.Blood Plasma **3.Blood plasma without Protein** 4.Blood plasma with Protein
The perforations in the dialysis machine have an average diameter of _____ Angstrom.	1. 100 2.10 3. 1000 **4. 50**
By which of the following the control action is determined when a man walks along a path?	**1. Eyes** 2. Legs 3. Brain 4. Hands
A free running multivibrator using timer has RA = 1000 ohms, RB = 3 Mohms and C = 1nF. What is the frequency of oscillation?	1. 278 Hz 2. 178 Hz 3. 78 Hz 4.

	8 Hz
_____ is a closed loop system.	1. Electric switch 2. Direct current generator 3. Car starter **4. Autopilot for an aircraft**
Which of the following devices are commonly used as error detectors in instruments?	1. Resistors **2. Strain gauge** 3. Microsyns 4. Thermistors
The output of a feedback control system must be a function of	1. output and feedback signal 2. reference and output 3. reference and input **4. input and feedback signal**
If V_{cc} = +18 V, voltage-divider resistor R_1 is 4.7 kilo ohms, and R_2 is 1500 ohms, what is the base bias voltage?	**1.4.35 V** 2.0.7 V 3.2.90 V 4.8.70 V
To prevent self-heating errors becoming too great, the current through platinum element (100 ohm) is kept at a very small value of _____	1. 20 mA 2. 50 mA 3. 5 mA 4. 1 mA
The root of $x^3 - 2x - 5 = 0$ correct to three decimal places by using Newton-Raphson method is	1. 2.0946 2. 1.0404 3. 0.7011 4. 1.7321
Which measurement is a good guide to the quality of water	1.Turbidity **2.Dissolved O2 content** 3.Conductivity 4. pH
Mass-spring seismic sensors measure directly the _____	1. Velocity **2. Shock** 3. Acceleration 4. Displacement
Dipsticks are used for the	**1. Level measurement** 2. Displacement measurement 3. Flow measurement 4. Pressure measurement
A zero order system is the one in which output changes instantaneously as the input changes. The example of zero order system is	**1. Potentiometer** 2.Accelerometer 3.Liquid-in-glass thermometer 4. Transducer
Single step methods are----	1. Euler, Adam, Milne 2. Euler, RK method, Milne

	3. Euler, Milne and Taylor 4. Modified Eular, RK method, Taylor
If a balloon is equipped with temperature and altitude measuring instruments, then the order of the temperature measuring and altitude measuring instruments are	1. Zero order, first order 2. Both are first order instruments **3. First order, zero order** 4.Both are zero order instruments
Varies types of Runge-Kutta methods are classified according to their	1. Degree 2. Size 3. Rank **4. Order**
Accelerometer is a	1. First order instrument 2. Zero order instrument **3.Second order instrument** 4. Third order instrument
The corrector formula is applied to	1. adjust the value **2. improve the value** 3. Correct the value 4. modify the value
While going through a heap of junk in her garage, Jackie found an uncalibrated mercury thermometer. After a few experiments, she succeeded in calibrating it. Her notes show that ice point of thermometer corresponds to 3 cm while steam point corresponds to 30 cm of mercury. If Jackies calculations are fine then length = 15 cm would correspond to	1. 46 °C **2. 44 °C** 3. 40 °C 4. 42 °C
Average acceleration of body during time interval 't' is given by slope of its	1.Velocity-acceleration graph **2.Velocity-time graph** 3.Acceleration-time graph 4.Velocity-displacement graph
The purpose of compensation for a thermocouple is	1.Used for high-temperature circuits **2.To cancel unwanted voltage output of a thermocouple** 3.To increase voltage output 4.To decrease temperature sensitivity
Runge Kutta method is better than Taylor's series method because	1. It does not require prior calculations of higher derivatives as the Taylor's method does 2. It require prior calculations of higher derivatives as the Taylor's method 3. It requires manipulations of higher derivatives as the Taylor's

	method does 4. It requires both calculations and manipulations of higher derivatives as the Taylor's method does
The solubility constant of oxygen at 760mmHg is	1. 0.567 2. 0.0345 3. 0.0123 4. 0.0239
Out of Regula falsi method and Newton -Raphson method, the rate of convergence is faster For----------	1. RK Method 2. Regula-Falsi Method **3. Newton –Raphson Method** 4. Secant Method
In Regula falsi method of finding the real root of an equation , the curve AB is replaced by	1. Chord AB **2. Line AB** 3. Circle 4. Square
In the case of bisection method the convergence is	1. very slow 2. very fast 3. quadratic **4. linear**
Which of the following is a correct statement	1. (X+Y) (X+Z) = X 2. (X+Y) (X+Z) = X + X(Y+Z) 3. (X+Y) (X+Z) = X +Y 4. (X+Y) (X+Z) = X + YZ
A strain gauge bridge comprises of two fixed resistors each with a value of 100 Ω, one active gauge and other unstrained temperature compensation gauge. The two gauges are of unstrained resistance 100 Ω and gauge factor 2. Find the bridge output for a supply voltage of 4V, when the active gauge is subjected to 500 microstrains.	**1. 1mV** 2. 0.5mV 3. 3mV 4. 2mV
Which of these is not a type of capacitive transducer:	1.Variable area 2.Variable dielectric **3.Variable thickness** 4.Push pull
The secondary induced voltage of a LVDT at null position are V_1=1.0V<0° and V_2=1.0<10° respectively. Calculate the null voltage of the LVDT.	**1. 0.174 V** 2. Zero 3. 0.014V 4. 2V
An LVDT is supplied with a sinusoidal voltage of amplitude 5V and frequency 1 KHz. The output is connected to an AC voltmeter. The reading of the	1. -0.2V 2. 5V **3. 1V**

voltmeter is 1V for a displacement of 1mm from the null position. What is the reading of the voltmeter when the displacement is 1mm in the opposite direction from the null position?	4. -1V
A capacitive transducer using two quartz diaphragms of area 800 mm^2 and separated by a distance of 4 mm has a capacitance of 350 µF. When a pressure of 1MN/m^2 is applied to one of the diaphragms, a deflection of 0.75 mm is produced. The change in capacitance of the system is	1.81.2 µF 2.78.8 µF 3.21.8 µF **4.80.7 µF**
An inductive pick off operating from a 50^{th} wheel is used with a digital frequency meter to measure the speed of rotation of the shaft when the wheel is mounted. The gating period is set to 10^5 µs and a reading of 0050 is obtained on the 4-digit display. What is the shaft speed?	**1. 10rps** 2. 500rps 3. 100rps 4. 50rps
the circuit given below. In this circuit the race around	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
The smallest discernible change in intensity level is called _____ Intensity	**1. Resolution** 2. Contrast 3. Saturation 4. Contour
What is the tool used in tasks such as zooming, shrinking, rotating, etc.?	**1. Interpolation** 2. Contour 3. Filters 4. Sampling
The type of Interpolation where the intensity of the FOUR neighbouring pixels is used to obtain intensity a new location is called _____	1. bicubic interpolation 2. nearest neighbour interpolation **3. bilinear interpolation** 4. cubic interpolation
A tank initially holds 100 gallons of salt solution in which 50 lbs of salt has been dissolved. A pipe fills the tank with brine at the rate of 3 gpm, containing 2 lbs of dissolved salt per gallon. Assuming that the mixture is kept uniform by stirring, a drain pipe draws out of the tank the mixture at 2 gpm. Find the amount of salt in the tank at the end of	1. 143.25 lbs 2. 105.12 lbs 3. 124.11 lbs **4. 171.24 lbs**

30 minutes.	
The circuit shown below, Q_1 has negligible collector–to–emitter saturation voltage and the diode drops negligible voltage across if under forward bias. If V is 5V cc + , X and Y are digital signals with 0 V as logic 0 and Vcc as logic 1, then the Boolean expression for Z is	1. XY 2. X'Y 3. XY' 4. (XY)'
A signal other than the reference input that tends to affect the value of controlled variable is known as _____.	1. command 2. reference input 3. control element **4. disturbance**
If a step function is applied to the input of a system and the output remains below a certain level for all the time, the system is _____.	**1. not necessarily stable** 2. unstable 3. always unstable 4. stable
A signed integer has been stored in a byte using the 2's compliment format. We wish to store the same integer in 16 bit word. We should	1. copy the original byte to the less significant byte of the word and fill the more significant byte with zeros 2. copy the original byte to the more significant byte of the word and fill the more significant byte with zeros 3. copy the original byte to the less significant bytes well as the more significant byte of the word **4. copy the original byte to the less significant byte of the word and make each bit of the more significant byte equal to the most significant bit of the original byte**
Which of the following characteristics of a digital image is responsible for the brightness level in an image?	1. Image type 2. bit depth **3. pixel** 4. voxel
The circuit given below is a	1. J-K Flip flop 2. Johnson's counter **3.** **R-S latch** 4.

	T Flip flop
A 2-bit binary multiplier can be implemented using	**1. 2-input NORs and 1 XNOR gate only** 2. XOR gates and shift registers 3. 2 input X-ORs and 4-input AND gates only 4. 2 input ANDs only
The present output Q_n of an edge triggered JK flip-flop is logic 0. If J=1, then Q_{n+1}	1. will be logic 0 **2. will be logic 1** 3. will race around 4. cannot be determined
For logic circuit shown in figure, the output is equal to	1. (ABC)' **2.** **A'+B'+C'** 3. (AB)'+(BC)'+A'+C' 4. (AB)'+(BC)'
The nonlinear relation between the analog and digital frequencies is called	1. antialiasing 2. prewarping **3. warping** 4. aliasing
If 60 J of energy are available for every 15 C of charge, what is the voltage?	1. 60 V 2. 0.25 V 3. 15 V **4. 4 V**
What is the total power loss if 2 kΩ and 1 kΩ parallel-connected resistors have an I_T of 3 mA?	1. 36 W 2. 6 W **3. 6 mW** 4. 36 mW
For the output F to be **1** is the logic circuit shown, the input combination should be	1. A= 1, B= 1, C=0 2. A= 1, B= 0, C=0 3. A= 0, B= 1, C=0 **4.** **A= 0, B= 0, C=1**
Example of similarity approach in image segmentation is	1. edge based segmentation 2. boundary based segmentation 3. pixel segmentation **4. region based segmentation**

Example of discontinuity approach in image segmentation is	1. region based segmentation 2. boundary based segmentation 3. edge based segmentation 4. pixel segmentation
Decoder is used for	**1. image decompression** 2. image compression 3. image enhancement 4. image equalization
Encoder is used for	1. image decompression 2. image equalization 3. image enhancement **4. image compression**
For the ring oscillator shown in the figure, the propagation delay of each inverter is 100 pico sec. What is the fundamental frequency of the oscillator output	1. 10MHz 2. 100MHz 3. 1GHz **4.** **2GHz**
A variable air gap type capacitor consists of two parallel plates; a fixed plate and a moving plate at a distance x. If a potential V is applied across the two plates, the force of attraction between the plates is related to x as	**1.F α 1/x** 2.F α x^2 3.F α $1/x^2$ 4.Fα x
If inner region of object is textured then approach we use is	**1. similarity** 2. extraction 3. discontinuity 4. recognition
Computation of derivatives in segmentation is also called	1. low pass filtering 2. high pass filtering 3. frequency filtering **4. spatial filtering**
Minimum number of 2-input NAND gates required to implement the function, F = (X'+Y') (Z+W)	1. 3 **2.** **4** 3. 5 4. 6
Response of derivative mask is zero at	1. high intensities 2. low intensities

	3. constant intensities 4. sharp intensities
The most prominent EEG wave pattern of an awake, relaxed adult whose eyes are closed is:	1. Theta 2. Delta **3. Alpha** 4. Beta
Soft ferromagnetic materials have _____ coercive force	1. Extensive **2. Narrow** 3. Wide 4. Neutral
Which is a specific investigation of diagnosing seizure disorder?	1. EMG 2. EOG **3. EEG** 4. ERP
Find the value of the resistor, where the colors of a, b and c are red, red and violet.	1. 22000 **2. 220000000** 3. 220000 4. 2200
What is the bandwidth of the circuit with R=1K, L=5H and C=1μF?	**1.** **31.8 Hz** 2. 32.3Hz 3. 142Hz 4. 7.2Hz
In a parallel RLC circuit, which value may always be used as a vector reference?	1. Current 2. Resistance **3. Voltage** 4.Reactance
Line detection makes use of	1. Higher order interpolation **2. Zero order interpolation** 3. Lower order interpolation 4. Interpolation
AZTEC reconstruction process produces an ECG signal with _____ quantization	1. Triangle **2. Step** 3. Steep 4. Trapezoidal
Two 2's compliment numbers having sign bits x and y are added and the sign bit of the result is z. Then, the occurrence of overflow is indicated by the Boolean function	1. xyz 2. x'y'z' 3.

	x'y'z+xyz' **4.** **x'y'+yz+zx**
Turning point algorithm reduces the sampling frequency of an ECG signal from	**1. 200 to 100 samples/s** 2. 100 to 50 samples/s 3. 75 to 50 samples/s 4. 100 to 75 samples/s
A desired frequency response has its _____ which is the desired unit pulse sequence	1. FFT **2. IDTFT** 3. DTFT 4. DCT
What is the duration of the unit sample response of a digital filter?	1. Zero 2. Impulse 3. Finite **4. Infinite**
This circuit is known as a _____ filter, and the f_c is _____.	1.high pass, 1.59 kHz 2.bandpass, 15.9 kHz 3.low pass, 15.9 kHz **4.high pass, 15.9 kHz**
Base line drift in ECG	1. Notch filter 2. low pass filter **3. high pass filter** 4. ensemble average
Simpson's rule is the most widely used numerical_____ algorithm	1. Addition 2. Averaging 3. Differentiation **4. Integration**
Matrix has a value. This statement	1. Is always true **2.** **Is false** 3. Depends up on the matrices 4. true
If only even powers of x occur in the equation of a curve, then the curve is symmetrical about	1. Both axes **2. *y*-axis** 3. *x*-axis 4. y=x
The value of	1. / 2 2.

	3. / 4 4. 2
If	1. 0 2. 1 3. r 4. -r
Let	1. Parallel 2. Orthogonal 3. Same 4. Scalar
In a thermocouple two metal junctions between metals M1 and M2 are kept at temperature T1 and T2. The thermocouple emf is produced because	1. M1, M2 are dissimilar but T1, T2 are equal **2. M1, M2 are similar but T1, T2 are unequal** 3. M1, M2 are dissimilar but T1, T2 are unequal 4. M1, M2 are similar and T1, T2 are equal
Two ammeters having resistances of 0.5 Ω and 0.25 Ω and having full scale reading of 25 A each are connected in parallel. To ensure that neither of them goes beyond scale, the total current should not be more than	**1. 25 A** 2. 50 A 3. 37.5 A 4. 40 A
Which of the following can be used for measuring capacitance?	1. De sauty bridge **2. Maxwell's bridge** 3. Anderson bridge 4. Hay's bridge
To avoid creep in an energy meter	1. The potential coil is made of very thin wire 2. Two shading bands are put on

	shunt magnet 3. Two shading bands are put on series magnet **4. Two holes are cut in the disc on opposite sides of spindle**
A Weston frequency meter is	1. Induction instrument 2. Moving coil instrument 3. Dynamometer instrument **4. Moving iron instrument**
The value of the integral	1. - 1 2. 3 3. 0 4. 2
More memory consumption is required by	**1.** **VLIW Architecture** 2. Harvard architecture 3. Von Neumann architecture 4. VLSI architecture
Find the response of an FIR filter with impulse response h(n)= {1,2,4} to the input sequence x(n)={1,2}. a signal	**1.** **y(n)={1,4,8,8}** 2. y(n)={1,4,6,6} 3. y(n)={1,2,8,8} 4.

	none of above
The primary and secondary of an LVDT are connected to 3 kHz sinusoidal source and ideal semiconductor diode bridge based phase sensitive demodulator circuit. The core of the LVDT remains static at 15mm above the ideal null position. The frequency of the voltage observed at the input of the low pass filter is	1. 1 kHz **2. 3 kHz** 3. 6 kHz 4. 1.5 kHz
Under resonance condition the phase angle between voltage phase and current phase is ___ deg	**1.** **0** 2. -90 3. 90 4. 45
Which of the following represents the resonance frequency (ω_0) with respect to lower cutoff frequency (ω_1) and higher cutoff frequency (ω_2)	1. $\omega_1 + \omega_2$ 2.$\omega_1 - \omega_2$ 3.ω_1/ω_2 **4.**$\sqrt{\omega_1^2 + \omega_2^2}$
In RL series circuit R=2Ω and L=10mH and applied voltage is 10V DC. Then find the current in the network?	1. 1A 2. 10A 3. 2A **4.** **5A**
A piezoelectric type accelerator has a sensitivity of 100 mV/g. The transducer is subjected to a constant acceleration of 5g. The steady state output of the transducer is	**1. 0.5V** 2. Zero 3. 5V 4. 100 mV
Value of plank's constant h is	1. 9.55x10-34

	2. 8.55x10-34 3. 7.55x10-34 **4.** **6.55x10-34**
What is used to block light from a laser and let other light through	1. Spatial **2. Interference** 3. Color 4. Natural density
	1. f 2. 2f 3. 0 4. 1
_____ can be extended to systems which are time varying?	1. Bode Nyquist stability methods **2. State model representatives** 3. Root locus design 4. Transfer functions
Skin effects in conductors are the resultant of _____	1. Mutual inducatance 2. Induced magnetism 3. Hysteresis Loss **4. Self-induced eddy currents**
Given that and are the eigenvalues of a non singular matrix *A*, which of the following is not an eigenvalue of	1. 1 **2.** **5/6** 3. 6/5 4. 5/3
An amplifier can give which of the following characteristics?	1. Constant current **2. Constant current, constant voltage and constant power** 3. Constant current as well as constant voltage

	4. Constant voltage
	1. s 2. 2s 3. 3s 4. 0

PAGES 1-32

1. An oscillator whose frequency is changed by a variable dc voltage is known as

3. A VCO

2. _____ target angle is the most common angle of the rotating anode in x-ray machine.

1. 12 degrees

3. ---------- analyzer has the advantage of being programmed to perform only those tests which are requested

4. discrete sample

4. Another name for a unity gain amplifier is:

4. voltage follower

5. Fundamental interval of platinum is

3. 100 degrees celsius (VERIFY)

6. In which of the following method, we approximate the curve of solution by the tangent in each interval.

1. Eulers method

7. In which procedure, the needle-point electrodes are stuck into the tissue and kept steady?

1. Dessication

8. Lap choly refers to removal of _____

2. gall bladder

9. Maternal ECG and Fetal ECG can be separated using

3. adaptive noise canceller

10. The ends of a load line drawn on a family of curves determine:

2. saturation and cutoff

11. To operate properly, a transistor's base-emitter junction must be forward biased with reverse bias applied to which junction?

4. collector base

12. Which amplifier uses a minimum number of components and is cost-effective?

3. optically isolated

13. Which of these is an NTC device

4. thermistor

14. Which of these is not a type of capacitive transducer:

3. variable thickness

15. -------- number of starting values required for Adam's method

3. 3 (VERIFY)

16. ---------- states that the concentration of a solute is proportional to the absorbance

3. Beer-Lambert law

17. A switch-tail ring counter is made by using a single D flip-flop. The resulting circuit is a

3. T flip flop

18. The transformation which maps the angular domain 0<amp(z)< ?? /4 of the z-plane onto the upper half of the w- plane is:

2. w=z^4

19. In a resistive potentiometer, the non-linearity

3. Decreases with increase of load to potentiometer resistance (Rm/Rp)

20. In a C-E configuration, an emitter resistor is used for:

4. stabilization

21. A variable air gap type capacitor consists of two parallel plates; a fixed plate and a moving plate at a distance x. If a potential V is applied across the two plates, the force of attraction between the plates is related to x as

1. F is proportional to 1/x

22. If a certain zener diode has a zener voltage of 3.6V, it operates in

2. zener breakdown

23. A linear thermocouple with a sensitivity of 0.04 mV/°C and resistance of 100 O is connected to a load with a resistance of 1 kO. Find the voltage across the load for a temperature of 250 °C

3. 9.09V

24. A potentiometer displacement sensor has a supply voltage of 15V and a resistance of 50KO. The fractional displacement of the wiper is 0.3. The thévenin voltage of the circuit is:

2. 4.5V

25. If IC is 50 times larger than IB, then ßdc is

1. 50

26. An ideal or unloaded potentiometer used as a displacement transducer has a stroke of 100 mm and its resistance over this length is 1000 ?. The overall sensitivity of the transducer is 0.1V/mm. Power dissipated by the coil is

1. 0.1 W (VERIFY)

27. An npn transistor (with C=0.3 pF) has a unity gain cut-off frequency fT of 400 MHz at a dc bias current IC=1 mA. The value of its Cμ is approximately (VT=26 mV)

1. 15 pF

28. 1024 x 1024 image has resolution of

3. 1048576

29. 1101, 1001 and 111001 correspond to the 2's compliment representation of which one the following sets of number

4. -7, -7 and -7

30. 2's compliment representation of 16-bit number (1 sign bit and 15 magnitude bits) if FFFF. Its magnitude in decimal representation is

1. 1

31. 4-bit 2's compliment representation of a decimal number 1000. The number is

1. -8

32. At what kind of operating frequency diffusion or transition is a capacitor represented in parallel with the ideal diode?

4. Very high frequency

33. The diffused impurities with _____ valence electrons are called donor atoms.

3. 5

34. _____ is a reference electrode

3.Hydrogen electrode /4.Calomel electrode

35. _____ signal will become zero when the feedback signal and reference signals are equal.

3. Actuating

36. _____ is a recursive filter

3. RLS filter

37. _____ are also called Wiener Filter

1. LMS filter

38. _____ can be extended to systems which are timevarying?

2. State model representatives

39. _____ is not a final control element.

2. potentiometer

40. _____ directly converts temperature into voltage.

3. thermocouple

41. _____ increases the steady state accuracy.

2. integrator

42. _____ gas is commonly used for insufflating the abdominal cavity for laparoscopy.

2. Carbon dioxide

43. _____ has tendency to oscillate.

2. closed loop system

44. _____is the reference input minus the primary feedback.

1. actuating signal

45. _____ of infrared gas analyzer allows the energy to pass alternately through the reference and sample tubes.

1. coaxial chopper

46. _____ is a closed loop system.

4. Autopilot for an aircraft

47. _____ technique is not applicable to nonlinear system?

2. nyquist criterion

48. _____ is insensitive to turbulent flow of gases

4. Fleish type pneumotachometer (VERIFY)

49. _____is a part of the human temperature control system.

4. Perspiration system

50. _____algorithm make use of translational table

1. Huffman

51. A 2-bit binary multiplier can be implemented using

1. 2-input NORs and 1 XNOR gate only

52. A 3-digit voltmeter having a resolution of 100 mV can be used to measure a maximum of

4. 100 V

53. A 4-bit modulo- 16 ripple counter uses J-K flip flops. If the propagation delay of each FF is 50ns, the maximum clock frequency that can be used is equal to

2. 5 MHz

54. A breath that has a greater volume than the preset VT

4. sigh

55.A bulb in a staircase has two switches, one switch being at the ground floor and the other one at the first floor. The bulb can be turned ON and also can be turned OFF by any one of the switches irrespective of the state of the other switch. The logic of switching of the bulb resembles

4. XOR gate

56. A capacitance transducer has two plates each of area 5 mm2. The coil gap is 2 mm. Displacement sensitivity due to change in gap length is

1. 11.1 pF/cm

57. A capacitive transducer using two quartz diaphragms of area 800 mm2 and separated by a distance of 4 mm has a capacitance of 350 μF. When a pressure of 1MN/m2 is applied to one of the diaphragms, a deflection of 0.75 mm is produced. The change in capacitance of the system is

4. 80.7 μF

58. A wheatstone bridge has R3=R4=100?, galvanometer resistance of 50 ?, strain gauge R1=120?. The value of R2 is adjusted for zero strain of gauge factor equals 2. Battery voltage is 4V. For a strain of 400 microstrain, galvanometer current will be

??????????????????

59. Q1 on page 1

??????????????????????????

60. Q2 on page 1

??????????????????????

61. A car covers a distance of 5 km in 5 mins, its average speed is equal to

4. 60 km/h

62. A car is running at a constant speed of 50 km/hr, which of the following is the feedback element for the driver?

3. Needle of the speedometer

63. A causal and stable I I R filter has

4. no linear phase

64. A certain noninverting amplifier has Ri of 1 kO and Rf of 100 kO. The closed-loop voltage gain is ……

2. 101

65. A certain op-amp has bias currents of 50μA and 49.3μA. The input bias current is

1. 700 nA

66. A certain op-amp has bias currents of 50μA and 49.3μA. The input bias current is

1. 700 nA

67. A change in the value of the emitter resistance Re in a differential amplifier

4. does not affect either Ad and Ac

68. A class-A transformer coupled, transistor power amplifier is required to deliver a power output of 10 watts. The maximum power rating of the transistor should not be less than

1. 20 W

69. A closed loop system is distinguished from open loop system by which of the following?

2. Feedback

70. A collector characteristic curve is a graph showing:

2. collector current (IC) versus collector-emitter voltage (VCE) with (VBB) base bias voltage held constant

71. A commercial use of Image Subtraction is _____.

4. Mask mode radiography

72. A conditionally stable system exhibits poor stability at _____.

3. reduced values of open loop gain

73. A continuous image is digitised at _____ points.

3. sampling

74. A control system in which the control action is somehow dependent on the output is known as

1. Closed loop system

75. A control system with excessive noise, is likely to suffer from

2. saturation in amplifying stages

76. A control system working under unknown random actions is called

4. stochastic control system

77. A data reduction algorithm must also represent the data with acceptable

2. fidelity

78. A data signal having frequency components from dc to 50 Hz is to be sent through pulse code modulation using an 8 digit code. The minimum carrier channel bandwidth is

4. 4kHz

79. A desired frequency response has its _____ which is the desired unit pulse sequence

2. IDTFT

80. A differential amplifier has a differential gain of 20,000. CMRR = 80 dB. The common mode gain is given by

2. 2

81. A differential amplifier is invariably used in the input stage of all OPAMP's. This is done basically to provide the OPAMP's with a very high

4. slew rate

82. A differentiator is usually not a part of a control system because it _____

3. increases input noise

83. A digital voltmeter can count from 0 to 9999. If full scale reading is 9.999 V, the resolution of full scale reading is

4. 1 mV

84. A digital voltmeter has a read out range from 0 to 999 counts. If the full scale reading is 9.999 V, the resolution is

3. 1 mV

85. A girl with a mass of 40 kg wears heels with an area of 1 cm2 in contact with ground, pressure on ground is (take earth's gravitational field strength)

1. 4 x 10^5

86. A glucose measurement in whole blood is _____ the glucose levels in plasma

2. lower than

87. A good control system has all the following features except

4. slow response

88. A half-cycle average voltage of 12 V is equal to what rms voltage?

4. 13.33 V

89. A half-wave rectifier has an input voltage of 240 V r.m.s. If the step-down transformer has a turns ratio of 8:1, what is the peak load voltage? Ignore diode drop

2. 42.5 V

90. A JFET is set up as source follower. Given, μ=200, rd=100 k and source load resistance RL=1k. The output resistance R0 is approximated by

??????????????????????

91. A land line telemetry system is suitable for distance upto

3. About 1 km only

92. A linear displacement digital transducer generally uses

4. Gray code

93. A maximally flat frequency response is known as

3. Butterworth

94. A moving coil instrument has a resistance of 0.5 O and a full scale deflection of 0.1 A. To convert it into an ammeter of 0-10 A the shunt resistance should be

1. 0.005 O

95. A new Binary Coded Pentary (BCP) number system is proposed in which every digit of a base-5 number is represented by its corresponding 3-bit binary code. For example, the base-5 number 24 will be represented by its BCP code 010100. In this numbering system, the BCP code 100010011001 corresponds to the following number in base-5 system

3. 4231

96. A no-load condition means that

2. Both (a) and (c)

97. A noninverting closed-loop op-amp circuit generally has a gain factor

4. greater than one

98. A phase lag lead network introduces in the output _____.

4. lag at low frequencies and lead at high frequencies

99. A phase shifting transformer is used in conjunction with

1. Dryscale potentiometer

100. A piezoelectric crystal transducer of 0.5cm2 area and 1mm thickness is connected to a charge amplifier having a charge sensitivity (d)=2pC/N. The crystal is subjected to a sinusoidal force of 30x10-3sin150t N. Find out the peak to peak voltage of the crystal.

1. 0.5V

101. A piezoelectric type accelerator has a sensitivity of 100 mV/g. The transducer is subjected to a constant acceleration of 5g. The steady state output of the transducer is

1. 0.5V

102. A potentiometer has a supply voltage of 10 V, a resistance of 10 kOhm and a length of 10 cm. A recorder of resistance 10 kOhm is connected across the potentiometer. The recorder voltage for each of the wiper displacement of 2 cm is:

1. 1.72V

103. A predictor formula is used to predict the value of y at

1. x

104. A quartz piezo-electric type pressure sensor has a built in charge amplifier. The sensor has a sensitivity of 1 μV/Pa. It is subjected to a constant pressure of 120 kPa. The output of the transducer at steady state is

3. 0 mV

105. A rectifier voltmeter using bridge rectifier and PMMC meter is calibrated to read rms value of sine wave. A triangular wave is applied to it and it reads 6.82 V. The rms value of triangular wave is

1. About 7.1 V

106. A resistance is measured by voltmeter-ammeter method. The voltmeter is 0-250V, ± 1% accuracy and ammeter is 0-5 A, ± 1 % accuracy. The readings of voltmeter and ammeter are 100 V and 2 A respectively. The error in the measured resistance can be

3. ± 5%

107. A resistance potentiometer has a total resistance of 10000? and is rated 4W. If the range of potentiometer is 0 to 100 mm, then its sensitivity in V/mm is

1. 2

108. A ring oscillator consist of 5 inverters running at a frequency of 1.OMhz. The propagation delay per gate is _____ns

1. 100

109. A signal may have frequency components which lie in the range of 0.001 Hz to 10 Hz. Which one of the following types of coupling should be chosen in a multistage amplifier designed to amplify this signal?

4. Direct coupling

110. A signal other than the reference input that tends to affect the value of controlled variable is known as _____.

4. disturbance

111. A signed integer has been stored in a byte using the 2's compliment format. We wish to store the same integer in 16 bit word. We should

4. copy the original byte to the less significant byte of the word and make each bit of the more significant byte equal to the most significant bit of the original byte

112. A single element strain gauge bridge has two fixed resistances R1 and R1 of 120 O each and a variable resistance which gives full deflection at 120 O for zero strain and 120.6 O for strain. If gauge factor is 2, strain is

4. 0.0025

113. A sinusoidal ac voltage of amplitude 100 V is applied to a rectifying device which offers 10 O resistance in forward direction and infinite resistance in backward direction. A moving coil ammeter is also connected in the circuit. The reading of ammeter will be

3. 3.185 A

114. A sinusoidal signal is measured by CRO. The scale is set at 4 mV/cm. If vertical distance between positive and negative peaks is 6 cm, the peak value of ac signal is

4. 12 mV

115. A strain gauge has a nominal resistance of 600 ? and a gauge factor of 2.5. The strain gauge is connected in a DC bridge with three other resistances of 600 ? each. The bridge is excited by a 4V battery. If the strain gauge is subjected to a strain of 100 mm/m, the magnitude of the bridge output will be

4. 250μV

116. A tank initially holds 100 gallons of salt solution in which 50 lbs of salt has been dissolved. A pipe fills the tank with brine at the rate of 3 gpm, containing 2 lbs of dissolved salt per gallon. Assuming that the mixture is kept uniform by stirring, a drain pipe draws out of the tank the mixture at 2 gpm. Find the amount of salt in the tank at the end of 30 minutes.

4. 171.24 lbs

117. A thermistor has a resistance of 10K? at 25oC and 1K? at 1000C. The range of operation is 0 degrees to 150 degrees Celsius. The excitation voltage is 5V and a series resistor of 1kW is connected to the thermistor. The power dissipated in the thermistor is

2. 4.7 mW

118. A thermometer at room temperature 300C is dipped suddenly into a bath of boiling water of 1000C. It takes 30 seconds to reach 96.50C. The time required to reach a temperature of 980C is

3. 34.6 s

119. A third-order filter will have a roll-off rate of

2. –60 dB/decade

120. A transformer is plugged into a 120 V rms source and has a primary current of 300 mA rms. The secondary is providing 18 V across a 10K ohm load. What is the efficiency of the transformer?

1. 90%

121. A variable reluctance tachogenerator consists of a ferromagnetic wheel with 22 teeth and rotating close to a bar magnet and coil. If the wheel is rotating at 6000 rpm what is the frequency of the a.c. voltage induced in the coil.

4. 2200Hz (VERIFY)

122. A variable reluctance type proximity inductance transducer has an inductance of 3 mH. When the target made of ferromagnetic material is 1 mm away, then calculate the value of inductance when a displacement of 0.05 mm is applied to the target in a direction opposite to the core.

1. 3.14 mH (VERIFY)

123. A variable reluctance type tachometer has number of teeth on rotor as 60. The counter records 3600 counts per second. Determine the speed in rpm.

3. 3600rpm

124. A vibrating level sensor consists of

3. Two piezoelectric oscillators

125. A Weston frequency meter is

4. Moving iron instrument

126. A zener diode is used as ……..

3. a voltage regulator

127. A zero order system is the one in which output changes instantaneously as the input changes. The example of zero order system is

1. Potentiometer

128. A.C. servomotor is basically a

3. two phase induction motor

129. A.C. servomotor resembles

2. two phase induction motor

130. Accelerometer is a

3. Second order instrument

131. According to Newton's law of cooling, the rate at which a substance cools in air is directly proportional to the difference between the temperatures of the substance and that of air. If the temperature of the air is 30° and the substance cools from 100° to 70° in 15 minutes, how long will it take to cool 100° to 50°?According to Newton's law of cooling, the rate at which a substance cools in air is directly proportional to the difference between the temperatures of the substance and that of air. If the temperature of the air is 30° and the substance cools from 100° to 70° in 15 minutes, how long will it take to cool 100° to 50°?

1. 33. 59 min

132. Addition of zeros in transfer function causes which of the following?

4. Lag compensation

133. After the filter adapts itself, the output of the system y(n) is the estimate of _____

1. Desired signal

134. Air cored inductive transducers are suitable for use at

4. At higher frequencies

135. All pH measurements are made with a

4. Glass electrode

136. Among the digital IC- families ECL, TTL and CMOS

3. ECL has the least propagation delay

137. An amplifier can give which of the following characteristics?

2. Constant current, constant voltage and constant power

138. An amplifier has an open loop gain of 100, an input impedance of 1 kOhm, and an output impedance of 100 Ohm, and an output impedance of 100 Ohm. A feedback network with a feedback factor of 0.99 is connected in a voltage series feedback mode. The new input and output impedance are

3. 100 kOhm and 1 Ohm

139. An amplifier receives 0.1 W of input signal and delivers 15 W of signal power. What is the power gain in dB?

3. 8 dB

140. An amplifier with mid-band gain |A| = 500 has negative feedback |b| = 1/100. If the upper cut-off without feedback were at 60 Hz, then with feedback it would become

1. 360 kHz

141. An automatic toaster is a _____ loop control system.

3. open

142. An average amplifier has 5 inputs. The ratio of Rf / Ri must be

3. 0.2

143. An electronic watch has a clock of 32 kHz. To divide this frequency down to 1 Hz, it is necessary to have

2. Three decade counters, one four-bit binary counter and a T flip-flop

144. An equivalent 2's compliment representation of the 2's compliment number 1101

3. 111101

145. An image is a two dimensional function where x and y are

3. spatial coordinates

146. An increase in gain, in most systems, leads to _____.

3. smaller damping ratio

147. An LVDT is supplied with a sinusoidal voltage of amplitude 5V and frequency 1 KHz. The output is connected to an AC voltmeter. The reading of the voltmeter is 1V for a displacement of 1mm from the null position. What is the reading of the voltmeter when the displacement is 1mm in the opposite direction from the null position?

3. 1V

148. An N type semiconductor strain gauge has a nominal resistance of 1000 ? and gage factor of -100. The resistance of the gage when a compressive strain of 100μm/m is

1.1010 ?

149. An n-channel JFET having a pinch-off voltage (Vp) of -5 V shows a transconductance (gm) of 1 mA/V, when the applied gate-to-source voltage (VGS) is -3 V. Its maximum transconductance (in mA/V) will be

??????????????????????????????

150. An object falls from rest in a medium offering a resistance. The velocity of the object before the object reaches the ground is given by the differential equation dV / dt + V / 10 = 32, ft/sec. What is the velocity of the object one second after if falls?

2. 30.45 ft/sec

151. An op-amp clamper circuit is also referred as

4. DC inserter

152. An OPAMP has a slew rate of 5 V/μs. The largest sine wave output voltage possible at a frequency of 1 MHz is

1. 5/2p V

153. An R-S latch is

??????????????????????????

154. Any externally introduced signal affecting the controlled output is called a

1. stimulus

155. As a result of introduction of negative feedback which of the following will not decrease?

1. bandwidth

156. As soon as a new value of a variable is found by iteration, it is used immediately in the following equation, this method is called.

2. Gauss-Seidel Method

157. As the temperature is increased, the voltage across a diode carrying a diode carrying a constant current

1. increases

158. At resonance, the term bandwidth includes all frequencies that allow what percentage of maximum current to flow?

2. 70.7

159. At what pressure is the oxygen maintained at E tanks?

4. 2200PSI

160. Average acceleration of body during time interval 't' is given by slope of its

2. Velocity-time graph

161. Average angular velocity of body rotating at angle of 30° during time interval 5 seconds will be

4. 6 rad/s

162. AZTEC post processing needs _____ filter to remove its jagged appearance

1. Low pass filter

163. AZTEC reconstruction process produces an ECG signal with _____ quantization

2. Step

164. Base line drift in ECG

3. high pass filter

165. By applying the finite difference method, find y (0.5) from y"+y+1=0 with Y(0)=y(1)=0 taking h=0.5.

3. 0.14031 (VERIFY)

166. By applying the fourth order Runge – Kutta method find y(1.1) from y'=y2+xy, y(1)=1 taking h = 0.1.

4. 1.24149

167. By which of the following the control action is determined when a man walks along a path?

1. eyes

168. By which of the following, the system response can be tested better?

1. Unit impulse input signal

169. Calculate the power dissipation of a silicon diode having ID = 40 mA.

2. 28 mW

170. Changing overall sensitivity of image is called

1. brightness adaption

171. Chromatographic analyser is used to measure the_____

4. Amount of individual gases in a sample

172. Class AB operation is often used in power (large signal) amplifiers in order to

1. remove even harmonics

173. Clustering can be done using

2. VQ (VERIFY)

174. Compresses image can be recovered back by

3. Image decompression

175. Compressions are formed where air pressure is

4.Higher than the atmospheric pressure

176. Computation of derivatives in segmentation is also called

4. spatial filtering

177. Consider a 1cm thick specimen in which the acoustic power emerging is one half of that entering. Determine the attenuation coefficient of the medium

4. -3.01dB/cm

178. Consider the Boolean function F(w,x,y,z) = w y + x y + w' x y z + w' x' y + x z + x' y' z'. Which one of the following is the complete set of essential prime implicants?

1. y, x z, x' z'

179. DCT converts an image or audio block into its equivalent

3. frequency coefficients

180. Decimal 43 in Hexadecimal and BCD number system is respectively

3. 2B, 01000011

181. Decoder is used for

1. image decompression

182. Decorrelate property significant for
??????????????????????????????DCT

183. Determine the differential equation of the family of circles with center on the y-axis.

1. xy" – (y')^3 – y' = 0

184. Determine the differential equation of the family of lines passing through (h, k).

1. (y – k) dx – (x – h) dy = 0

185. Determine the nominal voltage for the Zener diode at a temperature of 120° C if the nominal voltage is 5.1 volts at 25° C and the temperature coefficient is 0.05%/° C.

2. 5.34 V

186. Determine the wavelength of ultrasound travelling in water with a velocity of 1480m/s and a frequency of 1MHz

1. 1.48

187. Digital camera and DVD players make use of
4. FFT (VERIFY)

188. Digital video is sequence of
1. frames

189. Digitizing image intensity amplitude is called
4. quantization

190. Dipsticks are used for the
1. Level measurement

191. Double (Repeated) root of 4x3- 8x2- 3x + 9 = 0 by Newton-Raphson method is
3. 1.5

192. DPI stands for
3. dots per inches

193. Due to which of the following reasons excessive bandwidth in control systems should be avoided?
3. Noise is proportional to bandwidth

194. Dynamic range of imaging system is a ratio where the upper limit is determined by
4. Saturation

195. EEG pattern in REM sleep is:
3. High amplitude, rapid waves

196. EMG and EEG recorders use _____ amplifiers
2. Ac coupled

197. Encoder is used for
4. image compression

198. Even after Reset operation, which of the following interrupt remains enabled?
1. TRAP

199. Example of discontinuity approach in image segmentation is
2. boundary based segmentation / 3. edge based segmentation

200. Example of similarity approach in image segmentation is
4. region based segmentation

201. Failure of heat sink in an ECG apparatus may lead to _____ noise
1. High frequency

202. Filters used to reject the 50Hz noise picked up from power lines are
called 4.Notch Filters

203. Find the determinant of the matrix with eigenvalues 1, -2, 3 and 0.
3. 0

204. Find the differential equation whose general solution is y = C1x + C2ex.
3. (x - 1) y" - xy' + y = 0

205.Find the differential equations of the family of lines passing through the origin.
2. x dy – y dx = 0

206. Find the equation of the curve at every point of which the tangent line has a slope of 2x
2. y = x^2 + C

207. Find the equation of the family of orthogonal trajectories of the system of parabolas y^2 = 2x + C.
4. y = Ce^-x

208. Find the general solution of y' = y sec x
3. y = C (sec x + tan x)

209. Find the value of the resistor, where the colours of a, b and c are red, red and violet.
2. 220000000

210. Find the value of the resistor, where the colours of a, b and c are violet, orange and black
3. 73

211. Find the value of the resistor, where the colours of a, b and c are white, grey and red.
2. 9800

212. Find the value of the resistor, where the colours of a, b and c are yellow, grey and blue
2. 48000000

213. First Order Runge Kutta method is
2. Euler's Method

214. For a 10-bit A/D converters, the quantization error is (in %)
4. 0.1

215. For a 5-bit ladder D-A converter, the output voltage for a digital input of 11010 is (assume the minimum and maximum power supplies used are 0V and 10 V)

1. 8.125

216. For a class B amplifier providing a 20 V peak signal to 16 Ω load and a power supply of Vcc=30 V, the efficiency (%) will be

1. 52.3

217. For a copper constantan (Type T) thermocouple, the junction E(in μV) at θ0C is given by: E= 38.74θ + 3.3X10-2θ2 + 2.07X10-4θ3 - 2.2X10-6θ4 + higher order terms, assuming the cold junction compensation. Find the sensitivity of the thermocouple at 100oC.

1. 42.75 μV/0C

218. For an n-variable Boolean function, the maximum number of prime implicants is

1. 2^n

219.For an open loop control system which of the following statements is incorrect?

3. Recalibration is not required for maintaining the required quality of the output

220. For measuring air flow, _____ is used

1. Vane type anemometer

221.For the efficient usage of adaptive filters

3. The desired signal should be correlated with the reference signal

222. Frequency of sleep spindles:

3. 10 to 14 Hz

223. From the following which one gives the more accurate value

1. RK method

224. From which of the following transfer function can be obtained?

4. Signal flow graph

225. Functions that combines to produce f(x,y)

4. illumination and reflectance

226. Gain of instrumentation amplifier is calculated using_____

3.1+ (2R/Rg)

227. Gauss-Seidel iteration method converges only if the Coefficient matrix is

1. Diagonally dominant

228. Given two numbers A and B in sign magnitude representation in an eight bit format A = 00011110 B = 10011100. The corresponding decimal numbers are

1. 30 and -100

229. Gray code representation of decimal 6 is

WRONG QUESTION

230. Harmonic distortion analyser

4. Measures RMS value of all harmonics except fundamental frequency

231. High frequency response of doppler ultrasonic blood flowmeter results in

4. Non-linearity into the i/p o/p calibration curve

232. High pass filters are used for image

2. sharpening

233. Hilbert transformer is also called as

1. Special type of FIR filters

234. Histogram Equalisation is mainly used for _____.

3. Contrast adjustment

235. Histogram equalization make image intensity changes

1. visible

236. Histogram equalization refers to image

3. normalization

237. How do you scale the gain of a FIR filter?

2. Multiply all coefficients by scale factor

238. How many electrodes are present in 10/20 electrode placement system of EEG machine?

2. 21

239. How much current will flow in a 100 Hz series RLC circuit if VS = 20 V, RT = 66 ohms, and XT = 47 ohms?

4. 247mA

240. Hydraulic torque transmission system is analog of _____

1. motor generator set

241. Hysteresis error in Bourdon tube can be minimized by

1. Using it well within the designed pressure range

242. I I R digital filters are of the following nature

1. Recursive

243. Ideally, a dc load line is a straight line drawn on the collector characteristic curves between

4. VCE(cutoff) and IC(sat)

244. IDSS can be defined as

3.the maximum possible current with VGS held at 0 V

245. If $\Delta f(x) = f(x+h) - f(x)$, then a constant k, Δk equals

2. 0

246. If f(x,y)=2x-3x2+ky2 is a harmonic function, then the value of k is:

3. 3

247. If f(z)=u+iv is an analytic function with u=x2-y2+y, then the Re[f'(z)] is:

3. 2x

248. If y1 = ex, y2 = xex are solutions of homogeneous 2nd order differential equation, then the Wronskian is

4. e2x

249. If 25 g of a liquid occupies 20 cm3 in a measuring cylinder, what is the density of the liquid?

1. 1.25 g cm-3

250. If 40 C of charge flow past a point in 20 s, what is the current?

1. 2 A

251. If 60 J of energy are available for every 15 C of charge, what is the voltage?

4. 4 V

252. If a 1 KΩ and a 2 KΩ resistor are parallel-connected across a 12 V supply, how much current is received by the 2 KΩ resistor?

2. 6mA

253. If a balloon is equipped with temperature and altitude measuring instruments, then the order of the temperature measuring and altitude measuring instruments are

3. First order, zero order

254. If a certain op-amp has a closed-loop gain of 20 and an upper critical frequency of 10 MHz, the gain-bandwidth product is

1. answers (a) and (c)

255. If a certain zener diode has a zener voltage of 65 V, it operates in
????????????????

256. If a step function is applied to the input of a system and the output remains below a certain level for all the time, the system is _____.
1. not necessarily stable

257. If a three-stage amplifier has individual stage gains of 10 db, 5 db and 12 db, then total gain in db is …….
4. 27 dB

258. If an amplifier with gain of -1000 and feedback of b = -0.1 had a gain change of 20% due to temperature, the change in gain of the feedback amplifier would be
??????????????????????????????

259. If dy = x2 dx; what is the equation of y in terms of x if the curve passes through (1, 1).
3. x3 – 3y + 2 = 0

260. If inner region of object is textured then approach we use is
1. similarity

261. If one diodes in bridge full-wave rectifier opens, the output is
1. a half-wave rectified voltage

262. If only even powers of x occur in the equationof a curve, then the curve is symmetrical about
2. y-axis

263. If pixels are reconstructed without error mapping is said to be
4. Reversible

264. If T is the clock period, a n-stage register results in a delay of
??????????????????

265. If the base-emitter junction is open, the collector voltage is
2. Vcc

266. If the function f(z)=x-2ay+i(bx-cy) is an analytic function, then:
1. b=2a

267. If the gain of the critical damped system is increased it will behave as _____.
1. oscillatory

268. If the nominal interest rate is 3%, how much is P5, 000 worth in 10 years in a continuous compounded account?

2. P6,750

269. If the power level of an amplifier reduces to half, the dB gain will fall by …….

1. 3 dB

270. If the spirometer is used for time-dependant parameters, then it must have a flat frequency response of upto .

3. 12 Hz

271. If the velocities of ultrasound in soft tissue and bone are 1500 and 1400m/s, respectively, the critical angle of incidence is given by

4. 22 deg (VERIFY)

272. If two parallel-connected resistors dissipate 6 watts and 10 watts of power, then what is the total power loss?

2. 16 Watts

273. If VCC = +18 V, voltage-divider resistor R1 is 4.7 kilo ohms, and R2 is 1500 ohms, what is the base bias voltage?

1. 4.35 V

274. If y1=cos2x, y2=sin2x are solutions of homogeneous differential equation of 2nd order then, the Wronskian is

3. 2

275. If α = 0.98, ICO = 6 μA, and Iβ = 100 μA for a transistor, then the value of IC will be

4. 5.2 mA

276. Image having gradient pixels is called

1. gradient image

277. Image linear interpolation is given by formula

3. v(x,y) = ax+by+cxy+d

278. Image processing approaches operating directly on pixels of input image work directly in _____.

3. Spatial domain

279. Images quantised with insufficient brightness levels will lead to the occurrence of _____

1. False Contours

280. Improper fixation of electrodes during the ECG acquisition leads to _____ noise
2. low frequency

281. In 3 phase power measurement by two wattmeter method, the reading of one wattmeter is zero. The power factor of load is
4. 0.5

282. In _____ image we notice that the components of histogram are concentrated on the low side on intensity scale.
2. dark

283. In a certain voltage-divider biased npn transistor, VB is 2.95 V. The dc emitter voltage is
4. 2.25 V

284. In a common emitter amplifier, the unbypassed emitter resistance provides
4. voltage-shunt feedback

285. In a control system integral error compensation _____ steady state error.
1. minimizes

286. In a control system the output of the controller is given to
1. final control element

287. In a megger the controlling torque is provided by
3. Coil

288. In a parallel RLC circuit, which value may always be used as a vector eference?
3. Voltage

289. In a platinum resistance thermometer which is used to measure temperature, if the resistance temperature coefficient of platinum is 0.00392/0C, then its sensitivity at room temperature will be
3. 0.00392 Ω/0C (VERIFY)

290. In a resistance thermometer, a metal wire shows a resistance of 500 Ω at ice point and 550 Ω at steam point, calculate temperature that corresponds to resistance of 535 Ω.
2. 70 °C

291. In a sequential circuit, the output depends on
4. present states and past inputs

292. In a single phase power factor meter the phase difference between currents in the two pressure coils is

4. Exactly 90°

293. In a stable control system backlash can cause which of the following?

1. Low level oscillations

294. In a stable control system saturation can cause which of the following?

2. Conditional stability

295. In a system low friction coefficient facilitates _____

4. reduced velocity lag error

296. In a tank are 100 liters of brine containing 50 kg. total of dissolved salt. Pure water is allowed to run into the tank at the rate of 3 liters a minute. Brine runs out of the tank at the rate of 2 liters a minute. The instantaneous concentration in the tank is kept uniform by stirring. How much salt is in the tank at the end of one hour?

1. 19.53 kg

297. In a thermocouple two metal junctions between metals M1 and M2 are kept at temperature T1 and T2. The thermocouple emf is produced because

2. M1, M2 are similar but T1, T2 are unequal

298. In a vibrating reed frequency meter the natural frequency of two adjacent reeds have a difference of

3. 0.5 Hz

299. In an Anderson bridge the unknown inductance is measured in terms of

3. Known capacitance and resistance

300. In an automatic control system which of the following elements is not used?

4. Oscillator

301. In an electrical pneumatic system analogy the current is considered analogous to

3. air flow rate

302. In an FET as VGS is changed from zero to increasing reverse bias, the value of gm

3. decreased

303. In an open loop control system

3. Output is independent of control input

304. In an open loop system

1. the control action is independent of the output

305. In analytical instruments, ---------- has higher sensitivity but more susceptible to interfering reactions with other substances.

2. GOD (VERIFY)

306. In both induction and synchronous ac motors

3. the stator magnetic field rotates

307. In case of type1 system steady state acceleration is _____.

1. infinity

308. In class A direct coupled (series fed) power amplifier, maximum dissipation capacity of the transistor is 2.5 watt. When delivering maximum ac power, the dc power in the load is

??????????????????

309. In closed loop control system, with positive value of feedback gain, the overall gain of the system

2. increases

310. In forcevoltage analogy, velocity is analogous to

2. current

311. In household energy meters the flux of series magnet is in phase with current but the flux of shunt magnet lags the voltage by 88°. The reading of energy meters

2. Will have a negative error

312. In I I R digital filter the present output depends on

3. Present Input, Previous input and output

313. In iterative method we get

3. Approximate solution

314. In liquid level and electrical system analogy, voltage is considered analogous to

3. head

315. In low power factor wattmeter, the compensating coil is connected

2. In series with pressure coil

316. In microwave diathermy, the conduction in the triode takes place during _____ phase of the cycle

4. Positive

317. In order for an output to swing above and below a zero reference, the op-amp circuit requires

2. a negative and positive supply

318. In order to increase the damping of a badly underdamped system which of following compensators may be used?

3. Phase lead

319. In pneumatic control systems the control valve used as final control element converts _____.

2. pressure signal to position change

320. In practical applications, battery voltage:

4. is lowered as the load increases

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The phase lag produced by transportation relays

1. decreases linearly with frequency
2. is inversely proportional to frequency
3. is independent of frequency
4. **increases linearly with frequency**

The population of a country doubles in 50 years. How many years will it be five times as much? Assume that the rate of increase is proportional to the number inhabitants.

1. 100 years
2. **116 years**
3. 120 years
4. 98 years

The position and velocity errors of a type2 system are _____ and _____ respectively.

. constant, constant
2. zero, constant
3. constant, infinity
4. **zero, zero (according to books if we take type 0,1,2 systems)**

The power of He-Ne laser utilized in laser Doppler blood flowmeter is

1. 50MW
2. 500mW
3. **5mW**
4. 50mW

The present output Qn of an edge triggered JK flip-flop is logic 0. If J=1, then Qn+1

1. will be logic 0
2. **will be logic 1**
3. will race around
4. cannot be determined

The primary and secondary of an LVDT are connected to 3 kHz sinusoidal source and ideal semiconductor diode bridge based phase sensitive demodulator circuit. The core of the LVDT remains static at 15mm above the ideal null position. The frequency of the voltage observed at the input of the low pass filter is

1. 1 kHz
2. **3 kHz**
3. 6 kHz
4. 1.5 kHz

The process of calculating the derivative of a function at some particular value of the independent variable by means of a set of given values of that function is

1. Numerical Value
2. Numerical integration
3. Quadrature
4. Numerical differentiation

The proportioning pumps of a dialysis machine delivers concentrate and water in the ratio of

1. 3.5:1
2. **1:35**
3. 1:3.5

4.35:1

The purpose of compensation for a thermocouple is 1.Used for high-temperature circuits

2.**To cancel unwanted voltage output of a thermocouple**

3.To increase voltage output

4.To decrease temperature sensitivity

The range of a signed decimal numbers that can be represented by 6-bit 1's compliment number is

1. -32 to +31
2. -63 to +63
3. **-31 to +31**
4. -64 to +63

The reconstruction process of Huffman coding recovers the _____ original data

1. **Perfectly**
2. Partially
3. Fully
4. Half

The resistance of a 125 Ω strain gauge changes by 1 ohm for 4000 micro strain. The gauge factor is

1. 2.5 2. 3
3. **2** 4. 1.5

The resolution of a 4-bit counting ADC is 0.5V. For an analog input of 6.6V, the digital output of the ADC will be

1. 1101 2. **1110**
3. 1011 4. 1100

The root of x3 - 2x - 5 = 0 correct to three decimal places by using Newton-Raphson method is

1. **2.0946** 2. 1.0404
3. 0.7011 4. 1.7321

The second derivative input signals modify which of the following?

1. The time constant of the system
2. Damping of the system
3. **The time constant and suppress the oscillations**
4. The gain of the system

The similarity between the Fourier transform and the z transform is that

1. Both convert analog signal to digital signal
2. **Both convert discrete time domain to frequency spectrum domain**
3. Both convert frequency spectrum domain to discr te time domain
4. Both convert digital signal to analog signal

The smallest change which can be measured by the transducer of the range of 0 to 150 N force and resolution of 0.1% of full scale is

1. 0.35 N 2. 0.3 N
3 .0.1N 4. **0.15 N**

The smallest discernible change in intensity level is called _____ Intensity

1. **Resolution**
2. Contrast
3. Saturation
4. Contour

The solubility constant of oxygen at 760mmHg is

1. 0.567
2. 0.0345
3. 0.0123
4. 0.0239

The speech signal is obtained after

1. **Digital to analog conversion**
2. Analog to digital conversion
3. Modulation
4. Quantization

The subtraction of a binary number Y from another binary number X, done by adding 2's compliment of Y to X results in a binary number without overflow. This implies that the result is

1. negative and is in normal form
2. positive and is in normal form
3. positive and is in 2's compliment from
4. **negative and is in 2's compliment from**

The temperature, under thermal and electrical system analogy, is considered analogous to

1. capacitance
2. charge
3. current
4. **voltage**

The term backlash is associated with_____

1. servomotors
2. thermistors
3. induction relays
4. **gear trains**

The threshold voltage of an n-channel MOSFET can be increased by

1. reducing the channel length
2. **decreasing the channel doping concentration**
3. reducing gate oxide thickness
4. increasing the channel doping concentration

The time base generator in a CRO gives an output which is

1. Low frequency sinusoidal
2. **High frequency sawtooth**
3. High frequency sinusoidal
4. Low frequency rectangular

The tone signal derived from the counter at 250Hz, facilitates the identification of _____

1. **Haemostasis**
2. Coagulation
3. Cutting
4. Fulgration

The torque in induction wattmeters due to

1. Electrostatic effect
2. Hall effect
3. **Eddy currents**
4. Capacitive current

The total gain of a multistage amplifier is less than the product of the gains of individual stages due to ……

1. Power loss in the coupling device
2. The use of many transistors
3. The use of many capacitors
4. **Loading effect of the next stage**

The total internal energy change in a bomb calorimeter is

1. 0
2. **$-C_v \Delta T$**
3. $\Delta H_c/-C_v$
4. $\Delta H_c/\Delta T$

The transfer function is applicable to which of the following?

1. **Linear and time invariant systems**
2. Nonlinear systems
3. Linear systems
4. Linear and time variant systems

The transient response, with feedback system,

1. **decays quickly**
2. rises slowly
3. rises quickly
4. decays slowly

The transition between continuous values of the image function and its digital equivalent is called _____

1. Restoration
2. Sampling

3. Saturation
4. Quantisation

The two numbers represented in signed 2's complement form are P= 11101101 and Q= 11100110. If Q is subtracted from P, the value obtained in signed 2's complement form is
1. 100000111
2. **00000111**
3. 11111001
4. 111111001

The type 0 system has _____ at the origin.
1. simple pole
2. net pole
3. **no pole**
4. two poles

The type 1 system has _____ at the origin.
1. two poles
2. no pole
3. **simple pole**
4. net pole

The type 2 system has _____ at the origin.
1. no net pole
2. **two poles**
3. net pole
4. simple pole

The type of Histogram Processing in which pixels are modified based on the intensity distribution of the image is called _____.
1. **Global**
2. Local
3. Intensive
4. Random

The type of Interpolation where for each new location the intensity of the immediate pixel is assigned is _____
1. cubic interpolation
2. **Nearest neighbour interpolation**

3. bilinear interpolation
4. bicubic interpolation

The type of Interpolation where the intensity of the FOUR neighbouring pixels is used to obtain intensity a new location is called _____

1. bicubic interpolation
2. nearest neighbour interpolation
3. **bilinear interpolation**
4. cubic interpolation

The value of a complex number with |z|=1.414 and arg(z) = 3 /4 is:

1. 1+i
2. -1+i
3. 1-i
4. -1-i

The viscous friction coefficient, in forcevoltage analogy, is analogous to

1. reciprocal of conductance
2. reciprocal of inductance
3. charge
4. **resistance**

The writing part of an EEG machine is usually _____.

1.Direct writing galvanometer
2.Potentiometric recorder
3.inkjet recording system
4. Thermal array recorder

The Wronskian of two functions y1=ex and y2=e-x is

1. 2 2. 3
3. -2 4. -3

The Y plates of a CRO are excited by a voltage 2 sin 100 t and the X plates are not connected. The display would be

1. **A vertical line**
2. A horizontal line
3. Slant line
4. Sine wave

Thermal expansion of a solid is employed in:

1. Thermocouple
2. Resistance thermometer
3. Bulb thermometer

4. **Bimetal element**

Three different Q points are shown on a dc load line. The upper Q point represents the:
1. minimum current gain
2.intermediate current gain
3.maximum current gain
4. cutoff point

Three phase four wire induction energy meter is used to measure
1. Energy in 3 phase balanced delta load
2. Energy in 3 phase unbalanced delta load
3. **Energy in 3 phase unbalanced load**
4. Energy in 3 phase balanced star load

To avoid creep in an energy meter
1. The potential coil is made of very thin wire
2. Two shading bands are put on shunt magnet
3. Two shading bands are put on series magnet
4. **Two holes are cut in the disc on opposite sides of spindle**

To detect the duration of QRS complex one has to use _____ methods
1. Template matching
2. Derivative based operators
3. **Pan – Tompkins**
4. RLS

To prevent self-heating errors becoming too great, the current through platinum element (100 ohm) is kept at a very small value of _____

1. **20 mA** 2. 50 mA
3. 5 Ma 4. 1 mA

To produce a change in deflection of 1.5 mm of the galvanometer of Wheatstone bridge, a change of 5Ω in the unknown arm of bridge is required. The sensitivity is

1. 0.5 mm/ Ω 2. 0.4 mm/ Ω
3. 0.2 mm/ 4. **0.3 mm/ Ω**

To reduce computation if one utilises non-overlapping regions, it usually produces _____ effect

1. Dark 2. Blurred
3. Dimming 4. **Blocky**

Transfer function of a system is used to calculate which of the following?
1. The time constant
2. **The output for any given input**

3. The order of the system
4. The steady state gain

Transforming difference between adjacent pixels is called

1. image watermarking
2. **mapping**
3. image compression
4. image equalization

Turning point algorithm reduces the sampling frequency of an ECG signal from

1. **200 to 100 samples/s**
2. 100 to 50 samples/s
3. 75 to 50 samples/s
4. 100 to 75 samples/s

Two ammeters having resistances of 0.5 Ω and 0.25 Ω and having full scale reading of 25 A each are connected in parallel. To ensure that neither of them goes beyond scale, the total current should not be more than

1. **25 A** 2. 50 A
3. 37.5 A 4. 40 A

Two binary signals A, B are to be compared. The output expression when the two signals are equal is

1. AB 2. AB +A'B'
3. AB' + A'B 4. A'B'

Two D flip-flops are connected as a synchronous counter that goes through the following QBQA sequence 00 →11→01→10→00→… The combination to the inputs DA and DB are

1. DA = QB; DB=QA
2. DA = QA'; DB = QB'
3. **DA = (QAQB + (QAQB)'); DB = QB'**
4. DA = (QAQB' + QA'QB); DB = QA'

Two voltmeters 0-250 V each having resistances of 5 kΩ and 10 kΩ respectively and are connected in series. To ensure that neither of them goes beyond scale the total voltage which can be applied should be less than

1. 400 V 2. 250 V

3. **375V** 4. 500V

Two voltmeters are each 0-300 V range. Their internal resistances are 10 kΩ and 20 kΩ. They are connected is series and a voltage of 400 V is applied. Their readings respectively will be

1. 100 and 300 V
2. 266.6 and 133.3 V
3. **133.3 and 266.6 V**
4. 200 V each

Using Bisection method, negative root of x3 - 4x + 9 = 0 correct to three decimal places is

1. - 2.406
2. 3.7576
3. -2.506
4. **-2.706**

Using Newton-Raphson method, find a root correct to three decimal places of the equation x3 - 3x - 5 = 0

1. 2.275
2. **2.279**
3. 2.2355
4. 2.222

Varies types of Runge-Kutta methods are classified according to their

1. Degree
2. Size
3. Rank
4. **Order**

Vector quantization is also called as _____ quantization

1. Partial
2. Perfect
3. Serial
4. **Block**

Velocity error constant of a system is measured when the input to the system is unit ____ function.

1. impulse
2. **ramp**
3. step
4. parabolic

Voltage to current converter is also called as

1. **Current series negative feedback amplifier**

2. Voltage series positive feedback amplifier
3. Voltage series negative feedback amplifier
4. Current series positive feedback amplifier

Wagner earthing device eliminates
1. Mutual coupling between components
2. All stray capacitance in the circuit
3. Stray capacitance between detector terminal and ground
4. Stray capacitances between components

We wish to solve x2 - 2 = 0 by Newton Raphson technique. If initial guess is x0 = 1.0, Subsequent estimate of x (i.e. x1) will be

1. 2.5 2. 2.0
3. 1.5 4. 1.414

What does a high resistance reading in both forward- and reverse-bias directions indicate?
1. An open diode
2. A defective ohmmeter
3.A shorted diode
4. A good diode

What happens to total resistance in a circuit with parallel resistors if one of them opens?
1. It decreases
2. It increases
3. It halves
4. It remains the same

What is Histogram Equalisation also called as?
1. Histogram Subtraction
2. Histogram linearization
3. Image Enhancement
4. Histogram Matching

What is the applied voltage for a series RLC circuit when IT = 3 mA, VL = 30 V, VC = 18 V, and R = 1000 ohms?

1. 34.98 V 2. 48.00 V
3. 12.37V 4. 3.00 V

What is the basis for numerous spatial domain processing techniques?

1. Histogram 2. Sampling

3. Scaling 4. Transformations

What is the concentration of a 0.5 % (w/v) solution when expressed as mg mL-1?

1. 0.05 mg mL-1
2. **5 mg mL-1**
3. 0.5 mg mL-1
4. 0.4 mg mL-1

What is the condition for linear phase in FIR filters?

1.coefficients are symmetrical around the center coefficient

2.coefficients are symmetrical around the last coefficient

3.coefficients are non-symmetrical around the center coefficient

4.coefficients are symmetry around the last coefficient

What is the differential equation of the family of parabolas having their vertices at the origin and their foci on the x-axis?

1. **2x dy – y dx = 0**
2. x dy + y dx = 0
3. 2y dx – x dy = 0
4. dy / dx – x = 0

What is the disadvantage of impulse invariant method

1. warping
2. anti aliasing
3. **Aliasing**
4. one to one mapping

What is the duration of the unit sample response of a digital filter?

1. Zero 2. Impulse
3. Finite **4. Infinite**

What is the flux density of a magnetic field whose flux is 3000 μWb and cross-sectional area is 0.25 m2?

1. **12,000 μT**
2. 83,300 T
3. 50T
4. 0 T

What is the frequency component of alpha waves?

1. Over 13 Hz 2. upto 4 Hz

3.4.1 – 8 Hz **4. 8.1- 13 Hz**

What is the instantaneous peak voltage at 250° on a 6 V peak sine wave?

1. -5.64 V
2. -26.13 V
3. +26.13 V
4. +5.64 V

What is the magnetomotive force in a 150-turn coil of wire with 2 A flowing through it?

1. 13.33 mAt
2. 65 At
3. 152 At
4. 300 At

What is the Q (Quality factor) of a series circuit that resonates at 6 kHz, has equal reactance of 4 kilo-ohms each, and a resistor value of 50 ohms?

1. 80
2. 50
3. 0.001
4. 4.0

What is the solution of the first order differential equation y(k + 1) = y(k) + 5.

1. y(k) = 4 – 5/k
2. y(k) = 20 + 5k
3. y(k) = C – k, where C is constant
4. The solution is non-existence for real values of y

What is the tool used in tasks such as zooming, shrinking, rotating, etc.?

1. Interpolation
2. Contour
3. Filters
4. Sampling

What is the total power loss if 2 kΩ and 1 kΩ parallel-connected resistors have an IT of 3 mA?

1. 36W 2. 6 W
3. 6 mW 4. 36 mW

What is the trace of the matrix A with eigenvalues and 1, 1/2, - 2/3

1. 5/6 2. 1/6
3. -5/6 4. -1/6

What is the transconductance of an FET when ID = 1 mA and VGS = 1 V?

1. 1 kΩ 2. 1 mΩ
3. 1 mS 4. 1 kS

What is the turns ratio of the transformer needed to match a 1 k ohm source resistance to a 160 ohm load?

1. 16:1
2. 6.25:1
3. **0.4:1**
4. 2.5:1

What is used to block light from a laser and let other light through

1. Spatial
2. Interference
3. Color
4. Natural density

When negative feedback is used, the gain-bandwidth product of an op-amp

1. stays the same
2. increases
3. decreases
4. fluctuates

When parallel resistors are of three different values, which has the greatest power loss?

1. The largest resistance
2. **The smallest resistance**
3. They have the same power loss
4. Voltage and resistance values are needed

When the initial conditions of a system are specified to be zero it implies that the system is _____.

1. **at rest without any energy stored in it**
2. at rest but stores energy
3. working normally with zero reference input
4. working normally with reference input

When the radio frequency output is applied to the pads of a short wave diathermy unit, _____ is manifested as heat.

1. Magnetic frequency
2. **dielectric losses of capacitor**
3. absorption in the tissue
4. resonance

When transistors are used in digital circuits they usually operate in the

1. **saturation and cutoff regions**
2. breakdown region
3. active region
4. linear region

Which algorithm is called as lossless algorithm

1. Huffman
2. CORTES
3. TP
4. AZTEC

Which algorithm produces better signal fidelity for the same reduction ratio

1. TP 2. AZTEC
3. Fan 4. CORTES

Which among the following represent/s the characteristic/s of an ideal filter?

1. non linear frequency response
2. Constant gain in passband
3. constant gain in stop band
4. non Linear Phase Response

Which bridge can be used to measure frequency?

1. Schering
2. Maxwell
3. Wein
4. Kelvin

Which capacitance dominates in the reverse-bias region of a diode?

1. depletion
2. conversion
3. Oxide capacitance
4. Diffusion

Which component is considered to be an "OFF" device?

1. Transistor 2. JFET
3 .D-MOSFET **4. E-MOSFET**

Which effect is useful in measuring rapidly varying forces

1. Change of capacitance
2. Strain gauge
3. Photovoltaic
4. Piezoelectric

Which is a specific investigation of diagnosing seizure disorder?

1. EMG 2. EOG
3. EEG 4. ERP

Which is the majority component of dialysate solution?

1.Sodium 2.**Calcium**
3.Potassium 4. Chloride

Which is the preferred electrode placement location for EMG?

1.parallel to muscle fibers

2.positioned on the outer edge of muscle

3. Oriented on the motor point

4.near the tendon

Which measurement is a good guide to the quality of water 1.Turbidity

2.Dissolved O2 content

3.Conductivity

4.pH

Which method has the low computational burden

1. **FFT** 2. IDCT
3. DCT 4. VQ

Which of the following alter name for method of false position

1. **Regula falsi method**
2. Method of tangents
3. Method of bisection
4. Method of Chords

Which of the following can be measured by LVDT?

1. Temperature
2. Pressure
3. Force
4. **Acceleration**

Which of the following can be measured by the use of a tachogenerator?

1. Acceleration
2. Speed and acceleration
3. **Speed**
4. Displacement

Which of the following can be used for measuring capacitance?

1. De sauty bridge
2. **Maxwell's bridge**
3. Anderson bridge
4. Hay's bridge

Which of the following characteristics does not necessarily apply to an op-amp?

1. High gain

2. **Low power**
3. High input impedance
4. Low output impedance

Which of the following characteristics of a digital image is responsible for the brightness level in an image?

1. Image type2. bit depth
3. **pixel** 4. voxel

Which of the following circuit exhibits memory

1. Astable multivibrator
2. Bistable multivibrators
3. NAND gate 4. XOR gate

Which of the following codes is a non-weighted code?

1. 63210 2. 2421
3. **excess 3** 4. 8421

Which of the following device is used as a standard for calibrating pressure gauges?

1. Bellows
2. Diaphragm
3. Manometer
4. **Dead weight tester**

Which of the following devices are commonly used as error detectors in instruments?

1. Resistors
2. **Strain gauge**
3. Microsyns
4. Thermistors

Which of the following devices is used for conversion of coordinates?

1. **Synchroresolver**
2. Synchro transformer
3. Microsyn 4. Selsyn

Which of the following equations is a variable separable DE?

1. (x + x2 y) dy = (2x + xy2) dx
2. y2 dx + (2x – 3y) dy = 0
3. (x + y) dx – 2y dy = 0
4. 2y dx = (x2 + 1) dy

Which of the following equations is an exact DE?

1. 2xy dx + (2 + x^2) dy = 0

2. x dy + (3x – 2y) dx = 0
3. (x^2 + 1) dx – xy dy = 0
4. (x^2)y dy – y dx = 0

Which of the following formulas is a particular case of Runge Kutta formula of the second order
1. Taylor's series
2. **Euler's modified**
3. Picard's formula
4. Milne's method.

Which of the following image processing operations can be used for 3D rendering of a Cat Scan?
1. **image enhancement**
2. image restoration
3. image compression
4. image analysis

Which of the following is a commonly used metastable radionuclide?
1. Thallium -201 2.**Technetium-99m**
3.Iodine -131 4.Gallium -67

Which of the following is an electro mechanical device?
1. Strain gauge
2. Induction relay
3. **LVDT**
4. Thermocouple

Which of the following is an open loop control system?
1. Metadyne
2. Stroboscope
3. Ward Leonard control
4. **Field controlled D.C. motor**

Which of the following is best suited for I I R filter when compared with the FIR filter
1. No sidelobes in stopband
2. Lower sidelobes in Passband
3. Higher Sidelobes in stopband
4. **Lower sidelobes in stopband**

Which of the following is exhibited by Root locus diagrams?
1. The bandwidth of the system
2. The frequency response of a system
3. The poles of the transfer function for a set of parameter values

4. The response of a system to a step input

Which of the following is not a Geometric Transformation?

1. Image rotation
2. **Histogram**
3. Scaling
4. Image translation

Which of the following is not an analytic function in the finite complex plane?

1. sinz
2. z'
3. **ez**
4. Cosz

Which of the following is required for oscillation?

1. The phase shift around the feedback network must be 180º
2. $\beta A \leq 1$
3. $\beta A > 1$
4. Both $\beta A > 1$ and the phase shift around the feedback network must be 180º

Which of the following is the best method for determining the stability and transient response?

1. Bode plot
2. Gantt chart
3. **Root locus**
4. Nyquist plot

Which of the following is the fastest memory cell

1. Core memory
2. **Semiconductor memory**
3. Double memory
4. Super conductor memory

Which of the following is the input to a controller?

1. Servo signal
2. Desired variable value
3. Sensed signal
4. **Error signal**

Which of the following is the nonlinearity caused by servomotor?

1. **Saturation**
2. Static friction
3. Resistance
4. Backlash

1. **D.C. voltage**
2. Direct current
3. A.C. voltage
4. Alternating current

Which of the following liquid dosage forms requires a sterile formulation?

1. Oral syrup
2. Spray applied to skin
3. Shampoo
4. **Eye drops**

Which of the following material is sensitive to light?

1. Photosensitive
2. **Photoresist**
3. Light sensitive
4. Maser

Which of the following method is called step by step method

1. Taylor's method
2. **RK method**
3. Milne's method
4. Newton's method.

Which of the following methods does not require starting values

1. Multi step methods
2. Adam's method
3. **Euler's method**
4. Milne's method

Which of the following should be done to make an unstable system stable?

1. **The gain of the system should be increased**
2. The gain of the system should be decreased
3. The number of poles to the loop transfer function should be increased
4. The number of zeros to the loop transfer function should be increased

Which of the following statement is correct for two wattmeters method of power measurement in 3 phase circuit?

1. When power factor is 1, one of the wattmeters readings is zero
2. Power can be measured by this method only for star connected loads
3. When two wattmeters have equal readings power factor is 0.5
4. **When the two wattmeter read equal and opposite, p.f. is zero**

Which of the following statements applies to the bisection method used for finding roots of functions?

1. Is faster than the Newton-Raphson method
2. **Guaranteed to work for all continuous functions**
3. Converges within a few iterations
4. Requires that there be no error in determining the sign of the function

Which of the following statements is correct for a system with gain margin close to unity or a phase margin close to zero?

4. **The system is highly oscillatory**

Which of the following statements is correct for any closed loop system?
3. **Only one of the static error coefficients has a finite nonzero value**

Which of the following statements is not necessarily correct for open control system?
1. Generally free from problems of nonlinearities
2. Less expensive
3. **Presence of nonlinearities causes malfunctioning**
4. Input command is the sole factor responsible for providing the control action

Which of the following system is time variant?
1. y(n) = x(n) + x(n-1)
2. y(n) = x(-n)
3. y(n)=x(n)
4. y(n)=1/x(n)

Which of the I I R Filter design method is antialiasing method?
1. **Bilinear transformation**
2. Impulse invariant method
3. The method of mapping of differentials
4. Matched Z - transformation technique

Which of the statements is not true about the characteristics a glass electrode
1.**Dependent on oxidation and reduction potential**
2.Equilibrium is reached rapidly
3.Can be used in coloured and turbid solutions
4.Gives accurate values in buffered solutions

Which of these instrument does not have a control spring?
1. Moving iron ammeter
2. PMMC ammeter
3. Electrostatic voltmeters
4. **Power factor meter**

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321. Which of these is NOT in four neighbors of pixel (x,y)?
3. (x+1, y+1)

322. Which of these pnuemotachometers use a light emitting diode for measurement of sample air flow? _____

4.Turbine type

323. Which one of the following is not used in colorimeter?

2. Dialyzer

324. Which one of the following statements is true of phase-shift type and Wein-bridge type RC oscillators?

2. The former uses positive feedback only whereas later uses both positive and negative feedback

325. Which transform is similar to PCA

1. KLT

326. Which transistor bias circuit provides good Q-point stability with a single-polarity supply voltage?

2. voltage-divider bias

327. Which type of device is suitable for dynamic force measurement:

3. Piezoelectric transducer

328. While going through a heap of junk in her garage, Jackie found an uncalibrated mercury thermometer. After a few experiments, she succeeded in calibrating it. Her notes show that ice point of thermometer corresponds to 3 cm while steam point corresponds to 30 cm of mercury. If Jackies calculations are fine then length = 15 cm would correspond to

2. 44 °C

329. Wired AND connection must not be used with totempole driver because

3. Transient current spikes occur

330. With feedback _____ increases.

1. system stability

331. With feedback _____ decreases.

1. system gain

332. X= 01110 and Y= 11001 are two 5-bit binary numbers represented in 2's compliment format. The sum of X and Y represented in 2's compliment format using 6 bits is

4. 000111

333. yn+1= yn+ h f (xn,yn) is the iterative formula for

2. Euler's method

334. Zener diodes with breakdown voltages less than 5 V operate predominantly in what type of breakdown?

1. Zener

335. Zero initial condition for a system means

4. system is at rest and no energy is stored in any of its components

336. For the ring oscillator shown in the figure, the propagation delay of each inverter is 100 pico sec. What is the fundamental frequency of the oscillator output

4. 2GHz

337. The circuit given below is a (page 66)

3. R-S latch

338. Given that 1, 3/5 and 5/6 are the eigenvalues of a non singular matrix A, which of the following is not an eigenvalue of A^-1

2. 5/6

339. If , where c is a constant, then

WRONG QUESTION

340. Which of the following symbol is called forward difference operator

1. *the upright triangle*

341. Using Newton-Raphson method, find a root correct to three decimal places of the equation sin x = 1 - x

1. 0.511

342. What is the condition for the convergence of Iterative method?

1. phi ' (x)< 1 for all x belonging to I

343. Newton-Raphson method fails when

2. f'(x) is zero

344. High pass filters promotes

3.high intensity components

345. Value of plank's constant h is

4. 6.55x10-34

346. Continuous generalized slowing consists of polymorphic delta activity that is continuous or near-continuous (>80% of the record) and reactive is suggestive of

2. Diffuse encephalopathy

347. Digital function's derivatives are defined as
1. differences

348. Digital images are displayed as a discrete set of
4. intensities

349. High pass filters are used for image
2. sharpening

350. In MxN, M is no of
3. Rows

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351. The minimized form of the logical expression (A'B'C'+A'BC'+A'BC+ABC') is
1. A'C'+BC'+A'B

352. The minimum number of NAND gates required to implement the Boolean function A+ AB'+AB'C is equal to
1. 0

353. The number of product term in the minimized sum-of-product expression obtained through the following K-map is (where ‘d’ denotes don’t care state)
1. 2

354. Two 2’s compliment numbers having sign bits x and y are added and the sign bit of the result is z. Then, the occurrence of overflow is indicated by the Boolean function
4. x'y'+yz+zx

355. Particular integral of the differential equation (D^2+4)y = cos2x is
3. 1/4 xsin(2x)

356. If f(z)= u+iv is an analytic function, phi=u^2, then phi(xx) + phi(yy)=
3. mod(f'(x)^2)

357. If f(z) is analytic and on a simple closed curve.....
4. 2pi i (R1+R2)

358. The constant term in the Laurent’s series expansion of the function....
3. 1/6

359. The Newton’s iterative formula is

1. xn+1 = xn - f(xn)/f'(xn)

360. The period of mod(sint) is
2. pi

361. The value of the real integral....
3. pi/2

362. Determine the order and degree of the differential equation...
1. Fourth order, first degree

363. Solve the differential equation: x(y – 1) dx + (x + 1) dy = 0. If y = 2 when x = 1
4. 1.55

364. Complimentary function of .....is
??????????????????

365. Current I in an LCR circuit is given by the equation .....
4. 12/5 e^-10t sin10t

366. y=cx=c^2 is the general solution of the differential equation
2. d^2 y/ dx^2 = 0

367. The differential equation whose auxiliary equation has the roots 0, -1, -1 is
3. y''' + y'' +4

368. The solution of the boundary value problem .....
1. Bsin npix/L

369. The solution of the differential equation .....
3. y= (c1+c2x)e^root2x + (c3+c4x)e^-root2x

370. The solution of the initial value problem .....
3. 15(e^-2t - e^-3t)

371. The solution of (1+x)^2y'' + (1+x)y' +y=0
??????????????????

372. Which of the following is the solution of .....
1. u=6e^-(3x+2t)

373. A necessary and sufficient condition that the line integral ..... for every closed curve c is that
3. curl A =0

374. Classify the region 1< |z| < 2 as one of the following

3. Closed bounded region

375. Find the value of ..... where f is any vector and s=x^2+y^2+z^2 =1

4. 0

376. For any closed surface S ....

1. 0

377. For the circuit shown, the counter state (Q1Q0) follows the sequence

4. 00, 10, 11, 00, 10…

378. For the function .....

??????????????????

379. Given that f(z) and its conjugate.....

2. zero

380. If f(z)= 1/2 log(x^2+y^2).....

2. -1

381. If is the upper half of the circle .....

??????????????

382. If a function f(z) is analytic and its derivative....

2. 0

383. If the surfaces .....

1.5/2,1

384. If C is |z|=1/2.....

??????????????????

385. If f(z) is analytic within a closed.....

1. 1/2pi i integral(f(z)/z-a)

386. If f(z)=z^2/.....

??????????????

387. If |z-5i/z+5i|.....

2. The straight line (WRONG QUESTION)

388. If a is a constant vector....

1. 2a

389. If A= [3 -4; 1 -1]...

1. [21 -40; 10 -19]

390. If r= xi+yj+.....

??????????????????

391. If phi(x,y,z)=c.....

2. Tangent to phi=c

392. If u(x,y)=x^3-3xy^2……

??????????????????

393. If f(z)=.....respectively are poles of order

4. 4 and 6

394. In the fourier series expansion of f(t)= |sint|.....

3. 0

395. The Cauchy–Riemann equations for…….to be analytic are

3. ux=vy , uy=-vx

396. The coefficient of z in the Taylor series expansion……

??????????????????w=3z

397. The complex representation of a straight line path from……

4. T+3it, 1<= t <=2

398. The figure is a logic circuit with inputs A and B and the output Y. Vss = 5 V.The circuit is of type……..

2. AND

399. The mean value of f(x)cos(nx).....

4. an

400. The output F of the digital circuit shown in figure below is

1. X'YZ + XY'Z

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1. What is the unit of responsivity? ~ Ampere/Watt
2. Which of these has the least permeability through flat membrane of hemodialysis? – Vitamin B12
3. Which type of the effluent pump is not preferred in hemodialysis machine? ~ Diaphragm type.
4. What is the wavelength of the LED used in the membrane leak detector of hemodialysis machine? – 560 nm
5. Which of these does not belong to the Low pressure system of Anaesthesia machine ~ Flow meters
6. Which of these is a non-technical problem with electrodes and leads of pacemaker? ~ Exit Block
7. Which amplifier rejects any common mode signal that appears simultaneously at both amplifier input terminals? ~ Differential Amplifier
8. Which non-invasive method of BP measurement is an accurate method? ~ Differential Ausculatory
9. Which of the following is most commonly used in single photon nuclear imaging? ~ Parallel hole collimator
10. Which of the following statement is true : Gamma radiations can be detected directly in a scintillating material
11. The preamplifiers used in EEG must have ~ High gain and high CMRR
12. The ratio of platinum and iridium in the electrode of sutureless leads of pacemaker is respectively ~ 70% and 30%
13. The repetition frequency of the burst in Coagulation mode is 15Khz
14. Which of the statement concerned with KIIL dialyzer is true? ~ it is not disposable
15. The secondary induced voltage of a LVDT at null position are $V=1.0V<0^0$ and $V=1.0<10^0$ respectively. Calculate the null voltage of the LVDT. $\frac{1}{2}$ 0.174 V
16. The source of fluid for flushing system of BP monitoring unit is a bag of ~ 600ml at pressure of 300mmHg
17. The transient response of a system is mainly due to ~ stored energy
18. The value of the Gamma rays associated with Pet scanning is 511Kev
19. V4 of unipolar chest lead is positioned at fifth intercostal space at mid-clavicular line.
20. What is the dimension of the titanium mesh patch used with pacemaker leads? ~ 6cm x 9cm
21. The frequency at which the open loop gain is equal to 1 is called Unity gain frequency
22. The function of anti-coincidence logic of Multi-crystal gamma cameras is to Reject two signals arising simultaneously.
23. The glomerular filtrate consists of Blood plasma without Protein.
24. The light from a laser source is monochromatic because all the photons have same energy.
25. The nominal pressure value in the arterial system is 30-300 mmHg.
26. The nominal pressure value in the pulmonary system is 6-25 mmHg.

27. The perforations in the dialysis machine have an average diameter of 50 Angstrom.
28. The PIV rating of each diode in a bridge rectifier is one-halfthat of the equivalent centre-tap rectifier
29. The position localization circuitry of gamma camera is part of which functional component? ~ Detector.
30. The ability to detect a small discontinuity or flaw is called Radiographic Sensitivity.
31. The commonly used unit for conductivity is nmho/cm
32. The considerable interference produced by the microwave diathermy machine necessitates the use of 500 mA fuse.
33. The contact impedance shown by the ECG electrodes is of the order of 50 kohms.
34. The conventional way of expressing vibrations is in terms of Richter Scale.
35. The expression Y = A+A'B is Y = A+B
36. sin ix= sin hx.
37. In a series R, L circuit, voltage across resistor and inductor are 3 V and 4 V respectively, then what is the applied voltage? ~ 5 V
38. In a series resonance circuit if bandwidth is 1 MHz and inductance is 1 mH, then what is the resistance value? ~ 1 Kohms
39. How many resistors are present in an instrumentation amplifier? ~ 7
40. For signal conditioning of the piezoelectric type transducer, we require a charge amplifier.
41. In the figure, the J and K inputs of all the four Flip-flops are made high frequency of the signal at output Y is 1.0 KHz
42. Larmor frequency of Hydrogen nuclei (proton) in an external magnetic field of 3.0 Tesla is 128 MHz
43. Let a and b be two vectors. If a.b =0 then a and b are orthogonal.
44. Light beam oscilloscope recorders use Chopper stabilized dc amplifiers
45. Which recorder is independent of signal amplitude and number of channels? ~ Electrostatic Recorders
46. When the output Y in the circuit below is '1', it implies that data has changed from 0 to 1
47. The digital circuit shown below uses two negative edge triggered D flip flops.

Assuming initial conditions of $Q_1$and Q_0 as zero, the output Q_1Q_0 of the circuit is 00,01,11,10

48. The output Y in the circuit below is always '1' when two or more of the inputs P,Q,R are "1"

49. The following binary values were applied to the X and Y inputs of the NAND latch shown in the figure in the sequence indicated below: X Y = 0 1; X Y = 0 0 X Y = 1 1. The corresponding stable P, Q outputs will be:

P =1, Q=0; P=1,Q=1; P=1; Q=0 or P=0,Q=1

50. The logic function implemented by the circuit below is (ground implies logic 0)

F = XOR(P,Q)

51. Magnetic flux can be measured by Hall effect pick up
52. Minute volume refers to tidal volume x number of respirations
53. Silver chloride tip is present in Reference electrode.
54. The circuit diagram of a standard TTL NOT gate is shown in the figure. When V_i= 2.5V, the modes of operation of the transistors will be

Q1 reverse active, Q2 saturation, Q3 saturation and Q4 cutoff

55. In the circuit shown below, Q_1 has negligible collector–to–emitter saturation voltage and the diode drops negligible voltage across if under forward bias. If V is 5V cc + , X and Y are digital signals with 0 V as logic 0 and Vcc as logic 1, then the Boolean expression for Z is

X'Y

56. In series RLC circuit, voltage across resistor, inductor and capacitor are 5V, 2V and 2V respectively. Find total voltage? ~ 5 V
57. For the output F to be **1**is the logic circuit shown, the input combination should be

A =0, B=0, C=1

58. Consider the circuit given below. In this circuit the race around occurs when CLK = 1 and A=B=1
59. A strain gauge of resistance 120 Ω and gauge factor 2.0 is at zero strain condition. A 200 kΩ fixed resistance is connected in parallel to it. Then its combination will represent an equivalent strain of -300 um/m.
60. A variable reluctance tachogenerator consists of a ferromagnetic gear wheel with 22 teeth rotating close to a magnet and coil assembly. The total flux *N* linked by the coil is given by: $N(\theta) = 4.0 + 1.5 \cos 22\theta$ milliwebers where θ is the angular position of the wheel relative to the axis of the magnet. What is the amplitude of the output signal when the angular velocity of the wheel is 1000 r.p.m. ~ 3.46 V
61. Assuming that flip-flops are in reset condition initially, the count sequence observed at QA in the circuit shown is 0110100
62. An object nearer to a converging lens than its focal point always has a/an Virtual image.
63. Commercially available implantable defibrillators all utilize Lithium Silver Vandium oxidecells.
64. In a common source amplifier, the output voltage is 180 degrees out of phase with the input.
65. In saturation of a transistor circuit, Vce is equal to 0.2 V.
66. In Computed tomography Sagittal images are produced by X-Z plane.
67. In an endoscope, differential measurement between two samples of each pixel is done by all of the above (CMOS,CDS, CCD)
68. What is the bandwidth of the circuit with R=1K, L=5H and C=1μF? ~ 31.8 Hz
69. For a certain 12 V zener diode, a 10 mA change in zener current produces a 0.1 V change in zener voltage. The zener impedance for this current range is 10 ohms

70. A thermistor is characterized by the relation $R_1 = R_0 ae^{(b/T)}$ where, R_0 is resistance at ice point, R is the resistance at the absolute temperature T K, and a & b are constants. Determine the temperature indicated by such a thermistor , if R=1050Ω,

1

0

71. 5 number of pumps are present in conventional Heart-Lung machine.
72. Forced Coagulationis characterized by the electric arcs which are intentionally generated deeper between the coagulation electrode and the tissue.
73. A controller essentially is a comparator.
74. A differential push pull type capacitive displacement sensor (nominal capacitance C_0=0.01 μF) is connected in two adjacent arms of an a.c bridge in such a way that the output voltage of the bridge is independent of the frequency of the supply voltage. Supply to the bridge is 1V at 1 kHz and two equal resistances (R=3.9 kΩ) are placed in the other two arms of the bridge. The bridge sensitivity is 0.05 mv/pF.
75. A 3 mm thick quartz piezoelectric crystal having a voltage sensitivity of 0.06 V-m/N is subjected to a pressure of 1.8MN/$m^2$and the permittivity of quartz is 40.6X10^{-12}F/m. Determine the voltage output is 324 V.
76. For logic circuit shown in figure, the output is equal to A'+B'+C'

77. For the 4 bit DAC shown in figure, the output voltage $V_0$is 5V

78. For the circuit shown below the output F is given by F = 0
79. For the logic circuit shown in the figure, the required input condition (A, B, C) to make the output (X) = 1 is 0,1,1

80. Minimum number of 2-input NAND gates required to implement the function, F = (X'+Y') (Z+W) are 4.
81. The K-map for a Boolean function is shown in figure. The number of essential prime implicants for this function is 4
82. The Boolean expression AC+BC' is equivalent to ABC+A'BC'+ABC'+AB'C.
83. The Boolean expression for the truth table shown is B(A+C)(A'+C')
84. The Boolean function f implemented in figure using two input multiplexers is AB'C+ABC'
85. Figure shows a mod-K counter, Here K is equal to 3
86. Dark current in light detectors is caused by absence of light input.
87. A thermocouple of AB with a constant of K_{AB} =35μV/^{0}C is used along with another thermocouple K_{BC} =25μV/^{0}C. The reference temperature is 25^{0}C and the measured temperature is 300^{0}C. The emf developed for AC thermocouple at the given temperature is 16.5 mV.
88. An inductive pick off operating from a 50thwheel is used with a digital frequency meter to measure the speed of rotation of the shaft when the wheel is mounted. The

gating period is set to 10 μs and a reading of 0050 is obtained on the 4-digit display. What is the shaft speed? ~ 10 rps

89. If a 16μF capacitor is used, then for the full output of 400 Watt to be available, the capacitor should be charged to 7000 V
90. If a sinewave of 1V, 1 kHz is applied to the input of voltage buffer using op-amp, the output would be a sinewave.
91. If V_{IN} increases, I_Z will increase
92. If curl F = 0 then F is irrotational vector.
93. If div F = 0 then F is solenoidal vector.
94. If F = (x+3y)i + (y-2z)j + (x+pz)k is solenoidal vector then the value of p is 1
95. If q(x,y) = 2x – 3x2+ky2 is a harmonic function, then the value of k is 3.
96. Determine the frequency of oscillation of an astable multivibrator using timer with RA = 100 ohms, RB = 500 ohms, and C = 10uF. ~ 131 Hz.
97. Find the derivative of $f(x,y) = x^2y$ in the direction of (1,2) at the point (3,2) is $30/(5)^{1/2}$
98. For signal conditioning of the piezoelectric type transducer, we require a charge amplifier
99. For a certain 12 V zener diode, a 10 mA change in zener current produces a 0.1 V change in zener voltage. The zener impedance for this current range is 10 ohms.
100. If u = xSiny + ySinx, then uxy – uyx = 0
101. If $u = x^y$ then du/dx (partial) = $y\,x^{y-1}$
102. A parallel plate air spaced capacitor has an effective plate area of $6.5 \times 10^{-4} m^2$ and the distance between the plates is 1 mm. The displacement sensitivity of the device, if air has a relative permittivity of unity. ~ 57.55×10^{-10} F/m.
103. A strain gauge bridge comprises of two fixed resistors each with a value of 100 Ω, one active gauge and other unstrained temperature compensation gauge. The two gauges are of unstrained resistance 100 Ω and gauge factor 2. Find the bridge output for a supply voltage of 4V, when the active gauge is subjected to 500 microstrains. ~ 1 mV
104. Two digital filters can be operated in cascade. Or, the same effect can be achieved by ~ convolving their coefficients.
105. Down – Sampling is used to decrease the sampling rate by an integer factor.
106. Up-sampling is used to increase the sampling rate by an integer factor.
107. Which is not the property of FIR filter? ~ FIR filter has a linear magnitude response.
108. Which of the given system is linear? ~y(n)=x(2n) *
109. Which of the given system is non linear? ~ y(n) = n x(n) *
110. Which of the system is causal? ~ y(n) = x(n) + [1/x(n-1)]
111. Sinogram contains information from all angles about a particular slice, with the information from each angle in its own row.
112. IIR filters use feedback.
113. More memory consumption is required by VLIW Architecture.
114. The direct form FIR filter needs extra pipeline registers between the adders to reduce the delay of the adder tree and to achieve high throughput.

115. The factor that influence the selection of the processor manufacturer/none of these. *
116. The FFT algorithms: eliminate the redundant calculation and enable to analyze the spectral properties of a signal. *
117. The inverse Fourier transform converts from the frequency domain to the time domain.
118. Truncation or rounding of the data results in degradation of system performance.
119. The output of two digital filters can be added. Or, the same effect can be achieved by adding their coefficients.
120. Correlation it gives a measure of similarity between two data sequences.
121. Determine the convolution sum of two sequences x(n) = {3, 2, 1, 2} and h(n) = {1, 2, 1, 2} ~y(n) = {3,8,8,12,9,4,4}
122. DFT stands as Discrete Fourier transform.
123. DSP stands for? Digital signal processing.
124. Find the response of an FIR filter with impulse response h(n)= {1,2,4} to the input sequence x(n)={1,2}. ~ y(n)={1,4,8,8}
125. Finite Impulse Response (FIR) is an always oscillating filter.
126. From the sampling theorem it is known that a the sampling rate of a critically sampled discrete-time signal with a spectrum occupying the full Nyquist range cannot be reduced any further since such a reduction will introduce aliasing.
127. If a linear phase filter has a phase response of 40 degrees at 200 Hz, what will its phase response be at a frequency of 400 Hz (assuming that both frequencies are in the passband of the filter)? ~ 80 degrees.
128. Decreased performance is the disadvantage of Von Neumann architecture.

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129. A signal can be restored to a higher sampling frequency by the processes of up sampling and interpolation.
130. A variation of the direct FIR model is called the transposed FIR filter. It can be constructed from the direct form FIR filter by set of process and one step includes, Inverting the direction of feed forward path.
131. Calculate DFT of x (n) = {1, 0, 1, 0} ~ x (k) = {2, 0, 2, 0}.
132. Coefficient symmetry is important in FIR filters because it provides linear phase response.
133. Condition for aliasing problem: fs < 2fm.
134. curl(grad) = zero
135. In RL series circuit R=2Ω and L=10mH and applied voltage is 10V DC. Then find the current in the network? ~ 5A
136. In RLC parallel circuit current through resistor, inductor and capacitor are 10A, 5A and 5A respectively. What is the total current in the circuit? ~ 10 A
137. Under resonance condition the phase angle between voltage phase and current phase is Zero degrees.

138. In ac RC series circuit total voltage is 10V and voltage across resistor is 6V, then what is voltage across capacitor? ~ 8V
139. What is the correct definition of a pseudoplastic liquid? ~ A liquid which becomes less viscous as the rate of shear increases
140. In the sum of products function f(X,Y,Z) = sum of (2,3,4,5), the prime implicants are X'Y, YX'.
141. Boolean expression for the output of XNOR (equivalence) logic gate with inputs A and B is A'B' + AB.
142. Figure shows a mod-K counter, Here K is equal to 3.
143. Two Eigen values of are 2 and 8 then the third eigen value is -2
144. LVDT is one primary coil and two secondary coils connected in phase.
145. If a resistor is connected across the voltage source and the frequency of voltage and current wave form is 50Hz, then what is frequency of instantaneous power? ~ 100 Hz.
146. The following is true for the following partial differential equation used in nonlinear mechanics known as the Korteweg-de Vries equation. ~ non-linear; 3rd order.
147. This circuit is known as a high pass filter, and the f_c is 15.9kHz.
148. The current gain for the Darlington connection is B1xB2
149. The partial differential equation is classified as elliptic.
150. When power factor angle is constant, then shape of the current locus is a straight line.
151. Which of the following represents the resonance frequency (ω_0) with respect to lower cutoff frequency (ω_1) and higher cutoff frequency (ω_2) ~ ($\omega_1^2 + \omega_2^2$)^1/2
152. The partial differential equation is classified as parabolic.
153. Which of the following equations are solutions to the partial differential equation? ~
154. The basic process that's going on inside a DSP chip is MAC.
155. TMS320C50 is based on VLIW Architecture.
156. y(n) = 1 for n ≥ 0 and it is = 0 for n < 0. This way of representing a signal is called as Functional.
157. Solve xy'(2y – 1) = y (1 – x) ~ ln (xy) = x + 2y + C.
158. Second soundof the PCG occurs at the closure of aortic and pulmonary valve.
159. An 8255 chip is interfaced to an 8085 microprocessor system as an I/O mapped I/O as shown in the figure. The address lines A_0 and A_1 of the 8085 are used by the 8255 chip to decode internally its three ports and the Control register. The address lines A3 to A7 as well as the IO/ M' signal are used for address decoding. The range of addresses for which the 8255 chip would get selected is: F8H-FFH
160. Figure below shows a circuit for implementing an 8-bit Digital-to-Analog converter (DAC) using two identical 4-bit DACs with equal reference voltages. Assume that b_0 represents LSB, b_7 MSB and the op-amp is ideal. To obtain correct analog values corresponding to an 8-bit DAC at the output the value of resistor R is 0.5kHz.

161. Match the logic gates in Column A with their equivalents in Column B P-4, Q-2, R-3, S-1

162. For the output F to be 1 in the logic circuit shown, the input combination should be A=0,B=0,C=1
163. Odd numbers of the EEG montage refer to Left side of the head.
164. The area of the cardioid r = a(1-cos(theta)) = 3*a*(pie)^2/2
165. Digital images are displayed as a discrete set of intensities.
166. High pass filters are used for image sharpening.
167. The monostable multivibrator which provides the refractory delay to the gate of atrial synchronous pacemaker provides a delay of 500ms.
168. Information per source is called ENTROPY
169. Stage 2 sleep is defined by the presence of sleep spindles and K complexes
170. If 0,3 and 15 are the Eigen values of the Quadratic form …..then the rank of the Quadratic form is 2
171. logx-logy is a homogeneous function of degree 1
172. If u=sin(ax+by+cz)..... acos(ax+by+cz)
173. Find the perimeter of the curve ….. 2pi r
174. Fourier expansion of an even function f(x) in (-pi, pi) has only cosine terms
175. Matrix has a value. This statement Is false
176. The minimum value of x^2+y^2+z^2…… 3a^2
177. Calculate DFT of x (n)= δ(n) =1
178. Programmable DSP with MAC can be used to implement digital filters
179. Sampling theorem fs>=2fm

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1.In radiation methods, the level detector system is located at - **Outside a liquid filled tank**

2. In Regula falsi method of finding the real root of an equation , the curve AB is replaced by - Chord AB
   2. Line AB
   3. Circle
   4. Square

3. In Secant method the formula requires the initial approximations for finding the root as - **2**
   4. In solving simultaneous equations by Gauss Jordan method , the coefficient matrix is reduced to ---------- matrix. - **Diagonal matrix**
   5. In sound, reflection coefficient of 1 is interpreted as - **None of the incident energy is transmitted**
   6. In standard TTL the ‘totem pole’ stage refers to - **the output buffer**

7. In the case of bisection method the convergence is – **linear**

8.

In the case of I I R filter which of the following is true if the phase distortion is tolerable

1. More parameters for design
2. More memory requirement
3. **Lower computational Complexity**
4. Higher computational complexity

9. In the Gauss elimination method for solving a system of linear algebraic equations, triangularization leads to – **Upper diagonal**

10. In the midrange of an amplifier's bandwidth, the peak output voltage is 6 V. At the lower critical frequency, the peak output voltage is – **4.24 V**

11. In the pulse height analyser, ----------gives an output pulse only when there is an impulse in only one of the input channels. - **anti-coincidence circuit**

12. In thermal¬ electrical analogy, charge is considered analogous to – **temperature**

13. In two wattmeter method of 3 phase power measurement, when does one wattmeter read negative - **When power factor is less than 0.5**

14. In ultrasonic level gauge, the ultrasonic source is placed at the - **Bottom of the vessel containing the liquid**

15. In Weston frequency meter, the magnetic axes of the two fixed coils are – **Perpendicular**

16. In which of following medium, speed of sound is the least? - **Air**

17. In which of the following methods proper choice of initial value is very important?

- **Newton-Raphson**

18.

In x-ray machine, the quantity of electrons controlled by the filament temperature determines ____ 1. kVp

2.V/mv

3.Micro V 4.mA

19. Indicate which of the following logic gates can be used to realize all possible combinational logic functions – **NAND**

20. Induction wattmeter can be used in –**AC circuit only**

21. Inspiration : Expiration ratio of a ventilator is usually set at _____ ratio – **1:2**

22. Instrumentation amplifiers are used primarily in - **high-noise environments**

23. Intel 8080 microprocessor has an instruction set of 91 instructions. The minimum length of the op-code to implement this instruction set is – **7 bit**

24. Intensity levels in 8bit image are – **256**

25. Largest amount of air that we can breathe in or out in one inspiration/expiration is

called the – **Vital capacity**

26.

Line detection makes use of 1. Higher order interpolation
2. Zero order interpolation
3. Lower order interpolation
4. Interpolation

27. Local velocity is measured by a_____ - **Pitot tube**

28. Lossy data compression is done using – **DCT**
29. Low pass filters are used for image - **blurring**
30. Low pass filters promotes - **low intensity components**
31. Luminance is measured in - **lumens**
32. LVDS technology provides data rate upto_____ - **600Mbps**
33. MAC operation represents - **Multiply-accumulate**

34.

Major disadvantage of Turning point algorithm is 1. **Distortion time**
2. Short term time distortion
3. Long term time distortion
4. No distortion

35. Mass, in force¬ voltage analogy, is analogous to - **inductance**

36. Mass-spring seismic sensors measure directly the _____ - **shock**
37. Maximum power in a circuit can be found by _____ - **Voc2 / 4RTh**

38.

Mercury in rubber strain gauge was wrapped around the forearm of a subject and it covers 6 cm of length. Venous occlusion was applied at time t=0 and the circumference of the forearm was increased by 0.5 cm in 64 secs. The initial limb circumference was 25.3 cm. the perfusion is ____ mL/min per 100mL of tissue.
1. 4
2. 3
3. 4.5
4. 3.7

39. Minimum number of flip-flops used to build a Mod-19 counter - **5**

40. Motion of fast moving systems may be timed and studied by means of a - **Piezoelectric crystal**
41. Name that does not relates to spatial filters - **PDF**
42. Newton-Raphson method is applicable to the solution of - **Both algebraic and transcendental Equations**

43.

Newton-Raphson method is used to find the root of the equation x2 - 2 If iterations are started from - 1, then iterations will be 1. converge to -1

2. converge to √2
3. no coverage
4. converge to -√2

44. No of bits to store image is denoted by formula - b = **MxNxK**

45. On the Argand diagram, the cube roots of unity lie on - **Equilateral triangle**

46. On which of the following factors does the sensitivity of a closed loop system to gain changes and load disturbances depend? - **Frequency, Loop gain, Forward gain**

47. One eV is equal to _____ J. - **1.6 × 10–19**

48. Order of convergence of Regula-Falsi method is - **1.618**

49. Out of Regula falsi method and Newton -Raphson method, the rate of convergence is faster For---------- - **Newton –Raphson Method**

50.

Out of the given I I R filters the following filter is the efficient one 1. Circular filter

2. Elliptical filter

3. Rectangular filter

4.

Chebyshev filter

51. Paramagnetic analyser is used to measure the following gas sample in air – **Oxygen**

52.

Particular integral of the differential equation (D2+D)y = x2 +2x +4 is

1. x2/3 +4x
2. x3/3 +4x
3. x2/3 +4
4. x3/3 +4x2

53. Particular integral of the differential equation (D2+D+1)y=sin2x is

1. -1/25(sin2x + 2cos2x)
2. -1/25(3sin2x + 5cos2x)
3. -1/25(3sin2x + 4cos2x)
4. -1/25(2sin2x + 3cos2x)

54. Permeability is the inverse equivalent of which electrical term? - **resistance**

55. Phase margin of a system is used to specify which of the following? - **Relative stability**

56. Pick up false statement about pressure measurements- **Absolute pressure is measured by piezoelectric crystal**

57.

Polarogram is used for the analysis of _____

1. CO_2
2. N_2O
3. O_2
4. **CO**

58. Power line noise can be removed from ECG signal using - **RLS filter**

59.

Predictor corrector methods are self-starting methods

1. **Always true**
2. Occasionally true
3. Always false
4. Occasionally false

60. Pressure error can be measured by which of the following? - **Differential bellows and strain gauge**

61. Proportioning systems automatically intercedes to maintain the concentration of O_2 and N_2O in the ratio of - **3:1**

62. Quantitatively, spatial resolution cannot be represented in which of the following ways - **square**

63. Radium decomposes at a rate proportional to the amount at any instant. In 100 years, 100 mg of radium decomposes to 96 mg. How many mg will be left after 100 years?- **92.16**

64. Radium decomposes at a rate proportional to the amount present. If the half of the original amount disappears after 1000 years, what is the percentage lost in 100 years? - **6.70%**

65. Regenerative feedback implies feedback with - **positive sign**

66. Region of Interest (ROI) operations is commonly called as _____. - **Masking**

67. Residual signal means- **difference between the reconstructed signal and the original signal**

68. Response of derivative mask is zero at - **constant intensities**

69. Roll-off factor is - **The bandwidth occupied beyond the Nyquist Bandwidth of the filter**

70. Runge Kutta method is self-starting method 1. Occasionally false
2. Always false
3. Occasionally true
4. Always true

71. Runge Kutta method is better than Taylor's series method because 1. It does not require prior calculations of higher derivatives as the Taylor's method does
2. It require prior calculations of higher derivatives as the Taylor's method
3. It requires manipulations of higher derivatives as the Taylor's method does
4. It requires both calculations and manipulations of higher derivatives as the Taylor's method does

72. Sallen-Key filters are – **second order filters**

73. Schering bridge is used to measure - **Capacitance and dielectric loss**

74.Signal detection and estimation can be done using 1. . IDFT
2. DCT
3. Wavelet
4. KLT

75. Simple way of image compression is removing - **Superfluous data**

76. Simplest image processing technique is - **intensity transformation**

77. Simpson's rule is the most widely used numerical_____ algorithm - **integration**

78. Since Gamma photons cannot be bent by using lenses, ------ is used to selectively absorb unwanted radiation. –**Collimator**

79.
Single step methods are---- 1. Euler, Adam, Milne
2. Euler, RK method, Milne
3. Euler, Milne and Taylor
4. Modified Eular, RK method, Taylor

80. Skin effects in conductors are the resultant of _____- **Self-induced eddy currents**

81. Smallest element of an image is called – **pixel**

82. Smoothing filters are mostly used in – **blurring**

83. Soft ferromagnetic materials have _____ coercive force – **Narrow**

84. Solve (cox x cos y – cotx) dx – sin x sin y dy = 0 - sin x cos y = **ln (c sin x)**

85. Solve (x + y) dy = (x – y) dx - **x2 – 2xy – y2 = C**

86. Solve (y – √(x2 + y2)) dx – x dy = 0 - **√(x2 + y2) + y = C**

87. Solve the differential equation dy – x dx = 0, if the curve passes through (1, 0). -

x2 – 2y – 1 = 0

88. Solve the linear equation: dy / dx + y / x = x2 - **x2y = x4 / 4 + C**

89. Spatial filtering method uses - **spatial filter**

90. Speech information compression is carried out by – **DCT**

91. Spring constant in force¬ voltage analogy is analogous to - **reciprocal of capacitance**

92.

Taylor's series method will be useful to give some------- of Milne's method values

1. No
2. Middle values
3. Ending values
4. **Starting values**

93. The 2's compliment representation of -17 is - **101111**

94. The 3rd sound of a phonocardiogram recording corresponds to _- **termination of ventricular filling**

95. The _____scissor is especially useful for cutting secured duct or artery in laparoscopic surgery. – **Hook type**

96. The artifact caused due to the slow establishment of electrochemical equilibrium at the electrode-skin interface is _____ - **shifting of the baseline**

97. The attenuation of the three-section RC feedback phase-shift oscillator is – **1/29**

98. The average value of full-wave rectified voltage with a peak value of 75 V is – **47.8**

99. The band width, in a feedback amplifier - **increases by the same amount as the gain decrease**

100. The bandwidth of an ac amplifier having a lower critical frequency of 1 kHz and an upper critical frequency of 10 kHz is –**9kHz**

101. The binary fraction 0.0111 in decimal form is - **0.4375**

102. The bit distance between all odd numbered columns in the K-map is- **Always 4**

103. The blood leak level, for normal operation, is set at _____ of hb / litre of dialysate. – **25mg**

104. The Boolean expression Y = A' B' C' D + A' B C D' + A B' C' D can be minimized to - **Y = A'BCD' + B'C'D + AB'C'D**

105. The breakdown voltage of a transistor with its base open is BVCEO and that with emitter open is BVCBO, then - **BVCEO < BVCBO**

106. The capacitance, in force¬ current analogy, is analogous to - mass

107. The cell counter considers_____ as the normal range of white blood cell in male. - **4.5-11 K**

108. The channel required for FM telemetry is - **100 times that required for AM** telemetry

109. The colormap array of the indexed image is always of class - **double**

110. The complimentary function of (D4- a4)y=0 is - **y=(c1 +c2x) e-ax + c3cosax**

+c4sinax

111. The convergence of which of the following method is sensitive to starting value? – **Newton Raphson**

112. The corrector formula is applied to - **improve the value**

113.

The CORTES algorithm is a hybrid of the 1. AZTEC and LMS
2. TP and RLS
3. LMS and TP
4. TP and AZTEC algorithms

114.

The curves u(x,y) =a and v(x,y)=b are orthogonal if 1. u+v is an analytic function
2. u-v is an analytic function
3. u+iv is an analytic function
4. u and v are complex functions

115.

The dialyzer used with portable kidney machines is of _____ type
1.coil type 2.hollow fibre type 3.All the above 4. Parallel plate

116. The early effect in a bipolar junction transistor is caused by - **large collector-base reverse bias**

117. The effect of error damping is to _____. - r**educe steady state error**

118. The equation y2 = cx is general solution of: - **y' = y / 2x**

119. The error caused in vibration measuring equipment due to non- compliance of bond made between sensor and the surface it is mounted is called: - **Coupling compliance**

120. The excess 3 code for number 3 is - **0110**

121.

The family u(x,y)=x2-y2 =c represent level curves to an analytic function f(z)=u+iv, then the slope of the level curve v(x,y)=k at the point (1,-2) is: 1. 1
2. -1
3. -2
4. 2

122. The fastest Bipolar logic family is -**ECL**

123. The filter which has a figure of merit, _____ has the narrowest band pass. - **Q=20**

124. The first instrument to be inserted during a laparoscopy procedure is _____ - **Trocar**

125. The first order control system, which is well designed, has a _____. - **large negative transfer function pole**

126. The flow meter which is replacing the differential pressure meters in its applications is - **Vortex-shedding flow meter**

127. The fluid for flushing system in a blood pressure monitoring, should not exceed the rate of _____ for adults. - **6 ml/hr**

128. The following formula is used for unequal intervals of x values - **Newton's forward formula**

129. The frequency and time domain are related through which of the following? - **Laplace Transform and Fourier Integral**

130.

The function u(x,y)= is said to be harmonic if 1. uxx=uyy

2. uxx=-uyy

3. ux=uy

4. ux + uy=0

131. The gain bandwidth product of a two stage CE amplifier is - **the same as that of one stage**

132. The gauge factor of the material of strain gauge is such that the resistance changes from 1000 Ω to 1009 Ω subjected to a strain of 0.0015. The poisson's ratio for the material of the gauge wire is - **2.5**

133.

The harmonic conjugate of the function u(x,y)=x3-3xy2 is: 1. x3-y3 +c

2. 3(x2y-y3) +c

3. x3+3xy2 +c

4. 3x2y-y3 +c

134. The I I R filter design method that overcomes the limitation of applicability to only Lowpass filter and a limited class of bandpass filters is - Impulse Invariance

135. The inductive transducers working on the principle of change of self-inductance L, are connected in push pull arrangement. If the change in inductance of transducers is ΔL the change of inductance exhibited at the output terminals is - **-2ΔL**

136. The initial response when the output is not equal to input is called - **Transient response**

137. The instrument used to check insulation of household wiring is- **Megger**

138. The lead-lag circuit in the Wien-bridge oscillator has a resonant frequency at which the attenuation is - **1/3**

139. The length of instruction register of a 8085 micro processor is- **8 bits**

140. The Lissajous pattern observed on screen of CRO is a straight line inclined at 45° to x axis. If X-plate input is 2 sin ωt, the Y-plate input is- **2 sin ωt**

141. The major difference between ground and virtual ground is that virtual ground is

only a- **voltage reference**

142.
The maximum conversion time of a 10-bit counter type A-D converter driven by 1 MHz clock is 1. 1.42 μs
2. 10.54 μs
3. 0.46 μs
4. 1.024 μs

143. The maximum power delivered by a short wave diathermy machine is _____. – **500W**

144.
The minimum breakdown voltage for a pressure transducer in a medical transducer is _____
1. 4000 Vdc 2. 1000 Vdc 3.6000 Vdc 4. 10000 Vdc

145. The minimum number of 2-to-1 multiplexers required to realize a 4-to-1 multiplexer is- **3**

146. The minimum number of NAND gates required to implement sum operation of a half adder is- **5**

147. The mobility of an electron in a conductor is expressed in terms of - **cm/V-s**

148. The MOSFET switch in its on-state may be considered equivalent to -**inductor**

149. The most common technique for the design of I I R Digital filter is -**In direct method**

150. The most prominent EEG wave pattern of an awake, relaxed adult whose eyes are closed is - **Alpha**

151. The most widely used Bipolar Technology for digital ICs is- **TTL**

152. The nonlinear relation between the analog and digital frequencies is called - **warping**

153. The number of bytes required to represent the decimal number 1856357 in packed BCD (Binary Coded Decimal) form is - **4**

154. The number of comparators in a 4-bit flash ADC- **15**

155. The number of comparators in a 5-bit flash ADC- **31**

156. The number of distinct Boolean expressions of 4 variables is - **65536**

157. The only function that is analytic from the following is- **sinz**

158. The on¬ off controller is a _____ system.- **discontinuous**

159. The Op-amp can amplify- **both a.c. and d.c. signals**

160. The order of convergence in Newton-Raphson method - **2**

161. The output of a feedback control system must be a function of- **input and feedback signal**

162. The output of a logic gate is 1 when all it's a inputs are at logic 0. The gate is either- **a NOR or an EX-NOR gate**

163. The output of a particular op-amp increases 8V in 12 μs. The slew rate is - **0.67 V/μs**

164. The output voltage of a LVDT is 1.5 V at maximum displacement. At a load of 0.5MΩ, the deviation from linearity is maximum and it is 0.003 V from a straight line through origin. The linearity at the given load is - **0.3%**

165. The output voltage of an OPAMP for input voltage of Vi1 = 150 μV, Vi2 = 140 μV if the amplifier has a differential gain of Ad = 4000 and the value of CMRR is 100, is- **45.8mV**

166. The output Y of a two-bit comparator is logic 1 whenever the two-bit input A is greater than the 2-bit input B. The number of combinations for which the output is logic 1 is- **6**

167.

The particular integral of (D2 -2D +2)y = xcosx is

1. ((x2ex)/2)sinx
2. ((xex)/2)cosx
3. **((xex)/2)sinx**
4. (ex/2)sinx

168. The period of cos(3x) is- **2π /3**

169. The phase lag produced by transportation relays-**increases linearly with frequency**

170. The population of a country doubles in 50 years. How many years will it be five times as much? Assume that the rate of increase is proportional to the number inhabitants. - **116**

171. The position and velocity errors of a type¬2 system are _____ and _____ respectively.- **zero, constant**

172.

The power of He-Ne laser utilized in laser Doppler blood flowmeter is 1. 50MW

2. 500mW
3. 5mW
4. 50mW

173. The present output Qn of an edge triggered JK flip-flop is logic 0. If J=1, then Qn+1 will be logic- **1**

174. The primary and secondary of an LVDT are connected to 3 kHz sinusoidal source and ideal semiconductor diode bridge based phase sensitive demodulator circuit. The core of the LVDT remains static at 15mm above the ideal null position. The frequency of the voltage observed at the input of the low pass filter is – **3kHz**

175. The process of calculating the derivative of a function at some particular value of the independent variable by means of a set of given values of that function is- **Numerical differentiation**

176. The proportioning pumps of a dialysis machine delivers concentrate and water in the ratio of- **1:35**

177. The purpose of compensation for a thermocouple is- **To cancel unwanted voltage output of a thermocouple**

178. The range of a signed decimal numbers that can be represented by 6-bit 1's compliment number is - **-31 to +31**