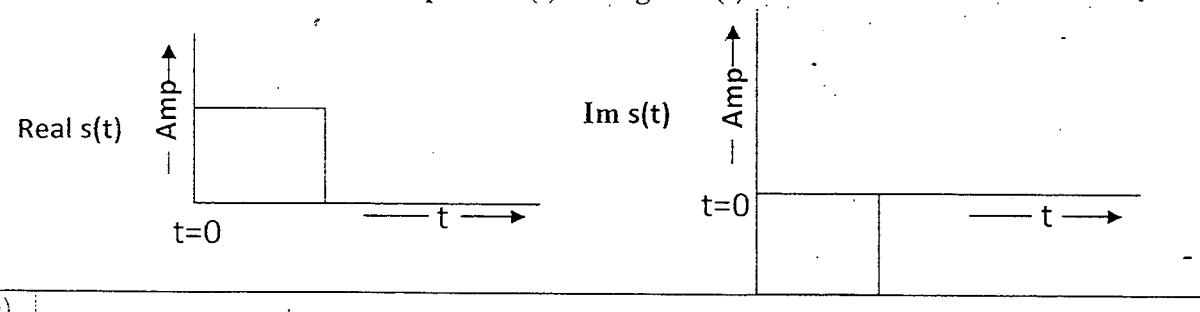
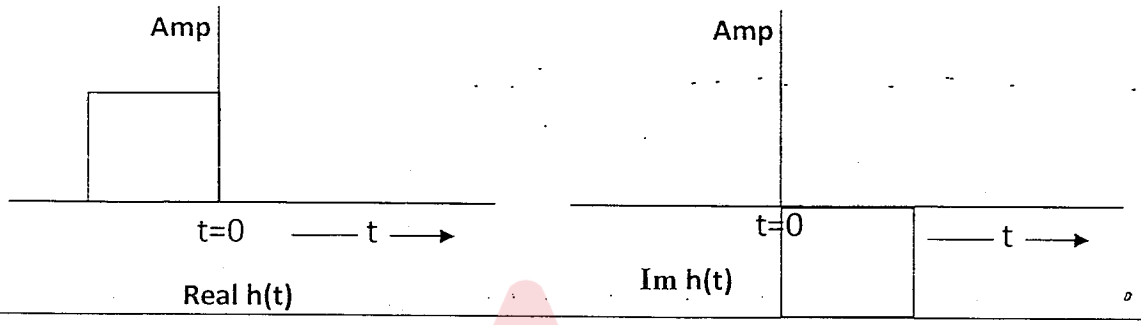
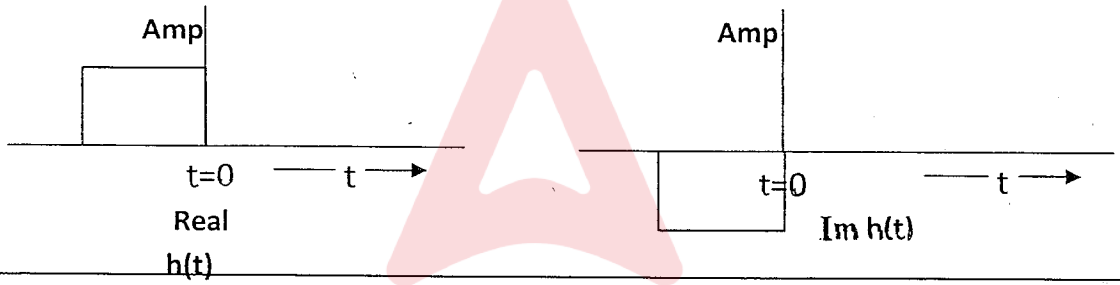
1 Determine the matched filter response h(t) for signal s(t) shown below :



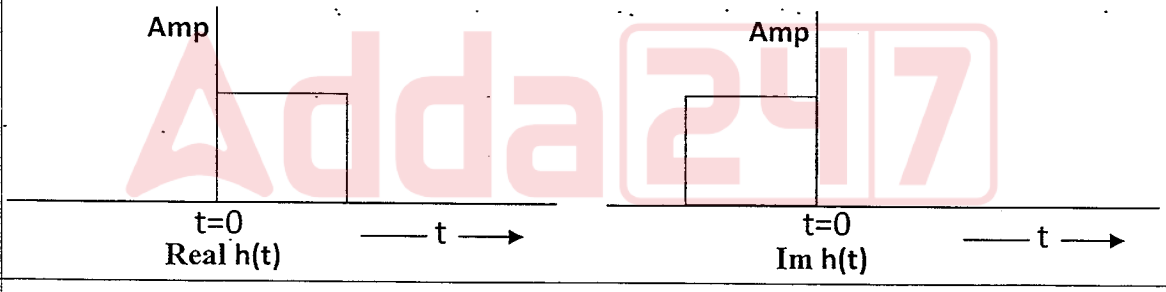
a)



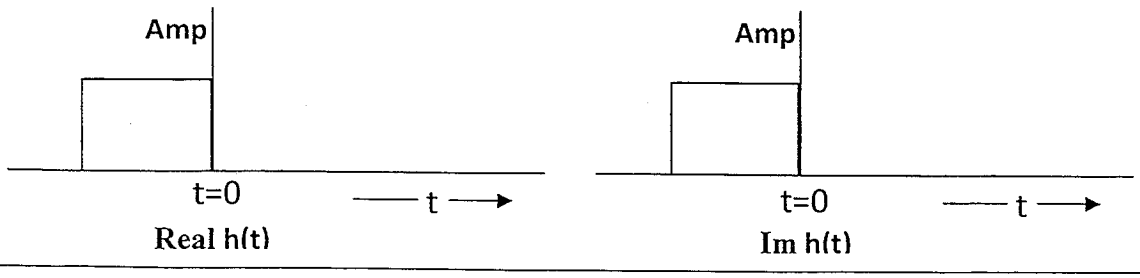
b)



c)



d)



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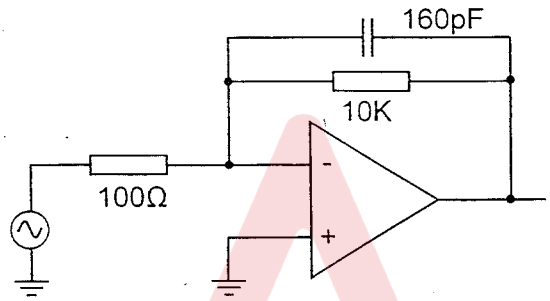
2 A signal source with 100m wavelength is connected to the input terminals of a 150m long transmission line terminated in its characteristic impedance. The phase difference between the voltages at two ends of the transmission line in steady-state condition is :

	a)	2π	b)	3π
	c)	4π	d)	π

3 A charge $Q_2 = 8.854 \times 10^{-9}$ C is located in a vacuum at P_2 (2,3,1). The force on Q_2 due to a charge $Q_1 = 4\pi \times 10^{-3}$ C at P_1 (2,2,1) is : *(Note : All the coordinates are measured in Meters. a_x, a_y and a_z are unit vectors in X, Y and Z direction respectively.)*

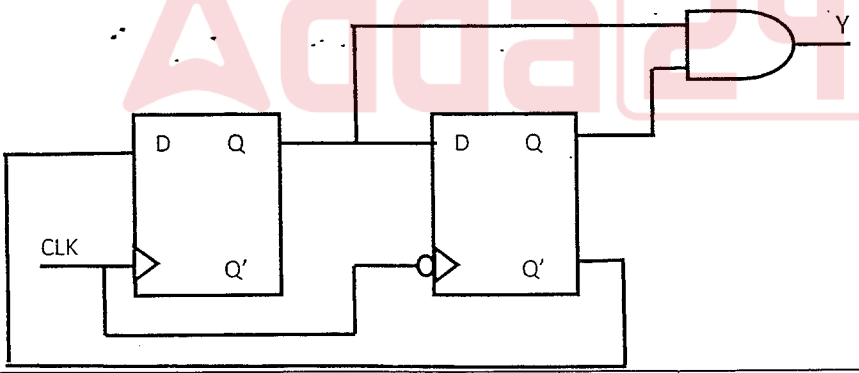
	a)	a_y N	b)	$-a_y$ N
	c)	$4a_x+5a_y+2a_z$ N	d)	$-4a_x-5a_y-2a_z$ N

4 A low pass filter as shown in following figure is built using an operational amplifier having unity gain bandwidth of 1MHz. What is the bandwidth of this circuit?

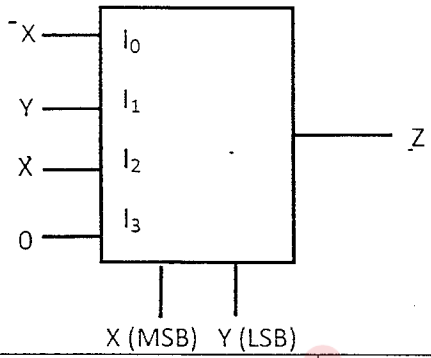
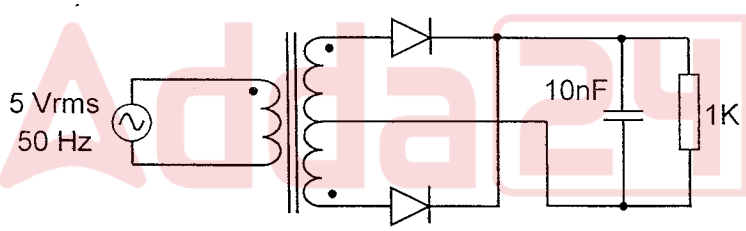
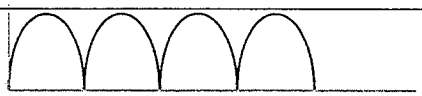
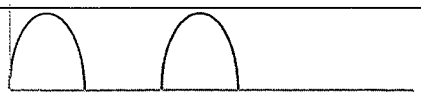


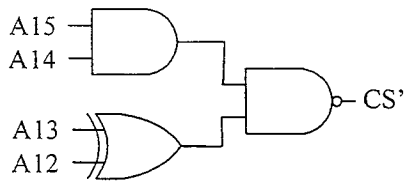
	a)	1 KHz	b)	10 KHz
	c)	100 KHz	d)	500 KHz

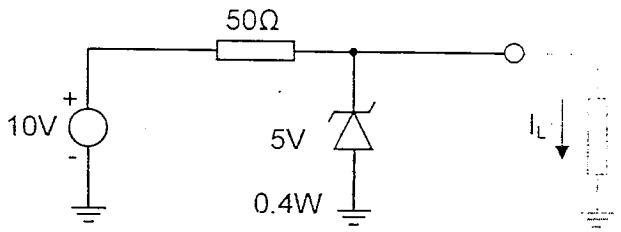
5 What is the frequency and duty cycle of output Y, when CLK frequency is 1MHz @ 50% duty cycle?



	a)	500 KHz @ 50% duty cycle	b)	500 KHz @ 25% duty cycle
	c)	250 KHz @ 50% duty cycle	d)	250 KHz @ 25% duty cycle

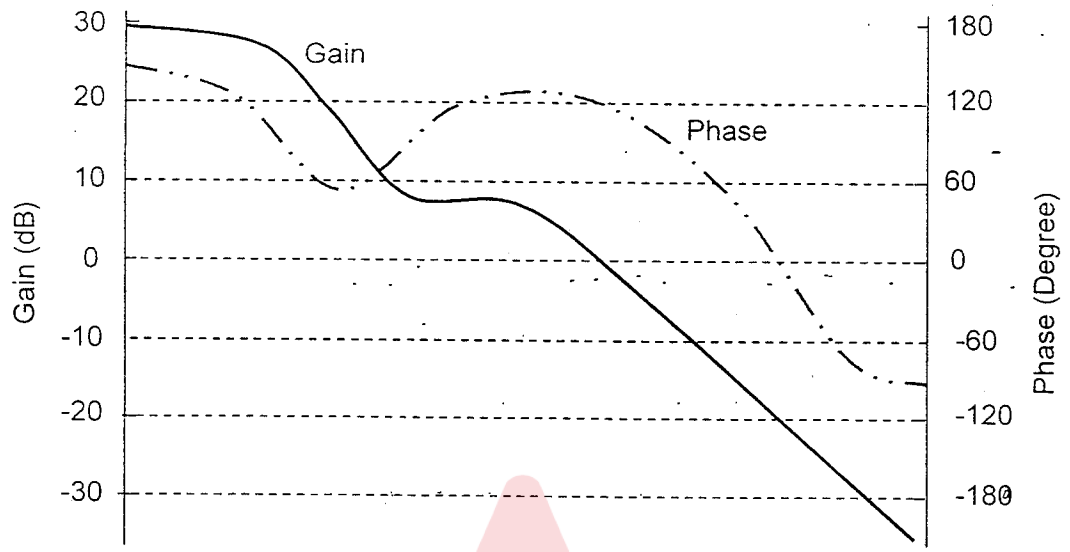
6	For an isotropic radiator, electric field intensity at a distance R is measured as 3V/m. What will be the electric field intensity at a distance 3R ?			
	a)	1 V/m	b)	$\frac{1}{3}$ V/m
	c)	$\frac{1}{9}$ V/m	d)	3V/m
7	The logic function implemented by following 4:1 MUX is 			
	a)	Z = X and Y	b)	Z = X or Y
	c)	Z = X xor Y	d)	Z = X xnor Y
8	Characteristic impedance of a two-wire transmission line at 10KHz is 200-j50 ohms. Line is terminated in its characteristic impedance, and a 28.28V p-p signal is measured at its input. Determine the real power supplied by the signal source to the line?			
	a)	0.5 W	b)	0.485W
	c)	0.47 W	d)	0.25 W
9	Which is the correct waveform across capacitor in the following circuit? 			
	a)		b)	
	c)		d)	

10	**Input voltage applied to a circuit is 1V rms and the output is 1mV rms. Net gain of the circuit is:**			
	a)	+ 30dB	b)	- 30dB
	c)	- 60dB	d)	+ 60dB
11	**Two ideal quantizers A and B have following specifications : A: 5 bit Quantizer with input dynamic range of -1V to +1V with Q1 as quantization noise power B: 8 bit Quantizer with input dynamic range of -0.5V to +0.5V with Q2 as quantization noise power. Then Q1/Q2 will be**			
	a)	16	b)	256
	c)	64	d)	128
12	**The divergence of magnetic field intensity is**			
	a)	Electric charge density	b)	Electric field intensity
	c)	Zero	d)	Conduction current density
13	**A UART is configured to transmit 8 bit data, 1 start bit and 1 stop bit. The serial data output is observed on oscilloscope, which looks like a square wave with frequency of 9600 Hz. What is the baud rate and transmitted data?**			
	a)	Baud rate = 9600, Data = 55h	b)	Baud rate = 19200, Data = 55h
	c)	Baud rate = 19200, Data = FFh	d)	Baud rate = 9600, Data = AAh
14	**A transmission line having characteristic impedance of 50ohms has to deliver 10KW power at 100KHz to a load. Maximum permissible value of rms current anywhere along the line is 20A. What is the maximum VSWR that can be tolerated on this line?**			
	a)	2	b)	1
	c)	3	d)	2.5
15	**Routh Hurwitz criterion is used to determine**			
	a)	Relative stability of the system	b)	Time response of the system
	c)	Absolute stability of the system	d)	Roots of the characteristic equation graphically
16	**The decoding circuit shown in the figure is has been used to generate active low chip select signal of memory interfaced to 8 bit microprocessor with 16 bit address bus. What is address range and size of memory?**  			
	a)	D000h to EFFFh , size= 8K Bytes	b)	D000h to DFFFh, size= 4K Bytes
	c)	C000h to FFFFh, size= 16K Bytes	d)	E000h to EFFFh, size = 4K Bytes

17	**If the waveguide cross-section of a square waveguide with TE11 propagation mode is gradually deformed into a circle, then the corresponding circular waveguide mode will be:**			
	a)	TE11	b)	TE10
	c)	TE21	d)	TE12
18	**What could be the output current rating of following shunt regulator?** 			
	a)	$0 < I_L < 100mA$	b)	$20mA < I_L < 100mA$
	c)	$0 < I_L < 50mA$	d)	$10mA < I_L < 100mA$
19	**An FM-CW (Frequency Modulated – Continuous Wave) Radar is essentially**			
	a)	Bistatic	b)	Monostatic
	c)	Can operate either as monostatic or as bistatic	d)	None of the above
20	**The flux in a magnetic core is sinusoidally varying at 200 Hz. The maximum flux density is 2 Tesla and eddy current loss is 15 W. If the frequency is raised to 400 Hz and maximum flux density reduced to 1 Tesla, the eddy current loss will**			
	a)	Reduce to half	b)	Get doubled
	c)	Reduce to one-fourth	d)	Remain same
21	**The electric field intensity E and magnetic field intensity H are coupled and propagating in free space in x and y direction respectively, the Poynting vector is given by**			
	a)	$EH\hat{x}$	b)	$EH\hat{y}$
	c)	$EH\hat{x}\hat{y}$	d)	None of the above
22	**If x and y are two random signals with zero mean Gaussian distribution having identical standard deviation, the phase angle between them is**			
	a)	Zero mean Gaussian distributed	b)	Uniform between $-\pi$ and π
	c)	Uniform between $-\pi/2$ and $\pi/2$	d)	Non-zero mean Gaussian distributed
23	**The current flowing through a capacitor in an AC circuit is :**			
	a)	Non-existent	b)	Conduction current
	c)	Displacement current	d)	None of the above

24	**Which of the following is the Boolean function for Majority Voting, assuming A,B,C are inputs and Y is output?**			
	a)	Y = AB + AC + CB	b)	Y= A+B+C
	c)	Y= ABC	d)	Y= AB + BC
25	**For broadside antenna array, the largest possible spacing between the antenna elements without any grating lobes is**			
	a)	$\lambda/2$	b)	λ
	c)	2λ	d)	None of the above
26	**For the 8085 assembly language program given below, the content of the accumulator after the execution of the program is** **3000 MVI A, 45H** **3002 MOV B, A** **3003 STC** **3004 CMC** **3005 RAR** **3006 XRA B**			
	a)	00H	b)	45H
	c)	67H	d)	E7H
27	**Conduction angle of a Class AB amplifier is:**			
	a)	<180°	b)	Between 180° and 360°
	c)	360°	d)	90°
28	**For non dispersive medium**			
	a)	Phase velocity > Group velocity	b)	Phase velocity < Group velocity
	c)	Phase velocity = Group velocity	d)	None of the above
29	**Schottky clamping is resorted in TTL gates**			
	a)	to reduce propagation delay	b)	to increase noise margins
	c)	to increase packing density	d)	to increase fan-out
30	**At cut-off frequency, the phase velocity of a waveguide is**			
	a)	Zero	b)	Infinite
	c)	Finite	d)	None of the above
31	**A Zener diode, when used in voltage stabilization circuits, is biased in**			
	a)	reverse bias region below the breakdown voltage	b)	reverse breakdown region
	c)	forward bias region	d)	forward bias constant current mode

32 **The closed loop frequency response of a dc-dc converter is shown in following figure. What are the gain and phase margins?**



	a)	20dB, 80°	b)	26dB, 80°
	c)	20dB, 120°	d)	26dB, 120°

33 **If for a silicon npn transistor, the base-to-emitter voltage (*VBE*) is 0.7V and the collector-to-base voltage (*VCB*) is 0.2 V, then the transistor is operating in the**

	a)	normal active mode	b)	saturation mode
	c)	inverse active mode	d)	cutoff mode

34 **3 port Circulator is**

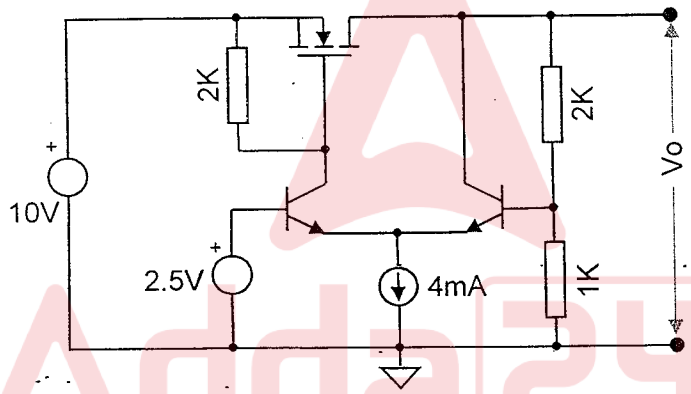
	a)	Reciprocal, matched	b)	Non reciprocal, unmatched
	c)	Non reciprocal, matched	d)	Reciprocal, unmatched

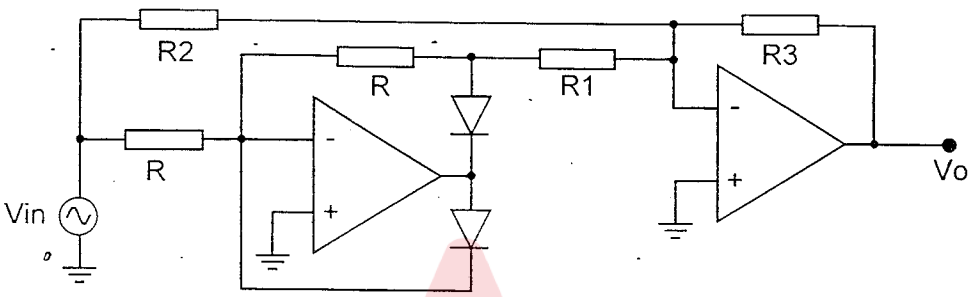
35 **An 8 bit ripple counter and an 8 bit synchronous counter are made using flip flops having a propagation delay of 10 ns each. If the worst case delay in the ripple counter and the synchronous counter be *R* and *S* respectively, then**

	a)	R = 10 ns, S = 80 ns	b)	R = 40 ns, S = 10 ns
	c)	R = 10 ns S = 10 ns	d)	R = 80 ns, S = 10 ns

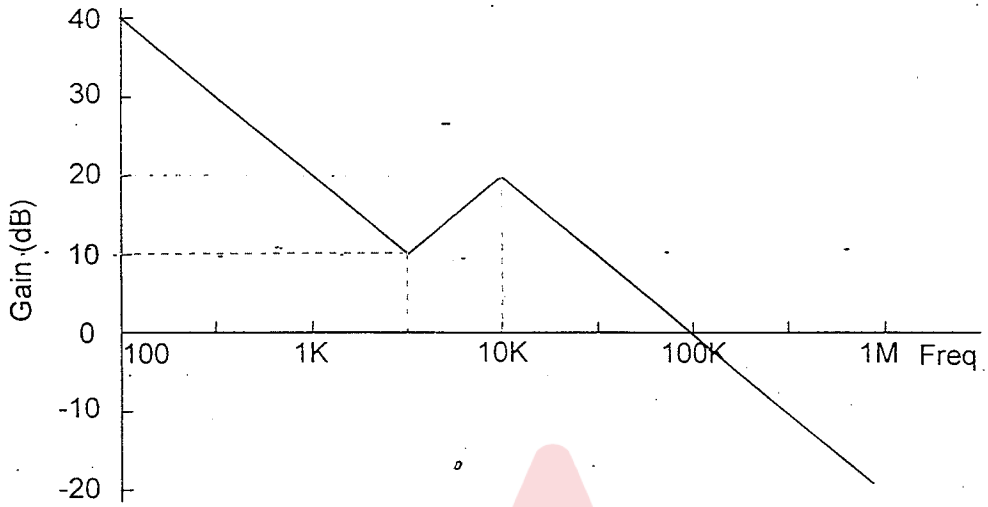
36 **Gain of an RC low pass filter having a time constant 'τ' and frequency 'ω' is:**

	a)	$\sqrt{1+(\omega\tau)^2}$	b)	$1/\sqrt{1+(\omega\tau)^2}$
	c)	$\omega\tau/\sqrt{1+(\omega\tau)^2}$	d)	$\omega\tau/\sqrt{1-(\omega\tau)^2}$

37	For a directional coupler, the quantities I (isolation in dB), D (directivity in dB), C (coupling in dB) are related by			
	a)	I=C/D	b)	I = D - C
	c)	I = D + C	d)	I= D/C
38	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 is			
	a)	1000001111	b)	00000111
	c)	11111001	d)	111111001
39	Depletion type MOSFET operates in :			
	a)	Depletion Model only	b)	Enhancement Mode only
	c)	Both depletion and enhancement mode	d)	None of the above
40	Electric Field and Magnetic Field are perpendicular to each other in :			
	a)	Klystron	b)	Magnetron
	c)	TWTA	d)	All of the above
41	A linear regulator is attempted using discrete components as shown below. What is the output voltage? 			
	a)	9.3 V	b)	7.5 V
	c)	0 V	d)	2.5 V
42	If range of a radar is to be doubled, the peak transmit power of the radar has to be :			
	a)	Increased by a factor of 2	b)	Increased by a factor of 4
	c)	Decreased by a factor of 4	d)	Increased by a factor of 16
43	The electric field measured in the far field of an antenna at a distance of 50m is 1V/m. The average power densities at a distance of 500m from the antenna is			
	a)	$26.6\mu W/m^2$	b)	$0.1\mu W/m^2$
	c)	$10\mu W/m^2$	d)	$13.3\mu W/m^2$

44	If a counter having 10 Flip Flops is initially at 0, what count will it hold after 2060 pulses ?			
	a)	000 000 1100	b)	000 001 1100
	c)	000 001 1000	d)	000 000 1110
45	For a frequency modulated signal represented by $s(t)=10\sin(6 \times 10^8 t + 2\sin 100\pi t)$. The maximum frequency deviation in the carrier from its unmodulated frequency is:			
	a)	990Hz	b)	100Hz
	c)	50Hz	d)	200Hz
46	For which of the following conditions, the circuit shown below will function as precision full wave rectifier? 			
	a)	R1 = R2 = R	b)	R1 = R3 = R
	c)	R2 = 2R1	d)	R1 = R2 = R3
47	In a monostatic radar, if the antenna aperture is doubled, then the radar range will			
	a)	Reduce by a factor of 2	b)	Increase by a factor of 2
	c)	Reduce by a factor of $\sqrt{2}$	d)	Increase by a factor of $\sqrt{2}$
48	The disadvantage of single stub matching is that			
	a)	Every load needs a new stub position	b)	Only shunt stub should be used
	c)	Only resistive load can be matched	d)	Useful only in two wire transmission line
49	A certain antenna with an efficiency of 95% has maximum radiation intensity of 0.5 W/sr. The directivity of the antenna fed by input power of 0.4 W			
	a)	16.53	b)	12.2
	c)	10.36	d)	11.31
50	A memory system of size 16 K bytes is required to be designed using memory chips which have 12 address lines and 4 data lines each. Then number of such chips required to design the memory system is			
	a)	2	b)	4
	c)	8	d)	16

51 **In the asymptotic bode plot of a transfer function of a closed loop system shown below, the number of poles and zeros are,**

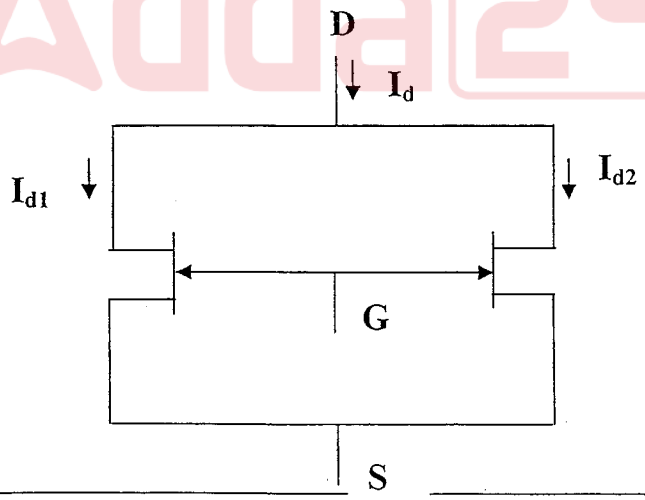


	a)	3 pole, 2 zero	b)	2 pole, 2 zero
	c)	2 pole, 1 zero	d)	3 pole, 1 zero

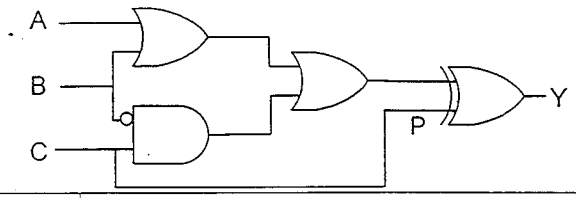
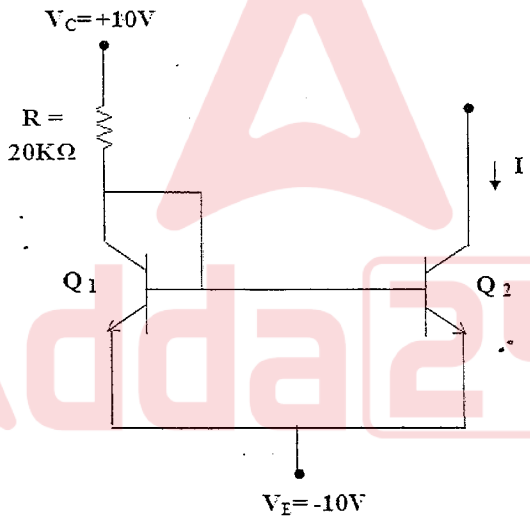
52 **Plane Wave travelling in free space has an average Poynting vector of $3W/m^2$. Average energy density (nJ/m^3)of the wave is:**

	a)	10	b)	5
	c)	1	d)	3

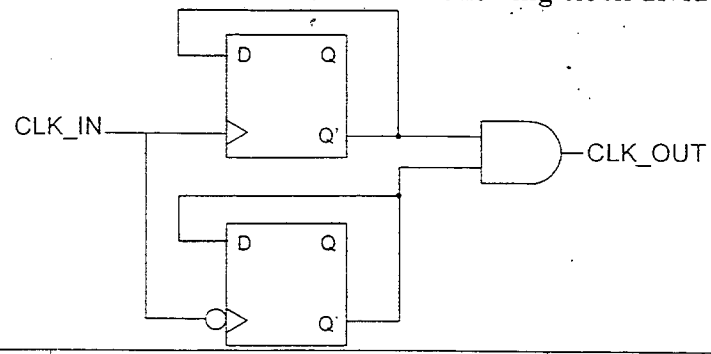
53 **For two identical n-channel JFET's connected in parallel as shown in fig. below, the pinch-off voltage of equivalent JFET is :**



	a)	Doubled	b)	Becomes half
	c)	Remains same	d)	None of the above
54	**The velocity at which a sinusoidal signal of 10^9 rad/s travels down a loss-less transmission line for which L=0.4 µH/m and C=40 pF/m is**			
	a)	2.36 x 10^8 m/s	b)	2.5 x 10^8m/s
	c)	5 x10^9 m/s	d)	4.5x10^9 m/s
55	**The Maxwell's equation $\nabla \times \overline{E} = -\frac{\partial \overline{B}}{\partial t}$ is obtained from :**			
	a)	Ampere's Law	b)	Faraday's Law
	c)	Lenz's Law	d)	Both b and c
56	**A lossless line having characteristic impedance Zo is terminated with a load impedance of jZo. VSWR of the line will be :**			
	a)	1	b)	10
	c)	Infinite	d)	None of the above
57	**A signal 1 + cos(2πft) + cos (6πft) where f=1MHz is sampled at 3MHz and Fourier Transform is carried out. How many lines will be seen in Fourier Transform?**			
	a)	5	b)	1
	c)	3	d)	2
58	**The array factor of an array antenna depends on**			
	a)	Number of radiating elements	b)	Spacing between the elements
	c)	Phase of the applied signal	d)	All of the above
59	**Which of the following parameter is improved by introducing pipelining in digital design?**			
	a)	Area (Gate count)	b)	Maximum clock frequency
	c)	Power dissipation	d)	Noise
60	**A transmission line having characteristic impedance 'Z_t' of varying length in series with a load impedance 'Z_L' appears in a Smith Chart on:**			
	a)	Constant Resistance Circle	b)	Constant VSWR Circle
	c)	Constant Reactance Circle	d)	All of the above
61	**Impedance characteristics on a Smith Chart repeat after a distance of:**			
	a)	λ	b)	λ/4
	c)	λ/2	d)	None of the above

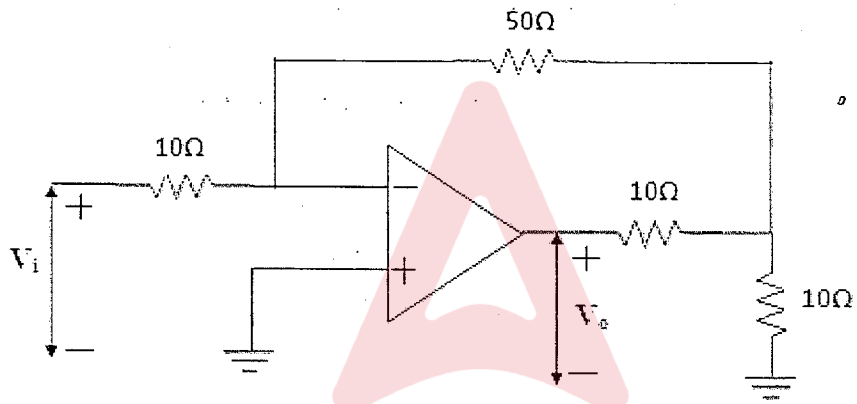
62	If τ is the time constant and ω is the applied frequency, a low pass RC filter acts as a pure integrator when:			
	a)	ωτ=0	b)	ωτ>> 1
	c)	ωτ = 1	d)	ωτ<< 1
63	10μF capacitor is connected across secondary winding of a high frequency transformer having primary to secondary turns ratio 5:2. What is the value of capacitance seen across primary?			
	a)	4μF	b)	62.5μF
	c)	25μF	d)	1.6μF
64	What will be the output of the following circuit, if point-P is stuck at 1? 			
	a)	A+B+C	b)	A'B'C'
	c)	(ABC)'	d)	0
65	For the current mirror circuit shown below, if the emitter area of Q2 is thrice of Q1, the current I is: 			
	a)	0.328mA	b)	2.955mA
	c)	0.105mA	d)	0.012mA
66	Output of an Op-amp is 1V peak, and slew rate is 5V/μs. The maximum frequency of input sinusoidal signal that can be reproduced is:			
	a)	398Hz	b)	796Hz
	c)	796KHz	d)	398KHz

67 **What is the division factor of the following clock divider circuit?**



	a)	2	b)	3
	c)	1.5	d)	2.5

68 **For the circuit given below, the voltage Vo across the op-amp output is:**

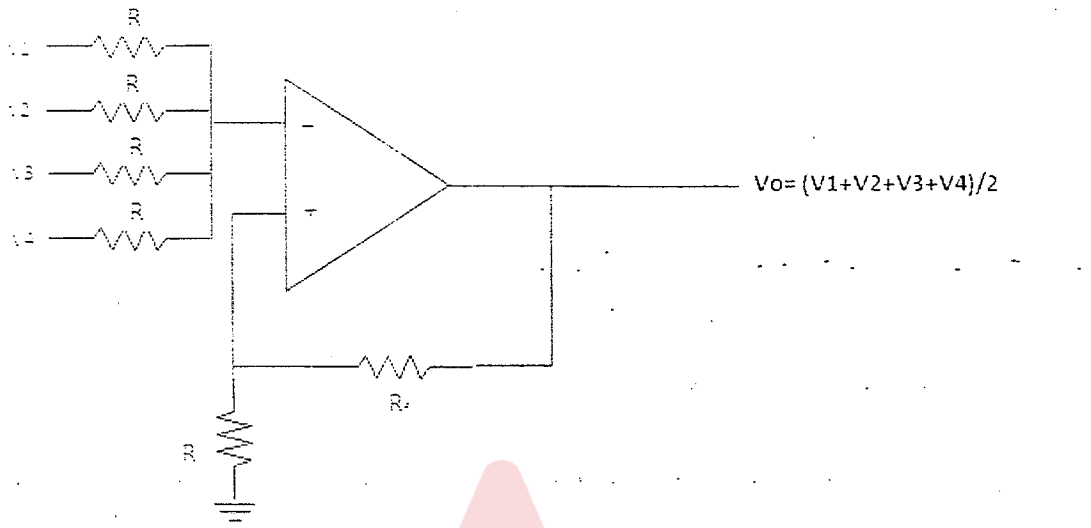


	a)	-9Vi	b)	-3Vi
	c)	-11Vi	d)	9Vi

69 **The rms value of current i(t) =I_1Sinωt + I_2Sin2ωt is:**

	a)	$(I_1^2 + I_2^2)^{1/2}$	b)	$(I_1^2/2 + I_2^2/2)^{1/2}$
	c)	$(I_1^2/2 + 2I_2^2)^{1/2}$	d)	$(I_1^2 + 4I_2^2)^{1/2}$

70 **Given the output for the following non-inverting summing amplifier, the relation between R_f and R in the circuit is :**



	a)	R_f=R	b)	R_f=4R
	c)	R_f=2R	d)	R_f=R/2

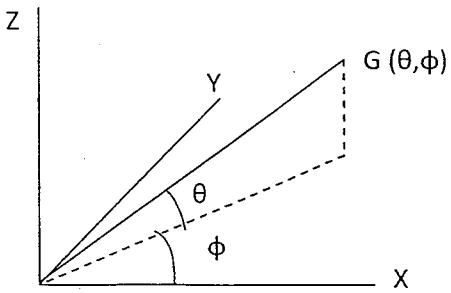
71 **A pulse signal having 100 kHz frequency and 70 nsec rise time is to be measured on an oscilloscope. The minimum required bandwidth of the oscilloscope is,**

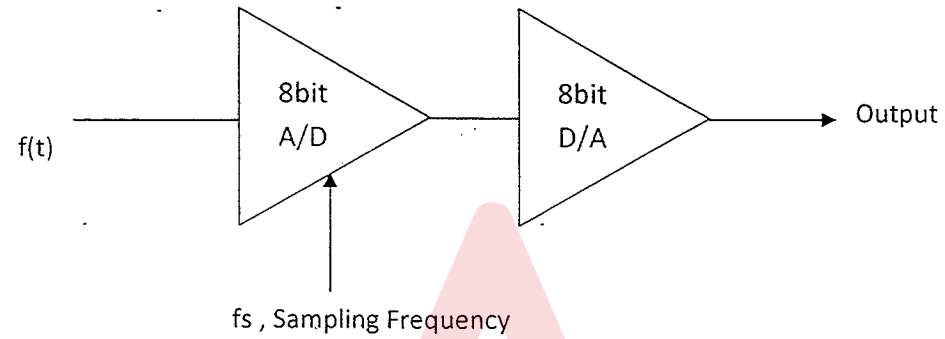
	a)	500 kHz	b)	14.3 MHz
	c)	5 MHz	d)	200 kHz

72 **Multiple collectors are used in Traveling Wave Tube (TWT) to :**

	a)	To distribute the dissipated heat evenly	b)	To increase the overall efficiency
	c)	To increase the gain of the TWT	d)	To shape the electron beam

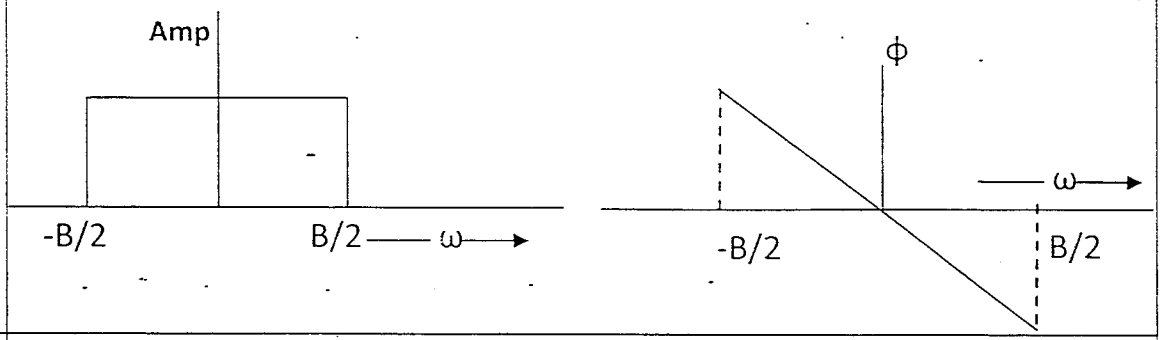
73 **A lossless antenna has directional gain G(θ,φ), then $\int_{\varphi=-\pi/2}^{\varphi=\pi/2}\int_{\theta=-\pi/2}^{\theta=\pi/2} G(\theta,\varphi)d\theta d\varphi$ is :**



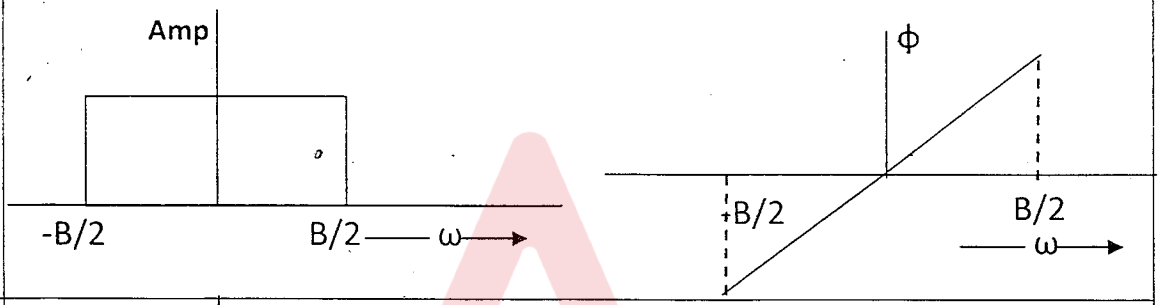
	a)	4π	b)	2π
	c)	$\leq 4\pi$	d)	$\leq 2\pi$
74	$\sqrt[3]{Cosx - jSinx}$ is equal to			
	a)	$(cosx)^{1/3} - j(sinx)^{1/3}$	b)	$\sqrt[3]{cos^2x - jsin^2x}$
	c)	$cos\frac{x}{3} - jsin\frac{x}{3}$	d)	$sin\frac{x}{3} - jcos\frac{x}{3}$
75	If f(t) is 1 MHz sinusoid with 1 Vp-p and sampling frequency fs is 25KHz, the output will be : 			
	a)	0V	b)	DC value anywhere between -1V and +1V
	c)	DC value anywhere between -0.5V and +0.5V	d)	1Vp-p 1MHz sinusoid

76 **For a practical low pass filter , the ideal amplitude and phase response will be :**

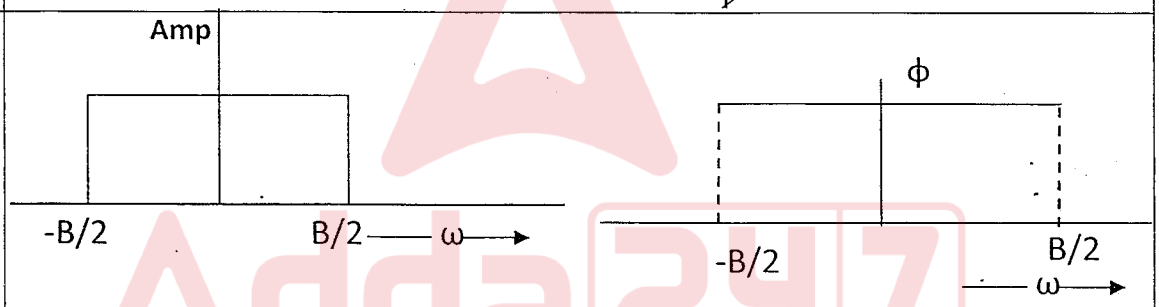
a)



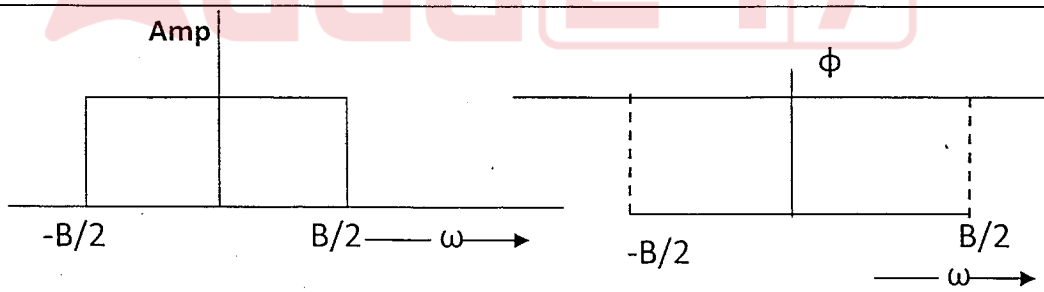
b)

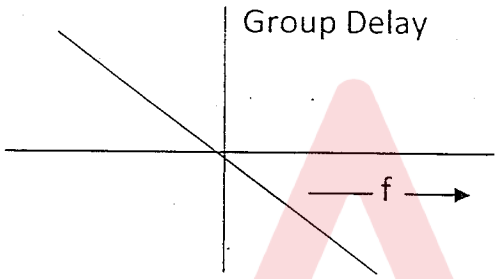
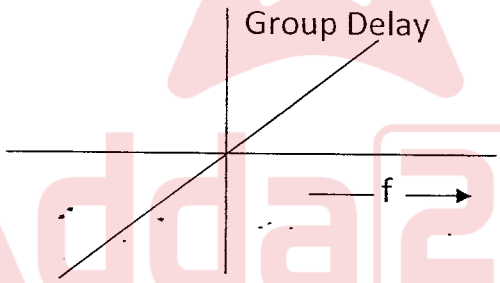
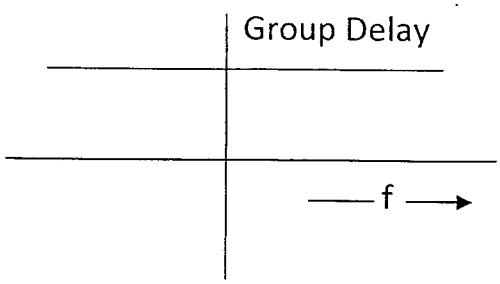


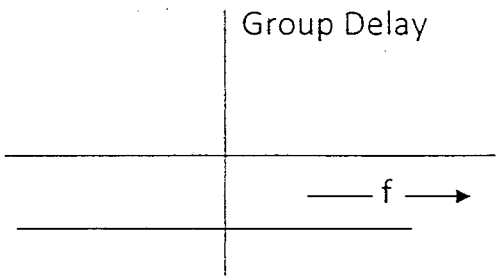
c)



d)



77	**A 10dB attenuator is put at the input of a low noise amplifier having 3dB noise figure. Now the noise figure of the cascaded amplifier will be**			
	a)	3dB	b)	12dB
	c)	7dB	d)	None of the above
78	**A 33.33% duty cycle rectangular wave is fed to the input of an Spectrum Analyzer. What will be observed?**			
	a)	$2^{nd}, 5^{th}, 8^{th}$ ..... harmonics missing	b)	$3^{rd}, 6^{th}, 9^{th}$ ..... harmonics missing
	c)	$1^{st}, 4^{th}, 7^{th}$ ..... harmonics missing	d)	All the harmonic present
79	**Phase function of a filter is $(f) = kf^2, k > 0$. The group delay of the filter has the shape**			
	a)			
	b)			
	c)			

	d)	
80	**1V p-p sinusoid is digitized by a 4 bit A-to-D converter with input dynamic range of 2V p-p. The signal to noise ratio of the digitized signal is :**	
	a)	384
	b)	96
	c)	48
	d)	24

End of questions