NATIONAL INSTITUTE OF TECHNICAL TEACHERS TRAINING AND RESEARCH

(DEEMED TO BE UNIVERSITY UNDER DISTINCT CATEGORY)

CHANDIGARH

Ph.D. Entrance Examination - August 2025

Subject / Branch / Department	:	ELECTRONICS & COMMUNICATION ENGINEERING
Roll No.	:	
Candidate Name	:	
Date of Examination	:	

Maximum Marks: 25 (There is no negative marking)

Notes: (a) Only one option to be tick-marked out of the four options given as answer

(b) The Candidate must put his/her signature with date at the bottom of each page

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Q1.	An ideal op-amp is an ideal
(a)	Voltage controlled current source
(b)	Voltage controlled Voltage source
(c)	Current controlled current source
(d)	Current controlled Voltage source
Q2.	A BJT is said to be operating in the saturation region if
(a)	Both the junctions are reverse biased
(b)	Base-Emitter junction is reverse biased and Base-Collector junction is forward biased
(c)	Base-Emitter junction is forward biased and Base-Collector junction is reverse biased
(d)	Both the junctions are forward biased
Q3.	The Zener diode is primarily used as:
(a)	Oscillator
(b)	Rectifier
(c)	Voltage regulator
(d)	Amplifier
Q4.	The dynamic resistance of a Zener diode in breakdown region is:
(a)	Very high
(b)	Zero
(c)	Very low
(d)	Negative

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Q5.	A 2's complement representation of a 16-bit number (one sign bit and 15 magnitude bits) if FFFF , its magnitude in decimal representation is
(a)	0
(b)	1
(c)	32, 767
(d)	65, 535
Q6.	An R-S Latch
(a)	Combinatorial circuit
(b)	Synchronous sequential circuit
(c)	One-bit memory element
(d)	One clock delay element
Q7.	In a DRAM
(a)	Periodic refreshing is not required
(b)	Information is stored in a capacitor
(c)	Information is stored in a latch
(d)	Both read and write operations can be performed simultaneously
Q8.	The process of adding impurities to a semiconductor to increase its conductivity is called:
(a)	Polishing
(b)	Refining
(c)	Purification
(d)	Doping
Q9.	The noise variance for AWGN is:
(a)	N0
(b)	N0/2
(c)	N0/4
(d)	2N0
Q10.	Auto correlation function $Rx(\tau)$ of a stationary process X(t) is:
(a)	A deterministic function with maximum value at $\tau=0$.
(b)	A deterministic function which is periodic.
(c)	A stationary random process.
(d)	A periodic stationary process.
Q11.	Amplitude modulation is a type of _____ modulation.
(a)	Frequency
(b)	Phase

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(c)	Carrier
(d)	Both a and b
Q12.	In the context of the Channel Capacity Theorem, what role does channel bandwidth play in determining the capacity of a communication channel?
(a)	Channel bandwidth has no effect on channel capacity.
(b)	Channel bandwidth is directly proportional to channel capacity.
(c)	Increasing channel bandwidth decreases channel capacity.
(d)	Channel bandwidth is inversely proportional to channel capacity.
Q13.	Calculate the baud rate of ASK signal having a bit rate of 400bps.
(a)	800 baud/s
(b)	300 baud/s
(c)	400 baud/s
(d)	200 baud/s
Q14.	In the context of digital communications, what is the primary benefit of using a matched filter?
(a)	It reduces intersymbol interference.
(b)	It requires less power for the same performance.
(c)	It increases the transmission bandwidth.
(d)	It enhances the phase stability of the received signal.
Q15.	Quantizing noise occurs in
(a)	TDM
(b)	FDM
(c)	PPM
(d)	PCM
Q16.	In context of error detection and correction in computer networks, CRC stands for:
(a)	Cyclic Reduction Code
(b)	Cyclic Redundancy Check
(c)	Cyber Request Check
(d)	Cyber Repetition Code
Q17.	The wavelength (λ) in meters of an electromagnetic wave is related to its frequency (f) in MHz as:
(a)	$\lambda = (3x10^8)/f$
(b)	$\lambda = (3x10^{10})/f$
(c)	$\lambda = 300/f$

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(d)	$\lambda = 30/f$
Q18. For a plane travelling EM wave, the correct equation for characteristic impedance Z for the medium with permittivity of ε and permeability of μ is:	
(a)	$Z = \sqrt{\frac{\mu}{\varepsilon}}$
(b)	$Z = \sqrt{\frac{\varepsilon}{\mu}}$
(c)	$Z = \sqrt{(\mu * \varepsilon)}$
(d)	$Z = \frac{1}{\sqrt{(\mu * \varepsilon)}}$
Q19. According to superposition theorem, when analyzing a circuit with multiple sources:	
(a)	All sources must be considered simultaneously
(b)	Only voltage sources are considered
(c)	Each source is considered one at a time with others replaced by their internal impedances
(d)	Only current sources are considered
Q20. Which transform is widely used for solving differential equations in circuit analysis?	
(a)	DFT
(b)	Laplace Transform
(c)	Z Transform
(d)	DTFT
Q21. In an RLC circuit, resonance occurs when:	
(a)	Inductive reactance = Capacitive reactance
(b)	Resistance = Reactance
(c)	Inductance = Capacitance
(d)	Voltage = Current
Q22. The z-transform is useful in analyzing:	
(a)	Continuous-time systems
(b)	Discrete-time systems
(c)	Only sinusoidal signals
(d)	Power electronic circuits
Q23. In a negative feedback control system, the main advantage is:	
(a)	Gain increases
(b)	Disturbance is amplified

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(c)	Stability improves
(d)	Noise increases
Q24. The block diagram of a control system represents:	
(a)	Internal structure
(b)	Flow of signals between components
(c)	Only the mechanical system
(d)	State equations
Q25. The time taken for a system response to reach and stay within a specified percentage (like 2% or 5%) of its final value is called:	
(a)	Delay time
(b)	Peak time
(c)	Stability time
(d)	Settling time

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Reference key

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Question No.	Answer No.
Q1	b
Q2	d
Q3	c
Q4	c
Q5	b
Q6	c
Q7	b
Q8	d
Q9	b
Q10	a
Q11	c
Q12	b
Q13	c
Q14	a
Q15	d
Q16	b
Q17	c

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Q18	a
Q19	c
Q20	b
Q21	a
Q22	b
Q23	c
Q24	b
Q25	d

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BM Mahendra 29/8/25

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