NATIONAL INSTITUTE OF TECHNICAL TEACHERS TRAINING AND RESEARCH

(DEEMED TO BE UNIVERSITY UNDER DISTINCT CATEGORY)

CHANDIGARH

Ph.D. Entrance Examination - December 2025 Session

Subject / Branch / Department :	ELECTRICAL 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

(c) For any rough work, please use ONLY back-sides of pages which are left blank

Q1.	**In a single-phase full bridge rectifier with RL load, freewheeling diode is used to:**
(a)	Reduce harmonics
(b)	Provide continuous load current
(c)	Step up voltage
(d)	Improve commutation
Q2.	**Thevenin's theorem reduces a linear circuit to:**
(a)	Current source and parallel resistance
(b)	Voltage source and series resistance
(c)	Purely resistive network
(d)	Star–delta equivalent
Q3.	**If A is a 3×3 matrix with eigenvalues 1, 2, 3, then det(A) = ?**
(a)	6
(b)	0
(c)	1
(d)	2
Q4.	**A D flip-flop stores data:**
(a)	On rising edge of clock
(b)	On falling edge of clock
(c)	Both edges of clock
(d)	Only when reset is applied

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Q5.	**Gauss's law states:**
(a)	$\oint E \cdot dl = 0$
(b)	$\oint E \cdot dA = Q\_enclosed/\varepsilon_0$
(c)	$\oint B \cdot dA = Q\_enclosed$
(d)	$\oint H \cdot dl = \varepsilon_0 E$
Q6.	**A purely inductive circuit draws current that:**
(a)	Leads voltage by 90°
(b)	Lags voltage by 90°
(c)	In phase with voltage
(d)	Zero current
Q7.	**A transformer works on:**
(a)	Coulomb's law
(b)	Electromagnetic induction
(c)	Ohm's law
(d)	Fleming's left hand rule
Q8.	**The equal area criterion is used for:**
(a)	Voltage stability
(b)	Transient stability
(c)	Frequency control
(d)	Harmonic analysis
Q9.	**Nyquist sampling theorem requires:**
(a)	$f\_s > f\_max$
(b)	$f\_s \geq 2\, f\_max$
(c)	$f\_s \geq f\_max/2$
(d)	$f\_s = f\_max$
Q10.	**A root locus plot shows:**
(a)	Poles/zeros vs frequency
(b)	Location of closed-loop poles as gain varies
(c)	Step response
(d)	Signal distortion
Q11.	**The torque–speed curve of a DC shunt motor is:**
(a)	Constant torque
(b)	Torque linearly independent of speed
(c)	Hyperbolic

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(d)	Linear with speed
Q12. **In an RLC series circuit at resonance:**	
(a)	Current is minimum
(b)	Power factor is unity
(c)	Voltage across inductor = 0
(d)	Net reactance is maximum
Q13. **Load flow analysis provides:**	
(a)	Stability margin
(b)	Voltage magnitude & angle at buses
(c)	Fault MVA directly
(d)	Torque angle
Q14. **For a unity feedback system, steady-state error to a ramp input is inversely proportional to:**	
(a)	Kp
(b)	Kv
(c)	Ka
(d)	System order
Q15. **A Wattmeter's pressure coil is connected:**	
(a)	In series with load
(b)	Across load
(c)	In series with current coil
(d)	Across supply neutral
Q16. **An inverting op-amp has a phase shift of:**	
(a)	0°
(b)	90°
(c)	180°
(d)	360°
Q17. **A buck converter is used to:**	
(a)	Step down DC voltage
(b)	Step up DC voltage
(c)	Convert AC to DC
(d)	Convert DC to AC

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Q18. **The skin effect in conductors:**	
(a)	Increases resistance at high frequency
(b)	Decreases resistance at high frequency
(c)	Decreases inductance
(d)	Eliminates current flow
Q19. **The Laplace transform of e^{at} is:**	
(a)	$1/(s-a)$
(b)	$1/(s+a)$
(c)	$s/(s-a)$
(d)	$a/(s-a)$
Q20. **A SCR is turned off by:**	
(a)	Forward biasing gate
(b)	Removing anode current below holding current
(c)	Reverse biasing gate
(d)	Increasing temperature
Q21. **Poynting vector represents:**	
(a)	Stored energy in a field
(b)	Power flow per unit area
(c)	Capacitance per unit length
(d)	Magnetic flux density
Q22. **In a 3-phase induction motor, slip at synchronous speed is:**	
(a)	0
(b)	1
(c)	Between 0 and 1
(d)	Negative
Q23. **The per-unit system is preferred because:**	
(a)	Removes frequency dependence
(b)	Values become dimensionless and comparable
(c)	Reduces harmonics
(d)	Eliminates resistance
Q24. **Routh–Hurwitz criterion determines:**	
(a)	Response speed

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(b)	Closed-loop stability
(c)	Gain margin
(d)	Nyquist contour

Q25. **An instrument transformer is mainly used for:**

(a)	Power factor correction
(b)	Insulation testing
(c)	Extending measurement range
(d)	Frequency conversion

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ANSWER KEY PhD ENTRANCE TEST

1. (b), 2. (b), 3. (a) 4. (a), 5. (b), 6. (b) 7. (b), 8. (b), 9. (b) 10. (b), 11. (b), 12. (b) 13. (b),14. (b), 15. (b), 16. (c) 17. (a), 18. (a), 19. (a) 20. (b), 21. (b), 22. (a) , 23. (b), 24. (b), 25. (c)

Ashish (ASHISH)
29/8/25