TN TRB
Asst Prof.

Previous Year Paper
(Electronics Engg.)
06 Apr, 2025

The recruitment of 'ASSISTANT PROFESSORS', 'ASSISTANT LIBRARIANS' and 'ASSISTANT DIRECTORS PHYSICAL EDUCATION' in various disciplines for the University Colleges of Engineering Regional Campuses of Anna University, Chennai

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Master Question Paper

Module Name : Electronics and Communication Engineering
Exam Date : 06-Apr-2025 Batch : 09:00-12:30

Sr. No.	Electronics and Communication Engineering
	PAPER I
1	‘பதிந்து’ சரியான உறுப்பிலக்கணம் தருக. A : பதி + த் + த் + உ B : பதி + த்(ந்)+ த் + உ -(Correct Option) C : பதி + த் + து D : பதி + ந் + த் + உ
2	பிரித்தெழுதுக. – ‘நுண்மையுற்றாலொழிய’ A : நுண்மையுற்றால் + ஒழிய B : நுண்மை + உற்றால் + ஒழிய -(Correct Option) C : நுண்மை + உற்றாலொழிய D : நுண் + மையுற்றால் + ஒழிய
3	பகுபத உறுப்பிலக்கணம் தருக. ‘தொடுப்பது’ A : தொடு + ப் + ப் + அ + து -(Correct Option) B : தொடு + ப் + ப் + அது

C : தொடு + ப் + அது

D : தொடு + ப் + அ + து

4 ‘உறங்கு’ ‘இறங்கு’ என்னும் சொற்களில் அமைந்துள்ள குற்றியலுகரம் :

A : வன் தொடர்க் குற்றியலுகரம்

B : இடைத் தொடர்க் குற்றியலுகரம்

C : உயிர்த் தொடர்க் குற்றியலுகரம்

D : மென் தொடர்க் குற்றியலுகரம் -(Correct Option)

5 சொற்களை ஒழுங்குபடுத்திச் சொற்றொடராக்குக.

A : வறுமை சிறிதும் இல்லாததால், கோசல நாட்டில் கொடைக்கு அங்கே இடமில்லை

B : கொடைக்கு அங்கே இடமில்லை, கோசல நாட்டில் வறுமை சிறிதும் இல்லாததால்

C : கோசல நாட்டில் வறுமை சிறிதும் இல்லாததால், கொடைக்கு அங்கே இடமில்லை -(Correct Option)

D : வறுமை சிறிதும் இல்லாததால், கொடைக்கு அங்கே இடமில்லை கோசல நாட்டில்

6 பொருந்தாத இணையைக் கண்டறிக :

	உறுப்பு		அணிகலன்
(a)	காலில் அணிவது	-	சிலம்பு
(b)	காதில் அணிவது	-	குண்டலம்
(c)	இடையில் அணிவது	-	தூழி
(d)	நெற்றியில் அணிவது	-	சுட்டி

A : (a)

B : (b)

C : (c) -(Correct Option)

D : (d)

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பொருத்துக :

	சொல்		இலக்கணக் குறிப்பு
(அ)	எழுந்து	(1)	உவமைத் தொடர்
(ஆ)	சார்ந்தோர்	(2)	பெயரெச்சம்
(இ)	தணியாத	(3)	தொழிற்பெயர்
(ஈ)	பொன் நிதிபோல்	(4)	வினையாலணையும் பெயர்
		(5)	வினையெச்சம்

A : (அ)-(4), (ஆ)-(5), (இ)-(1), (ஈ)-(2)

B : (அ)-(5), (ஆ)-(4), (இ)-(2), (ஈ)-(1) -(Correct Option)

C : (அ)-(1), (ஆ)-(5), (இ)-(4), (ஈ)-(3)

D : (அ)-(3), (ஆ)-(2), (இ)-(5), (ஈ)-(4)

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பொருந்தாத இணையைக் கண்டறிக.

A : பிரபஞ்சம் – உலகம்

B : நுண்மை – கூர்மை

C : பிணைத்தல் – வேறுபடுத்துதல் -(Correct Option)

D : தொடுப்பது – சேர்ப்பது

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பொருத்துக :

(அ)	பைம்பொன்	(1)	எண்ணும்மை
(ஆ)	குண்டலமும், குழைகாதும்	(2)	பெயரெச்சம்
(இ)	ஆடுக	(3)	பண்புத்தொகை
(ஈ)	கட்டிய	(4)	வியங்கோள் வினைமுற்று

A : (அ)-(2), (ஆ)-(4), (இ)-(1), (ஈ)-(3)

B : (அ)-(3), (ஆ)-(1), (இ)-(2), (ஈ)-(4)

C : (அ)-(1), (ஆ)-(3), (இ)-(4), (ஈ)-(2)

D : (அ)-(3), (ஆ)-(1), (இ)-(4), (ஈ)-(2) -(Correct Option)

10	அறனீனும் இன்பமும் ஈனும் _____ தீதின்றி வந்த _____. A : திறன் பார்த்து, சொல் B : திறனறிந்து, பொருள் -(Correct Option) C : செயல்பட்டு, செல்வம் D : நெறியறிந்து, பொழுது
11	‘வில் பிடித்த’ – இச்சொல்லின் இலக்கணக் குறிப்பு யாது ? A : பண்புத் தொகை B : வினைத் தொகை C : இரண்டாம் வேற்றுமைத் தொகை -(Correct Option) D : நான்காம் வேற்றுமைத் தொகை
12	பொருத்துக : (அ) இடையாளோடும், இளையானோடும் (1) நான்காம் வேற்றுமைத் தொகை (ஆ) நெடும்படை (2) வினைத் தொகை (இ) விரிசோதி (3) பண்புத் தொகை (ஈ) காலதூதர் (4) எண்ணும்மை A : (அ)-(4), (ஆ)-(3), (இ)-(2), (ஈ)-(1) -(Correct Option) B : (அ)-(1), (ஆ)-(2), (இ)-(3), (ஈ)-(4) C : (அ)-(3), (ஆ)-(2), (இ)-(1), (ஈ)-(4) D : (அ)-(4), (ஆ)-(1), (இ)-(2), (ஈ)-(3)
13	பொருத்துக : (அ) வெய்யோன் (1) பகைவர் (ஆ) வேழம் (2) மேகம் (இ) கொண்டல் (3) யானை (ஈ) செறுநர் (4) பகலவன்

A : (அ)-(4), (ஆ)-(3), (இ)-(1), (ஈ)-(2)

B : (அ)-(4), (ஆ)-(3), (இ)-(2), (ஈ)-(1) -(Correct Option)

C : (அ)-(1), (ஆ)-(2), (இ)-(3), (ஈ)-(4)

D : (அ)-(2), (ஆ)-(3), (இ)-(4), (ஈ)-(1)

14 ‘அறனீனும்’ என்னும் சொல்லைச் சீர்பிரித்து வாய்பாடு தருக.

A : நிரை, நேர், நேர் – புளிமாங்காய் -(Correct Option)

B : நிரை, நிரை – கருவிளம்

C : நேர், நேர், நேர் – தேமாங்காய்

D : நேர், நிரை, நேர் – கூவிளங்காய்

15 கருவியும் காலமும் செய்கையும் செய்யும்
அருவினையும் மாண்ட தமைச்சு –இக்குறட்பாவில் பயின்றுவரும் எதுகை நயத்தைக் குறிப்பிடுக.

A : கருவியும், காலமும்

B : அருவியும், காலமும்

C : கருவியும், அருவினையும் -(Correct Option)

D : கருவியும், செய்கையும்

16 திணைக்கேற்ற தொழிலைப் பொருத்துக.

	திணை		தொழில்
(அ)	குறிஞ்சி	(1)	நெல்லரித்தல்
(ஆ)	முல்லை	(2)	தேனெடுத்தல்
(இ)	மருதம்	(3)	உப்பு விற்றல்
(ஈ)	நெய்தல்	(4)	நிரைமேய்த்தல்

A : (அ)-(2), (ஆ)-(4), (இ)-(3), (ஈ)-(1)

B : (அ)-(2), (ஆ)-(3), (இ)-(4), (ஈ)-(1)

C : (அ)-(1), (ஆ)-(2), (இ)-(3), (ஈ)-(4)

	D : (அ)-(2), (ஆ)-(4), (இ)-(1), (ஈ)-(3) -(Correct Option)
17	நேர், நிரை, நேர் – கூவிளங்காய் – இவ்வாய்பாடு பயின்று வரும் சொல்லைக் கண்டறிக. A : அருளொடும் B : ஆள்வினையும் -(Correct Option) C : அறனீனும் D : குன்றேறி
18	தவறான இணையைக் கண்டுபிடிக்கவும். A : கார்காலம் – ஆவணி, புரட்டாசி B : முன்பனி – மார்கழி, தை C : முதுவேனில் – ஆனி, ஆடி D : குளிர்காலம் – மாசி, பங்குனி -(Correct Option)
19	"பொருளல் லவரைப் பொருளாகச் செய்யும் பொருளல்ல தில்லை பொருள்". – இக்குறட்பாவில் பயின்று வரும் அணி எது ? A : சொற்பொருள் பின்வரு நிலையணி B : வஞ்சப்புகழ்ச்சி அணி C : உருவக அணி D : சொல் பின்வருநிலை அணி -(Correct Option)
20	தவறான இணையைத் தேர்ந்தெடுக்கவும் : A : சா. கந்தசாமி – பாய்ச்சல் B : சாயாவனம் – புதினம்

	C : விசாரணைக் கமிஷன் – ஞானபீட விருது -(Correct Option) D : தக்கையின் மீது நான்கு கண்கள் – சிறுகதை தொகுப்பு
21	“மேடையிலே வீசுகின்ற மெல்லியபூங் காற்றே” என்ற பாடலைப் பாடியவர் யார் ? A : தாயுமானவர் B : வள்ளலார் -(Correct Option) C : அருணகிரிநாதர் D : கண்ணதாசன்
22	‘உண்மையான செல்வம் என்பது பிறர் துன்பம் தீர்ப்பதுதான்’ என்று கூறியவர் ? A : நல்வேட்டனார் -(Correct Option) B : நல்லந்துவனார் C : நக்கீரனார் D : நப்பூதனார்
23	தமிழகத்தின் வடக்கெல்லை வேங்கட மலையாகவும் தெற்கெல்லை குமரிமுனையாகவும் இருந்ததாகக் குறிப்பிடும் இலக்கியங்கள் எவை ? A : புறநானூறு, தொல்காப்பியம் B : புறநானூறு, சிலப்பதிகாரம் -(Correct Option) C : சிலப்பதிகாரம், பட்டினப்பாலை D : அகநானூறு, மதுரைக் காஞ்சி
24	நிரல்நிறைப் பொருள்கோள் எத்தனை வகைப்படும் ? A : ஐந்து

	B : மூன்று C : நான்கு D : இரண்டு -(Correct Option)
25	‘மொழி பெயர்த்தல்’ என்ற தொடரைத் தொல்காப்பியர் எந்த இயலில் குறிப்பிட்டுள்ளார் ? A : மரபியல் -(Correct Option) B : செய்யுளியல் C : கிளவியாக்கம் D : தொடரியல்
26	கரிசல் இலக்கியப் பரம்பரையைச் சேராத எழுத்தாளர் யார் ? A : பிரபஞ்சன் -(Correct Option) B : வேல ராமமூர்த்தி C : பூமணி D : சோ. தர்மன்
27	மையோ மரகதமோ மறிகடலோ மழை முகிலோ – இத்தொடரில் அமைந்துள்ள வினா வகை. A : அறி வினா B : அறியா வினா C : ஐய வினா -(Correct Option) D : கொளல் வினா

28	“ஏர்பிடிக்கும் கைகளுக்கே வாழ்ததுக் கூறுவோம்” என்று பாடியவர் யார் ? A : பட்டுக்கோட்டை கல்யாண சுந்தரம் B : கா.மு. ஷெரீப் -(Correct Option) C : மருதகாசி D : உடுமலை நாராயணகவி
29	விழிகளை இழக்க நேரிட்டால் கூட தாய்த் தமிழினை இழந்துவிடக் கூடாது என்று எண்ணியவர் யார் ? A : இரா. இளங்குமரனார் -(Correct Option) B : திரு.வி.க C : அப்பாத்துரையார் D : பாவாணர்
30	‘அசைஇ’ என்ற சொல்லுக்குச் சரியான பொருளைத் தேர்வு செய்க. A : பள்ளம் B : அருமை C : இளைப்பாறி -(Correct Option) D : தங்கி
	PAPER II
31	For what value of k, the vector $\begin{pmatrix}3\\k\\0\end{pmatrix}$ is an eigen vector of the matrix $\begin{pmatrix}4&2&2\\2&4&2\\0&0&2\end{pmatrix}$? A : 1

	B : 2 C : 3 -(Correct Option) D : 4
32	Rank of the matrix $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 5 \\ -1 & 0 & 1 & 2 \\ 2 & 2 & 2 & 2 \end{pmatrix}$ is A : 1 B : 2 -(Correct Option) C : 3 D : 4
33	The system of linear equation $x + y + z = 1$ $x - y + z = 0$ $x - 5y + z = -2$ has A : No solution B : Only one solution C : exactly two solutions D : more than two solutions -(Correct Option)
34	One of the critical points of the function $f(x, y) = x^2 - 2xy + y^3$ is **A : $(\frac{2}{3}, \frac{2}{3})$ – (Correct Option)** B : $(\frac{2}{3}, 0)$ C : $(\frac{3}{2}, 0)$

D
:

35 Which of the following integrals represent the area of the region enclosed by $y - 2x = 0$ and $y - 2x^2 = 0$

A : $\int_0^1 \int_x^{x^2} dydx$

B : $\int_0^1 \int_{x^2}^{x} dydx$

C : $\int_0^1 \int_{2x}^{2x^2} dydx$

D : $\int_0^1 \int_{2x^2}^{2x} dydx$ – (Correct Option)

36 The general solution of

$$x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} - 4y = x^2$$

is

A : $y = x^{-1}[C_1 \cos(\ln\sqrt{3})\, x + C_2 \sin(\ln\sqrt{3})x] + \frac{x}{4}e^{2x}$

B : $y = x^{-1}[C_1 \cos(\ln\sqrt{3})\, x + C_2 \sin(\ln\sqrt{3})x] + \frac{x^2}{4}\ln x$

C : $y = C_1 x^2 + \frac{C_2}{x^2} + \frac{x^2}{4}\ln x$ – (Correct Option)

D : $y = C_1 x^2 + \frac{C_2}{x^2} + \frac{x}{4}e^{2x}$

37 The particular solution of $4y'' + 36y = \operatorname{cosec} 3x$ is

A : $\frac{-x}{12}\cos 3x + \frac{\sin 3x}{36}\ln|\sin 3x|$ – (Correct Option)

B : $\frac{-x}{12}\sin 3x + \frac{\sin 3x}{36}\ln|\cos 3x|$

C :

D : $\frac{-x}{12}\cos 3x + \frac{\cos 3x}{36}\ln|\sin 3x|$

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Let $D = \frac{d}{dx}$

If $(D-3)^2 (D^2 + 4D + 5)\, y = e^{3x} + e^{-2x}(\cos x - \sin x)$, then by the method of undetermined coefficient, the choice of y_p is

A : $y_p(x) = \alpha_1 e^{3x} + e^{-2x}(\alpha_2 \cos x + \alpha_3 \sin x)$

B : $y_p(x) = \alpha_1 x e^{3x} + e^{-2x}[(\alpha_2 + \alpha_3 x)\cos x + (\alpha_4 + \alpha_5 x)\sin x]$

C : $y_p(x) = \alpha_1 x^2 e^{3x} + e^{-2x}[(\alpha_2 + \alpha_3 x)\cos x + (\alpha_4 + \alpha_5 x)\sin x]$ – (Correct Option)

D : $y_p(x) = \alpha_1 x^2 e^{3x} + e^{-2x}[\alpha_2 \cos x + \alpha_3 \sin x]$

39

Consider $\frac{dz}{dx} + 4z = \frac{dz}{dy}$, $z(x, 0) = 4e^{-3x}$

Let $z = \alpha\, e^{\beta x + \gamma y}$ be the solution of the partial differential equation. Then $\alpha + \beta - \gamma =$

A : 8

B : 6

C : 2

D : 0 -(Correct Option)

Question Dropped

40

Let the vector field

$\vec{F} = (\alpha xy + \beta z^3)\hat{Z} + (4x^2 - Z)\hat{J} + (3xz^2 - 2y)\hat{k}$ $(xz \neq 0)$ be irrotational.

Then $\alpha + \beta - \gamma =$

A : 9

B : 7

C :

D : $\frac{19}{3}$

41 Let C be the triangle with vertices (0, 0), (0, 1) and (–1, 1). Then $\oint_C e^{x^2}dx + 2\tan^{-1}x\,dy =$

A : $-\frac{\pi}{2} + ln2$

B : $\frac{\pi}{2} - ln2$ – (Correct Option)

C : $\frac{3\pi}{2} - ln2$

D : $\pi - ln2$

42 Let C : |z| = 3. Then $\oint_C \left[\frac{\cos h\, z}{(z-\pi)^3} - \frac{\sin^2 z}{(2z-\pi)^3}\right] =$

A : $-\frac{\pi i}{4}$

B : $-\frac{\pi i}{2}$

C : $\frac{\pi i}{2}$

D : $\frac{\pi i}{4}$ – (Correct Option)

43 Consider the Taylor series of $f(z) = \frac{1}{3-z}$ at $z_0 = 2i$. Then the radius of convergence of this series is

A : $\frac{1}{3}$

B : $\frac{1}{2}$

C : $\frac{1}{\sqrt{13}}$

D : $\sqrt{13}$ – (Correct Option)

44

Consider the joint probability density function

$$f(x,y)=\begin{cases}2xe^{1-y}, & x^2<y, x>1\\ 0, & \text{otherwise}\end{cases}$$

Then $P(x \geq 2) = ?$

A : e

B : e^{-3} -(Correct Option)

C : e^{-1}

D : e^{3}

45

Let X be a continuous random variable with pdf

$$f(x)=\begin{cases}\frac{1}{x\ln 2\ln x}, & e<x<e^2\\ 0, & o/w\end{cases}$$

Then $E((\ln X)^2)$ is

A : $\frac{2}{3\ln 2}$

B : $\frac{3}{2}$

C : $\frac{3}{2\ln 2}$ – (Correct Option)

D : $\frac{e^2-e}{\ln 2}$

46

Suppose 2% of bulbs made by a machine are defective. If bulbs are packaged 150 per box, then the approximate probability (Using Poisson distribution) that a given box contains at least 2 defectives is

A : $4e^{-3}$

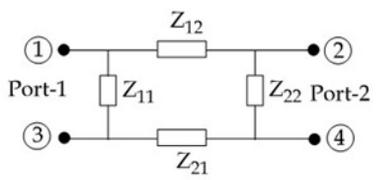
B : $1\text{-}4e^{-3}$ – (Correct Option)

C : $4e^{-2}$

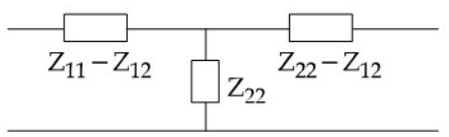
D : $1\text{-}3e^{-2}$

47

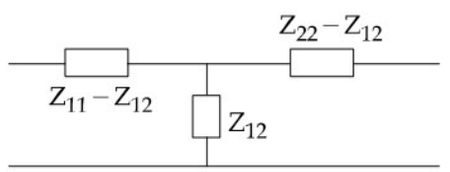
For the 2-port 4-terminal network shown below, find the equivalent 2-port 3-terminal network.



A :

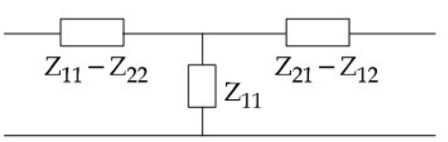


B :

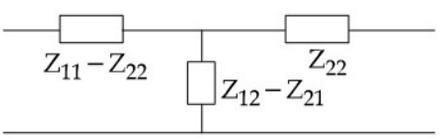


– (Correct Option)

C :



D :



48

A : 10 µs

B : 5 µs

C : 20 µs -(Correct Option)

D : 30 µs

49 In 2-port network system, Z-parameter matrix is converted to ABCD - matrix. The equations for A, B, C, D are
Where $\Delta = Z_{11}\,Z_{22} - Z_{12}Z_{21}$ and $Z_{12} = Z_{21}$.

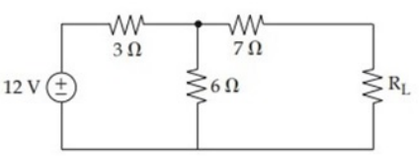
A : $A = \frac{Z_{22}}{Z_{11}}; B = \frac{1}{Z_{21}}; C = \frac{\Delta}{Z_{11}}; D = \frac{Z_{11}}{Z_{22}}$

B : $A = \frac{1}{Z_{11}}; B = \frac{+1}{Z_{21}}; C = \frac{\Delta}{Z_{21}}; D = \frac{Z_{22}}{Z_{12}Z_{21}}$

C : $A = \frac{Z_{11}}{Z_{22}}; B = \frac{\Delta}{Z_{11}}; C = \frac{\Delta}{Z_{22}}; D = \frac{Z_{21}}{Z_{12}}$

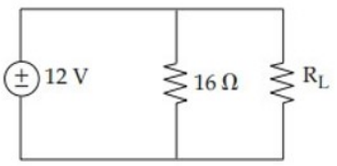
D : $A = \frac{Z_{11}}{Z_{21}}; B = \frac{\Delta}{Z_{21}}; C = \frac{1}{Z_{21}}; D = \frac{Z_{22}}{Z_{21}}$ **– (Correct Option)**

50 Consider the Circuit shown in Figure. Determine the Thevenin equivalents for the part of the circuit to the left of R_L:

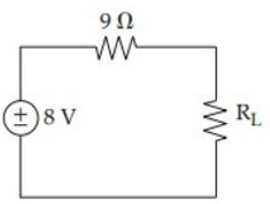


A
:

B
:

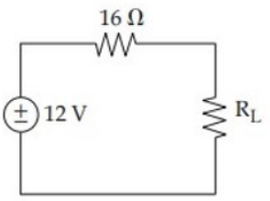


C
:

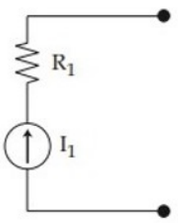


– (Correct Option)

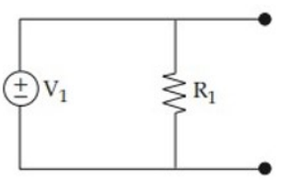
D
:



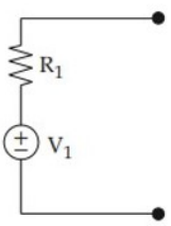
51 The equivalent circuit of the network shown below is :

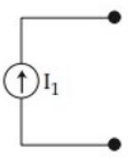


A
:



B
:



	C : **D** **:**  **– (Correct Option)**
52	The output of an LTI system in response to an input $x(t) = e^{-2t}\, n(t)$ is $y(t) = e^{-t}n(t)$. What is the impulse response of this system? A : 1 B : $\delta(t) + e^{-t}n(t)$ -(Correct Option) C : $\delta(t)$ D : $\delta(t) - e^{-t}n(t)$
	Question Dropped
53	Calculate the energy in a signal $x[n] = \frac{\sin(Wn)}{\pi n}$ using Parreval's theorem. A : Wπ B : 2W C : 2W/π D : W/π
54	Determine the Magnitude response of a LTI system at w=5, given the transfer function $H(S) = \frac{(S-0.5)}{(S+0.1-5j)(S+0.1+5j)}$ A : 0.5 B : 0.1 C : 5 -(Correct Option)

D : 10

55 Determine the sampling interval T_S, such that x(t) is uniquely represented by discrete time sequence x[n] = x[n T_S]
x(t) = cos(πt) + 3 sin (2πt) + sin(4πt)

A : $T_s < ¼$ -(Correct Option)

B : $T_s > ¼$

C : $T_s < ½$

D : $T_s > ½$

Question Dropped

56 A signal has FT x (t) $\overset{FT}{\leftrightarrow}$ x(jw) = $e^{-jw}|w|\ e^{-2/w}$. Determine the FT of y(t) = x(−2t)

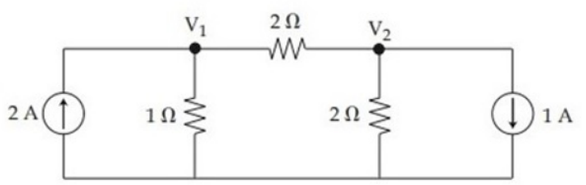
A : $e^{-jw/2}\left|\frac{w}{2}\right|e^{-|w|}$

B : $\frac{1}{2}e^{jw/2}\left|\frac{w}{2}\right|e^{-|w|}$

C : $\frac{1}{2}e^{-jw/2}\left|\frac{w}{2}\right|e^{-|w|}$

D : $e^{jw/2}\left|\frac{w}{2}\right|e^{-|w|}$

57 Obtain the values of V_1 & V_2 for the following circuit.



A : V_1 = -6/5, V_2 = 2/5

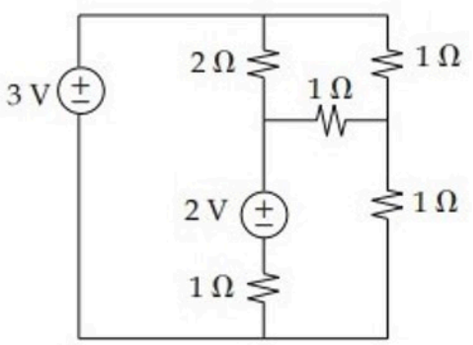
B : V_1 = 6/5, V_2 = -2/5 -(Correct Option)

C : V_1 = 6/5, V_2 = 2/5

D : $V_1 = -6/5, V_2 = -2/5$

58

Determine the three mesh currents in the following circuit.
Find i_1, i_2 & i_3.



A : $i_1 = 4/135$ $i_2 = 79/65$ $i_3 = -11/13$

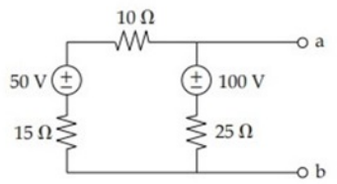
B : $i_1 = 11/13$ $i_2 = 79/65$ $i_3 = -4/135$ -(Correct Option)

C : $i_1 = -79/65$ $i_2 = -11/13$ $i_3 = 4/135$

D : $i_1 = 79/65$ $i_2 = 11/13$ $i_3 = -4/135$ -(Correct Option)

59

Find the Thevenin equivalent at terminal a and b for the network shown below.



A : -75V in series with 12.5 Ω

B : 75V in series with 25 Ω

C : 750V in series with 72.5 Ω

D : 75V in series with 12.5 Ω -(Correct Option)

60

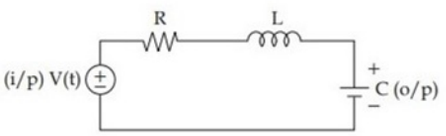
A : 80 $e^{-50,000t}$ - 20$e^{-200,000t}$ V, t > 0 -(Correct Option)

B : 160 $e^{-50,000t}$ - 40$e^{-200,000t}$ V, t > 0

C : 80 $e^{-50,000t}$ + 20$e^{-200,000t}$ V, t > 0

D : -160 $e^{-50,000t}$ + 40$e^{-200,000t}$ V, t > 0

61 Considering the following RLC circuit, find the system function (transfer function). Output = Voltage across capacitor, Input = V(t)



A : $H(S) = \frac{1/LC}{S^2 + (L/R)S + (1/LC)}$

B : $H(S) = \frac{1/LC}{S^2 + (R/L)S + (LC)}$

C : $H(S) = \frac{1/LC}{S^2 + (R/L)S + 1/LC}$ – (Correct Option)

D : $H(S) = \frac{1/LC}{S^2 + (L/R)S + LC}$

62 To calculate the mass of an atom in kilograms, multiply the atomic weight of an atom by

A : 2.33 * 10^{-21}

B : 1.66 * 10^{-27} kg -(Correct Option)

C : 3.1 * 10^{-24} kg

D : 6.3 * 10^{-19} kg

63 Find the Band-gap energy of GaAs at Room temperature, with $\alpha = 5.405 * 10^{-4}$ and $\beta = 204$.

A : 1.12

B : 1.17

C : 0.743

D : 1.42 -(Correct Option)

64 In Thermal equilibrium, the relationship between electron carrier diffusion coefficient (D_n) and Mobility of electron (μ_n) is given as,

k = Boltzmann constant
T = Absolute Temperature
q = Charge of an electron
$F_{1/2}$ and $F_{-1/2}$ = Fermi Dirac Integrals
E_C = Energy at bottom of conduction band
E_F = Fermi Energy

A : $D_n = 2\left(\frac{kT}{q}\mu n\right) F_{-1/2}\left(\frac{E_F - E_C}{kT}\right) \Big/ F_{-1/2}\left(\frac{E_F - E_C}{kT}\right)$

B : $D_n = 2\left(\frac{kT}{q}\mu n\right) F_{1/2}\left(\frac{E_C - E_F}{kT}\right) \Big/ F_{-1/2}\left(\frac{E_C - E_F}{kT}\right)$

C : $D_n = 2\left(\frac{kT}{q}\mu n\right) F_{1/2}\left(\frac{E_F - E_C}{kT}\right) \Big/ F_{-1/2}\left(\frac{E_F - E_C}{kT}\right)$ – (Correct Option)

D : $D_n = 2\left(\frac{kT}{q}\mu n\right) F_{1/2}\left(\frac{E_C - E_F}{kT}\right) \Big/ F_{1/2}\left(\frac{E_C - E_F}{kT}\right)$

65 The intrinsic concentration of Silicon

A : Triples for every 10°C rise in temperature

B : Remains constant with Temperature

	C : Doubles for every 20^{o}C rise in temperature D : Doubles for every 11^{o}C rise in temperature -(Correct Option)
66	The ionization energy for the Hydrogen atom is A : 9.3 eV B : 10.2 eV C : 1.2 eV D : 13.6 eV -(Correct Option)
67	Donor impurities with concentration N_D cm^{-3} is added to a crystal. To preserve electrical neutrality, the condition is, N_D^+ = No. of ionized donors A : $n + N_D^+ = p$ B : $n - N_D^+ = p$ -(Correct Option) C : $n + p = N_D^+$ D : $n + p + N_D^+ = 0$
68	The relative dielectric constant of Ge is, A : 12 B : 16 -(Correct Option) C : 10 D : 14
69	If a donor - type impurity is added to the extent of 1 part in 10^8 Germanium atoms, find the number of holes if the density of donor atoms N_D is given by 4.41 x 10^{14} atoms/cm^3 and the intrinsic concentration is given by 2.5 x 10^{13} atoms/cm^3 A : 0.864 x 10^8 holes/cm^3

B : 1.04 x 10^{12} holes/cm^3

C : 1.42 x 10^{12} holes/cm^3 -(Correct Option)

D : 2.42 x 10^{15} holes/cm^3

70 Choose the correct statement related to the diffusion process in semiconductor by Schottky.
S_1 : The Barrier height is much larger than KT.
S_2 : the effect of electron collisions within the depletion layer is included.
S_3 : the carrier concentration are affected by the current flow.
S_4 : the impurity concentration is degenerate
Options

A : S_1, S_3, S_4 are correct

B : S_1, S_4 are correct

C : S_1, S_2 are correct -(Correct Option)

D : S_3, S_4 are correct

71 The relationship between Diffusion and Mobility using Einstein equation is given by

A : $D_pD_n = \mu_p\mu_n$

B : $\frac{D_p}{D_n} = \frac{\mu_n}{\mu_p}$

C : $D_p\mu_p = D_n\mu_n$

D : $\frac{D_p}{\mu_p} = \frac{D_n}{\mu_n}$ – (Correct Option)

72 The intrinsic carrier concentration(n_i) is a function of

A : Pressure

B : Temperature -(Correct Option)

C : Impurity atoms

D : Mass -(Correct Option)

73 Match **List-I** with **List-II**

	List-I		**List-II**
	(Properties)		**(Silicon Material)**
(a)	Energy Gap (300 k)	(i)	5.0×10^{22}
(b)	Intrinsic Concentration (300 k)	(ii)	2,30,000 Ω cm
(c)	Resistivity (300 k)	(iii)	1.1 ev
(d)	Atoms/cm^3	(iv)	$1.5\times10^{10}cm^{-3}$

A : (a)-(i), (b)- (ii), (c)-(iii), (d)-(iv)

B : (a)-(ii), (b)- (i), (c)-(iv), (d)-(iii)

C : (a)-(iv), (b)- (iii), (c)-(ii), (d)-(i)

D : (a)-(iii), (b)- (iv), (c)-(ii), (d)-(i) -(Correct Option)

74 The extensively used recombation agent by semiconductor device manufacturer is

A : Copper

B : Silver

C : Gold -(Correct Option)

D : Aluminium

75 The diffusion hole current density (Jp) is proportional to the concentration gradient and is given by

A : $J_p = +qD_p\frac{dp}{dx}$

B : $J_p = -qD_p\frac{dp}{dx}$ **– (Correct Option)**

C : $J_p = -qD_p\frac{dx}{dp}$

D
:

76 Hall effect is used to determine
S_1: Semiconductor is n-type or p-type
S_2: Carrier concentration
S_3: measuring the conducitivity (σ)
S_4: measuring the mobility (μ)
Options:

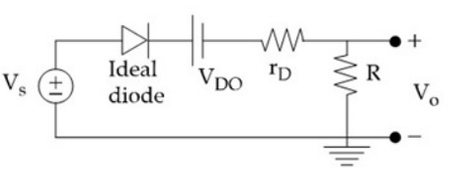
A : S_1 and S_2 are correct; S_3 and S_4 are wrong

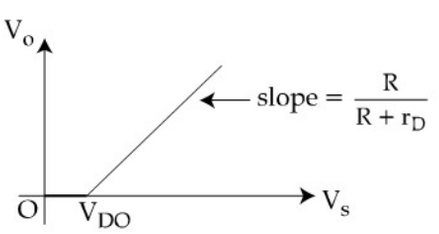
B : S_1 is correct; S_2, S_3, S_4 are wrong

C : S_3 and S_4 are correct; S_1 and S_2 are wrong

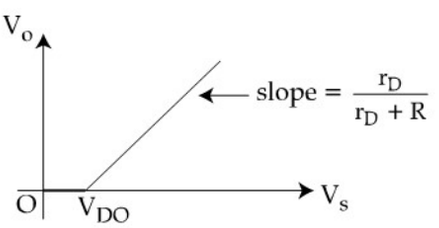
D : S_1, S_2, S_3, S_4 are correct -(Correct Option)

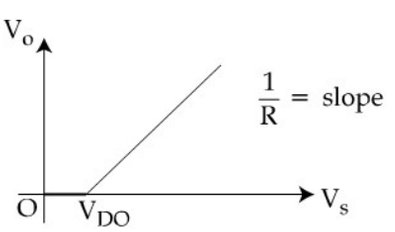
77 The transfer characteristics of the Half wave-rectifier circuit shown below is :



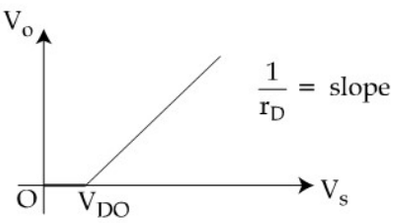
A :


– (Correct Option)

B :


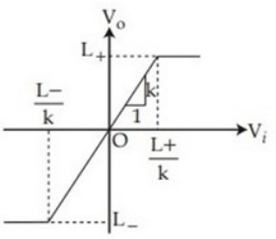
C :


D :



78

The Transfer characteristics shown below corresponds to



K = constant
$L_+ = L_-$ = limiting values
V_i = input voltage
V_o = output voltage

A : Hard limiter -(Correct Option)

B : Soft limiter

C : Single limiter

D : Clamper

79

The purpose of Biasing in BJT is
Reason 1 (R1):
To establish constant DC current in collector
Reason 2 (R2):
To locate DC bias point
Reason 3 (R3):
The constant DC current should be sensitive to large variations in value of β.
Find which of the above reason supports biasing

A : R1 and R2 supports, R3 does not support -(Correct Option)

B : R2 and R3 support, R1 does not support

C : R1 alone supports, R2 and R3 does not Support

D : R2 alone supports, R1 and R3 does not support

80

In a MOSFET transistor, if there is NO bias voltage applied to the Gate terminal, then the final transistor setup corresponds to

A : Two front to front diodes in series between Drain and Source

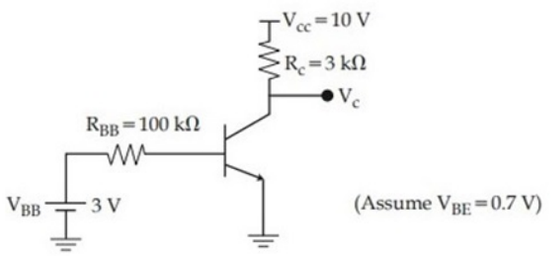
B : Two back to back diodes in series between Drain and Source -(Correct Option)

C : Two front to front diodes in parallel between Drain and Source

D : Two back to back diodes in parallel between Drain and source

81

For the transistor amplifier shown below, find the DC voltage at the collector (V_C) with $\beta = 100$.



A : 4.6 V

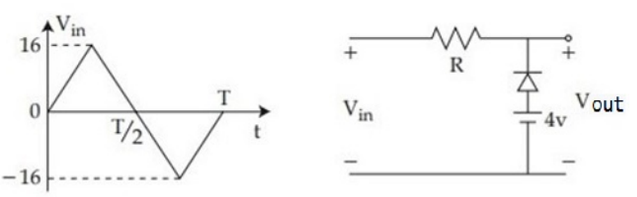
B : 10.3 V

C : 3.1 V -(Correct Option)

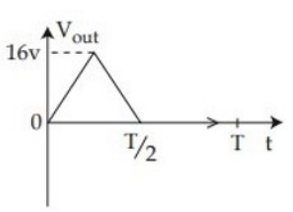
D : 9.1 V

82

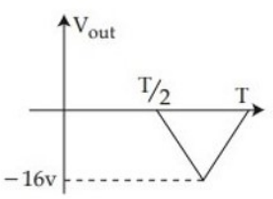
Determine the V_{out} for the network given below



A :



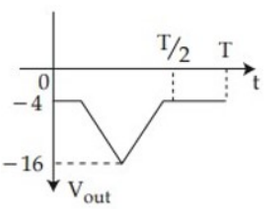
B :



C
:

– (Correct Option)

D
:



83 What is the Peak Inverse Voltage (PIV) required for a diode to build a Bridge rectifier ?

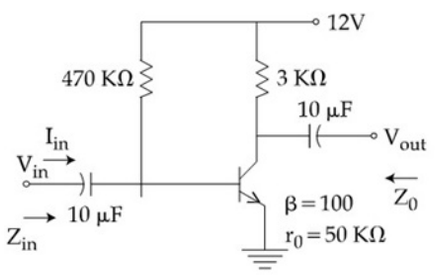
A : PIV $\leq V_m$

B : PIV $\leq 2V_m$

C : PIV $\geq V_m$ -(Correct Option)

D : PIV $\geq 2V_m$

84 Determine the output impedance of the circuit given below, where ' r_o' is the resistance due to Early effect



A : 3.8 kΩ

B : 53 kΩ

C : 2.5 kΩ

D : 2.83 kΩ -(Correct Option)

85

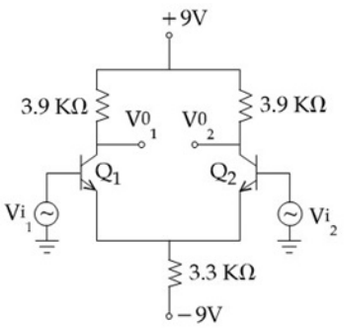
A : $\frac{\beta r_e R_2}{\beta r_e + R_2} + R_1$

B : $\beta r_e \| R_1 \| R_2$ – (Correct Option)

C : $\beta r_e \| (R_1 + R_2) \|$

D : $\frac{\beta r_e R_1}{\beta r_e + R_1} + R_2$

86 Calculate the DC collector current in the circuit given below:



A : 1 mA

B : 1.25 mA -(Correct Option)

C : 2.25 mA

D : 5 mA

87

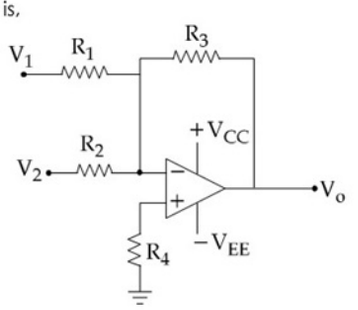
A : 100 Ω

B : 75 Ω

C : 111 Ω -(Correct Option)

D : 10 Ω

88 For the summing amplifier shown below the value of R_3 is greater than R_1 and R_2, then the value of closed loop voltage gain (A_{CL}) is,



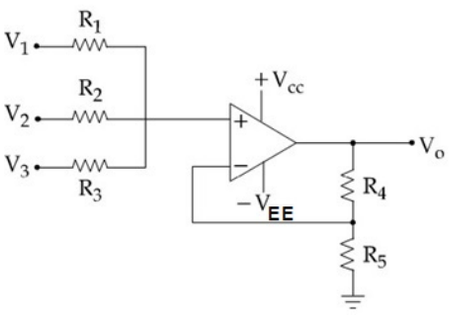
A : $A_{CL} = -1$

B : $A_{CL} < -1$

C : $A_{CL} > 1$ -(Correct Option)

D : $A_{CL} = 1$

89 A three input non-inverting summing circuit is shown below. If $V_0=V_1+V_2+V_3$, then the gain of the amplifier must be,



A : 10

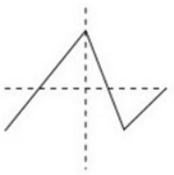
B : 3 -(Correct Option)

C : 2

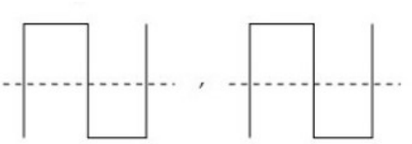
D : 9

90 A triangular wave is given as input to a R-C differentiating circuit & a basic op-amp differentiating circuit. The output of both the differentiating circuits are

Input :



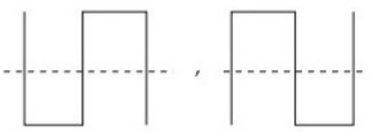
A :



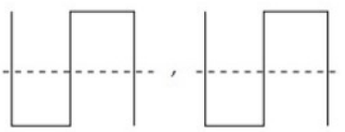
B :

– (Correct Option)

C :



D :



91 The difference between a R-C integration circuit and a basic op-amp integration circuit is

A : Basic op-amp circuit has lower output resistance and higher output voltage compared to R-C circuit -(Correct Option)

	B : R-C circuit has lower output resistance and higher output voltage compared to basic op-amp circuit C : Basic op-amp has lower output resistance and lower output voltage compared to R-C circuit D : R-C circuit has higher output resistance and higher output voltage compared to a basic op-amp circuit
92	Simplify the function x'y'z + x'yz + xy' to minimum number of literals. A : x'y + yz B : x'z + xy' -(Correct Option) C : xy' D : x + y + z
93	Using Karnaugh map, the Boolean function F(x, y, z) = Σ 0, 2, 4, 5, 6 simplifies to A : z + x B : z C : z' + xy' -(Correct Option) D : z + y
94	Which of the following gates gives the output equation $Y = \overline{AB}$. A : NAND -(Correct Option) B : NOR C : XOR D : OR
95	Suppose a three variable truth table has a high output for the input conditions : 000, 010, 100. and 110. What is the sum-of-products circuit? A : $y = \bar{a}\bar{b}\bar{c} + abc + a\bar{b}\bar{c} + \bar{a}bc$

	B : **– (Correct Option)** C : $y = abc + a\bar{b}\bar{c}$ D : $y = \bar{a}\bar{b}\bar{c} + abc$
96	For which set of inputs A and B, the output of a two input Exclusive OR gate is high? A : When both A and B are zero B : When both A and B are 1 C : When either A or B is 1 -(Correct Option) D : O/P is always O
97	A BCD to decimal decoder can be realized using a _____. A : 1 - to - 16 demultiplexer B : 1 - of - 16 decoder C : 4 - of - 10 decoder D : 1 - of - 10 decoder -(Correct Option)
98	A positive NOR gate implemented in CMOS gives output low : A : When any input is high -(Correct Option) B : Only when both inputs are high C : Only when both inputs are low D : is always low irrespective of the inputs
99	Give the simplest logic output for the following logic equation where d represents don't care condition for the following equation: F(A, B, C, D) = Σ m(7) + d(10, 11, 12, 13, 14, 15)

	A : Y = ABC B : Y = A + BCD C : Y = BCD -(Correct Option) D : Y = A + BC + D
100	The characteristic equation of a JK flipflop is **A :** $Q_{n+1} = JQ_n' + K'Q_n$ **– (Correct Option)** B : $Q_{n+1} = J + K$ C : $Q_{n+1} = J + KQ_n$ D : $Q_{n+1} = J'Q_n' + K'Q_n'$
101	A synchdronous counter overcomes the _____ drawback of the ripple counter. A : toggling B : locking time C : settling time -(Correct Option) D : transit time
102	How many bits are required for a DAC if it is necessary to resolve voltages to 5 mV and the ladder has +10V full scale? A : 10 bits B : 11 bits -(Correct Option) C : 5 bits D : 4 bits
103	The _____ holds the address of the next instruction to be read from the memory.

A : Instruction Register

B : Program Counter -(Correct Option)

C : Accumulator Register

D : Memory Buffer Register

104 In the design of a 8-bit ALU, consider 4 status bits C for carry, S for sign, Z for Zero and V for overflow. Which of the four status bit is set when output of the ALU contains all 0's.

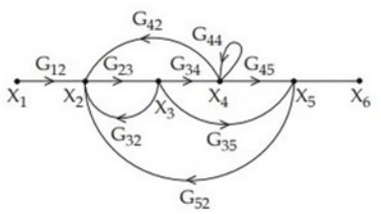
A : S is set

B : C is set

C : Z is set -(Correct Option)

D : V is set

105 From the signal flow graph shown below, find the possible combination of non-touching loops and loop gain products.



A : 1, G_{23} G_{34} G_{45} G_{52} G_{44}

B : 2, G_{23} G_{34} G_{42} G_{44} and $G_{23}G_{34}$ G_{45} $G_{52}G_{44}$

C : 2, G_{23} G_{32} G_{44} and G_{23} G_{35} G_{52} G_{44} -(Correct Option)

D : 4, G_{23} G_{32} and $G_{23}G_{34}$ G_{42} and G_{34} G_{45} G_{35} and G_{23} G_{34} G_{45} G_{52}

106 Choose the correct option regarding the effect of feedback on the performance of the system.
S1 Feedback can improve the stability or harmful to stability.
S2 Feedback can increase or decrease the sensitivity of the system.
S3 Feedback can increase the effect of noise.
S4 Feedback can also affect bandwidth, impedance, transient and frequency responses.
Options:

A : Statements S1, S2, S3 are correct

B : Statements S2, S3, S4 are correct

C : Statement S1 & S4 only correct

D : Statements S1, S2 & S4 are correct -(Correct Option)

107 Choose the correct option regarding the transfer function of the system.
1. The transfer function is defined as the Laplace Transform of the impulse response.
2. The transfer function is defined only for non-linear system.
3. All initial conditions of the system are set to zero.
4. The transfer function is dependent of the input of the system.
Options:

A : 1, 2, 3, 4 are correct

B : 1 and 2 are correct

C : 3 and 4 are correct

D : 1 and 3 are correct -(Correct Option)

108 The steady state error of a system when the input signal is a step function with a magnitude of R will be

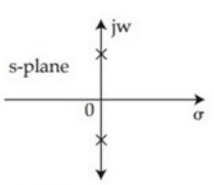
A : $I_{ss} = \frac{1}{1+k_p}$

B : $I_{ss} = \frac{R}{k_p}$

C : $I_{ss} = \frac{R}{1+k_p}$ – (Correct Option)

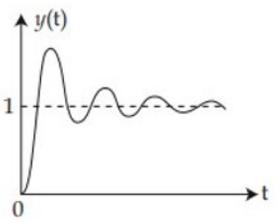
D : $I_{ss} = \frac{1}{k_p}$

109 If the roots of the characteristic equation lies only on the imaginary axis of the S-plane as shown below, then the step response of the system will be

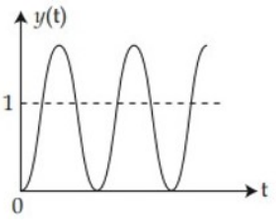


A
:

B
:

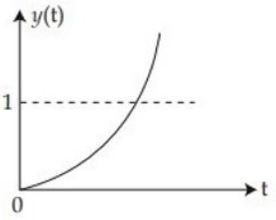


C
:



– (Correct Option)

D
:



110 If the damping ratio is $0 < \varsigma < 1$, then identify the second - order system and find the roots of the characteristic equation

A
:

Undamped system; $S_1, S_2 = -\varsigma w_n \pm j w_n \sqrt{1-\varsigma^2}$

B
:

Underdamped system; $S_1, S_2 = -\varsigma w_n \pm j w_n \sqrt{1-\varsigma^2}$ $(-\varsigma w_n < 0)$

– (Correct Option)

C
:

Underdamped system; $S_1, S_2 = -\varsigma w_n \pm j w_n \sqrt{1-\varsigma^2}$ $(-\varsigma w_n > 0)$

D
:

Critically damped system; $S_1, S_2 = -\varsigma w_n \pm j w_n \sqrt{1-\varsigma^2}$ $(-\varsigma w_n > 0)$

111 The maximum overshoot of the step response of a second order system will be

A
:

$e^{-\pi\varsigma/\sqrt{1-\varsigma^2}}$

– (Correct Option)

B :

C : $e^{-\pi\zeta}/\sqrt{\zeta^2-1}$

D : $e^{\pi\zeta}/\sqrt{\zeta^2-1}$

112 The addition of pole to the forward path transfer function makes the closed loop system to be

A : More stable and increases the bandwidth

B : More stable and decreases the bandwidth

C : Less stable and decreases the bandwidth -(Correct Option)

D : Less stable and increases the bandwidth

113 Consider the equation $S^2 + 2S + 2 + k(S + 2) = 0$, evaluate the breakaway points of the Root locus

A : S = -0.586 and S = -3.414 -(Correct Option)

B : S = -0.725 and S = -3.812

C : S = +0.586 and S = -2.414

D : S = +0.725 and S = +8.822

114 Match **List-I** with **List-II**

	List-I (Properties of Root loci)		**List-II**
(a)	Asymptotes	(i)	It can be determined using the roots of $\frac{dk}{ds}=0$ or $\frac{dG(s)H(s)}{ds}=0$
(b)	Angle of departure	(ii)	$\frac{1}{\lvert G(s)H(s)\rvert}$
(c)	Breakaway points	(iii)	$\frac{\sigma-\sum \text{real parts of poles of } G(s)H(s)}{-\sum \text{real parts of zeros of } G(s)H(s)}$ / n − m
(d)	Absolute value of K	(iv)	$\angle G(s)H(s)=\sum_{k=1}^{m}\angle(s+z_k)-\sum_{j=1}^{n}\angle(s+p_j)$

Choose the **correct** answer from the options given below :

A : (a)-(ii), (b) - (iv), (c)-(iii), (d)-(i)

B : (a)-(iii), (b)- (iv), (c)-(i), (d)-(ii) -(Correct Option)

C : (a)-(i), (b)-(ii), (c) - (iii), (d)-(iv)

D : (d)-(iv), (b)-(iii), (c)- (ii), (d)-(i)

115 Consider a system with the characteristic equation $S^4 + 8S^3 + 18S^2 + 16S + 5 = 0$.
Using Routh Array, check whether all the elements of the first column are positive or negative and also comment on the stability of the system.

A : elements are positive, stable system -(Correct Option)

B : elements are negative, unstable system

C : elements are zero, unstable system

D : elements are both positive and negative, marginally stable system

116 If the Nyquist plot of the open loop transfer function G(s) H(s) corresponding to the Nyquist contour in the S-plane encircles the critical point _____ as many times as the number of right half s-plane poles of G(s) H(s), then the closed loop system is stable.

A : critical point: -1 + jo in the counter clockwise direction -(Correct Option)

B : critical point: -1 + jo in the clockwise direction

C : zero critical point

D : $-2 + jo \rightleftarrows$ critical point in the counter clockwise direction

117 The gain margin and the phase margin of the closed loop system is defined as _____ and _____ respectively.

A : $GM = |G(j\omega_\phi)\ H\ (j\omega_\phi)|\ ;\ PM = 90° + \angle G(j\omega_g)H(j\omega_g)$

B : $GM = \frac{1}{|G(j\omega\phi)H(j\omega\phi)|}\ ;\ PM = 180° + \angle G(j\omega g)H(j\omega g)$ **– (Correct Option)**

C : $GM = \frac{1}{|G(j\omega\phi)H(j\omega\phi)|}\ ;\ PM = 90° + \angle G(j\omega g)H(j\omega g)$

D : $GM = |G(j\omega_\phi)\ H\ (j\omega_\phi)|\ ;\ PM = 180° + \angle G\ (j\omega_g)\ H\ (j\omega_g)$

118	The compensator has a single zero and single pole with the pole lying to the left of the zero on negative real axis of the complex plane is known as A : Lead Compensator -(Correct Option) B : Lag Compensator C : First-order Compensator D : Second-order Compensator
119	Consider the system $\dot{x} = Ax + bu$ $y = cx$ with $A=\begin{bmatrix}-2 & 1\\ 1 & -2\end{bmatrix}$; $b=\begin{bmatrix}1\\ 1\end{bmatrix}$; $c=[0\ 1]$ Check whether the given system is controllable and observable system. A : Uncontrollable, observable -(Correct Option) B : Controllable, observable C : Uncontrollable, Unobservable D : Controllable, Unobservable
120	Choose the correct option related to the advantages of a state variable methods. S_1: It is a direct frequency domain approach. S_2: It is applicable only for linear time varying MIMO systems. S_3: It is applicable only for non-linear time-invariant MIMO systems. S_4: Easily solved using digital computers. Options : A : S_1 & S_2 are correct B : S_2, S_3 & S_4 are correct -(Correct Option) C : S_3 is only correct D : S_4 is only correct
121	In a Quantizer, the maximum acceptable error is 0.5% of the peak amplitude for a signal M(t). Find the approximate no. of levels of quantization in terms of powers of 2.

A : 64

B : 256 -(Correct Option)

C : 128

D : 32

122 Which among the below pulse (P(t)) can achieve a zero ISI? Consider T_b as bit duration.

A : $P(t)=\begin{cases}0 & t=0\\ 1 & \text{elsewhere}\end{cases}$

B : $P(t)=\begin{cases}1, & t=0\\ 0, & t=\pm nT_b\ (n=1,2,3,\ldots)\end{cases}$ – (Correct Option)

C : $P(t)=\begin{cases}1, & t=0\\ 0, & t=\pm(T_b+1)n\ (n=1,2,3,\ldots)\end{cases}$

D : $P(t)=\begin{cases}n(t) & t\geq 0\\ 2.5n(t) & else\ where)\end{cases}$

123 _____ signal is a super position of two AM signals with different carrier frequencies and different but complementary amplitudes.

A : ASK

B : FSK -(Correct Option)

C : PSK

D : QAM

124 What is the maximum value of entropy for a discrete memoryless source, whose alphabet consists of 'n' different symbols?

A : n/2

B : $\log(n^2)$

C : log(n) -(Correct Option)

D : 1

125 What are the expressions for code efficiency (η) and redundancy (γ), respectively?

A : $\frac{Average\ length}{Entropy}$ & 2η

B : $\frac{Average\ length}{\gamma}$ & $2xEntropy$

C : $\frac{Entropy}{Average\ length} - 1$ & $\eta - 1$

D : $\frac{Entropy}{Average\ length}$ & $1 - \eta$ – (Correct Option)

126 Which of the following is a valid Hamming Code (n, k, m)?

A : (7, 4, 2)

B : (7, 4, 3) -(Correct Option)

C : (7, 4, 1)

D : (6, 4, 1)

127 Which of the following requires a coherent detection ?

A : PSK -(Correct Option)

B : ASK

C : FSK

D : DPSK

128 What is the channel capacity of a Binary Symmetric Channel (BSC) when the probability of error is ½?

A : 0 -(Correct Option)

	B : 1 C : 1.5 D : 0.5
129	Which of the following statements is True? A : All Ergodic process are wide sense stationary B : All wide sense stationary process are strict sense stationary process C : All Ergodic process are stationary process -(Correct Option) D : All stationary process are wide sense stationary process -(Correct Option)
130	The Autocorrelation function (Rg(τ)) of a real power signal g(t), is given by, A : $\lim_{T\to\infty}\frac{1}{T}\int_{-\infty}^{\infty} g(t)g(t+\tau)d\tau$ B : $\lim_{T\to\infty}\frac{2}{T}\int_{-T/2}^{T/2} g(t)g(t-\tau)dt$ **C :** $\lim_{T\to\infty}\frac{1}{T}\int_{-T/2}^{T/2} g(t)g(t-\tau)dt$ **– (Correct Option)** D : $\lim_{T\to\infty}\frac{2}{T}\int_{-T/2}^{T/2} g(t)g(t+\tau)dt$
131	Find the frequency of the Lower Side Band (LSB), if the message signal M(t) = cos(2000πt) is amplitude modulated using a carrier frequency of 100 kHz A : 99 kHz -(Correct Option) B : 101 kHz C : 100 kHz D : 98 kHz
132	A carrier signal 2cos(2000πt) is used for AM. What is the modulation index, if the maximum value of the message is 1V? Whether it is distorted or not ?

A : 1.5 and Distorted

B : 0.5 and Distortion less -(Correct Option)

C : 0.25 and Distortionless

D : 1 and Distorted

133 What is the range of instantaneous frequency of a FM signal using a carrier frequency of 100MHz and the message signal varying from -2V to 2V? Let the frequency sensitivity be $K_f = 2\pi \times 10^5$.

A : 99.8 MHz to 100.2 MHz -(Correct Option)

B : 99 MHz to 100 MHz

C : 99.6 MHz to 100.4 MHz

D : 98 MHz to 100 MHz

134 Which of the frequency given below produces an image frequency for the AM station operating at 1000 KHz? (Intermediate frequency is 455 KHz)

A : 455 KHz

B : 1910 KHz -(Correct Option)

C : 1455 KHz

D : 910 KHz

135 What is the autocorrelation of a random process $x(t) = A\cos(w_c t + \theta)$, where θ is uniformly distributed in the range $(0, 2\pi)$?

A : $R_x(\tau) = \frac{A}{2}\cos\left(\frac{w_c \tau}{2}\right)$

B : $R_x(\tau) = \frac{A^2}{2}\cos(w_c \tau)$ – (Correct Option)

C : $R_x(\tau) = A^2 \cos\left(\frac{w_c \tau}{2}\right)$

	D : $R_x(\tau) = \frac{A^2}{2}\cos^2(w_c \tau)$
136	James Clark Maxwell rearranged the Maxwell's equation in A : Mid 1840's B : Mid 1850's C : Mid 1860's -(Correct Option) D : Mid 1870's
137	Field equations are equate that : A : The magnetomotive force around a closed path is equal to the conduction current plus the time derivative of the electric displacement through any surface bounded by the path -(Correct Option) B : The magnetomotive force around a closed path is equal to the time derivative of the magnetic displacement through any surface bounded by the path C : The total magnetic displacement through the surface enclosing a Volume is equal to the total charge within the volume D : The net electric flux emerging through any closed surface is zero
138	Conductivity of copper (σ) is A : 4.8 x 10^7 s/m B : 3.8 x 10^7 s/m C : 5.8 x 10^7 s/m -(Correct Option) D : 6.8 x 10^7 s/m
139	Electromagnetic wave equations are **A :** $\nabla^2 E = \mu\varepsilon \frac{\partial^2 E}{\partial t^2}$ and $\nabla^2 H = \mu\varepsilon \frac{\partial^2 H}{\partial t^2}$ **– (Correct Option)**

	B : C : $\nabla^2 H = \mu\sigma \frac{\partial^2 E}{\partial t^2}$ and $\nabla^2 H = \mu\varepsilon \frac{\partial^2 H}{\partial t^2}$ D : $\nabla^2 E = \omega\mu \frac{\partial^2 E}{\partial t^2}$ and $\nabla^2 E = \sigma E \frac{\partial^2 E}{\partial t^2}$
140	Boundary conditions satisfy the following conditions: A : The normal component of H is continuous across a surface except at the surface of a perfect conductor B : The tangential component of E is continuous at the surface. That is, it is same just outside the surface as it is just inside the surface -(Correct Option) C : The tangential component of B is continuous at the surface of discontinuity D : The tangential component of D is continuous if there is no surface charge density
141	The polarization of uniform plane wave refers to A : The time - varying behavior of the electric field strength vector at some fixed point in space -(Correct Option) B : The frequency-varying behavior of the electric field strength vector at some fixed point in space C : The time-varying behavior of the magnetic field strength vector at some fixed point in space D : The time-varying behavior of the Electromagnetic field strength vector at some fixed point in space
142	The order of magnitude of δ is metals, the frequency of the depth of penetration is 1MHz wave into copper which a conductivity $\sigma = 5.8 \times 10^7$ mhos/m and μ is equal to free space. The depth of penetration δ is A : δ = 0.0456 mm B : δ = 0.0557 mm C : δ = 0.0657 mm -(Correct Option)

D : $\delta = 0.0667$ mm

143 Faraday's Law states that

A : The current around the path can be generated by a time-changing magnetic flux through a fixed path

B : The voltage around the closed path can be generated by a time-changing magnetic flux through a fixed path -(Correct Option)

C : The electric field around the path can be generated by a time-changing magnetic flux through a fixed path -(Correct Option)

D : The magnetic flux around the path can be generated by a time-changing magnetic field through a fixed path

144 The characteristic impedance of the loss less parallel-plane transmission line is

A : $Z_o = \sqrt{R/L}$

B : $Z_o = \sqrt{C/L}$

C : $Z_o = \sqrt{L/C}$ – (Correct Option)

D : $Z_o = \sqrt{L/R}$

145 The characteristic impedance of the transmission line is related with primary constants R, L, G, C by

A : $Z_o = \sqrt{\frac{G + jwC}{R + jwL}}$

B : $Z_o = \sqrt{\frac{R + jwL}{G + jwC}}$ – (Correct Option)

C : $Z_o = \sqrt{\frac{C + jwG}{L + jwR}}$

D : $Z_o = \sqrt{\frac{R + jwC}{C + jwG}}$

146	Cut-off frequency of Rectangular waveguide is **A** : $fc = \frac{1}{2\pi\sqrt{\mu\varepsilon}}\sqrt{\left(\frac{m\pi}{a}\right)^2 + \left(\frac{n\pi}{b}\right)^2}$ **– (Correct Option)** B : $fc = \frac{1}{\sqrt{\mu\varepsilon}}\sqrt{\left(\frac{m\pi}{a}\right)^2 + \left(\frac{n\pi}{b}\right)^2}$ C : $fc = \frac{1}{\sqrt{LC}}\sqrt{\left(\frac{m\pi}{a}\right)^2 + \left(\frac{n\pi}{b}\right)^2}$ D : $fc = \frac{1}{\sqrt{w\mu\varepsilon}}\sqrt{\left(\frac{m\pi}{a}\right)^2 + \left(\frac{n\pi}{b}\right)^2}$
147	I EEE frequency band of Super High Frequency (SHF) is A : 1 GHz - 10 GHz B : 3 GHz - 10 GHz C : 3 GHz - 30 GHz -(Correct Option) D : 1 GHz - 30 GHz
148	High gain antenna for AUT is A : dipole B : Horn C : Helical D : Reflector -(Correct Option)
149	Planar transmission line is A : Coaxial line B : Parallel plate -(Correct Option)

	C : Wave guide D : Microstrip line -(Correct Option)
150	Mathematical expression for induction theorem is: **A :** $Ms = -\hat{n} \times (E_t^{\dagger} - E_t') = -\hat{n} \times E^{\dagger}$ **– (Correct Option)** B : $Js = -\hat{n} \times (E_t^{\dagger} - E_t') = -\hat{n} \times E^{\dagger}$ C : $Rs = -\hat{n} \times (E_t^{\dagger} - E_t') = -\hat{n} \times E^{\dagger}$ D : $Es = -\hat{n} \times (E_t^{\dagger} - E_t) = -\hat{n} \times E^{\dagger}$