RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June 2025
Subject Name: Digital Circuits Design
Branch: ECE

Time: 3 Hours   **Max. Marks: 70**

Instructions:
1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

		PART-A			
1	a	What is the Gray equivalent of $(65)_{10}$?	2M	CO1	L1
	b	Draw the logic circuit of a 2 line to 4 line decoder.	2M	CO1	L1
	c	Write Verilog code using Case statement.	2M	CO2	L1
	d	Where the ripple counter is used? Explain.	2M	CO2	L1
	e	Compare PROM, PLA & PAL.	2M	CO3	L2
	f	If $143_5 = X_6$, then X is -----	2M	CO3	L1
	g	What is the working principle of a priority encoder?	2M	CO4	L1
	h	Mention data types used in Verilog HDL.	2M	CO4	L1
	i	What is the difference between synchronous and asynchronous counter?	2M	CO5	L1
	j	What is the working principle of a sequence detector?	2M	CO5	L1
		PART-B			
		UNIT-I			

2	a	Convert the following number systems.
		  i) $(631.134)_8 = ($ $)_{16}$
		  ii) $(150)_{10}$ $= ($ $)_{16}$
			5M	CO1	L3

	b	Convert the following Boolean expression into standard SOP form: ABC + AB + ABCD	5M	CO1	L3
		OR			
3	a	Minimize the following expressions using K-map and realize using logic gates: F=∑m(0,7,8,9,10,12)+d(2,5,13)	5M	CO1	L3
	b	Discuss the Laws and Theorems of Boolean Algebra.	5M	CO1	L4
		UNIT-II			
4	a	Design a 4-bit digital comparator and explain.	5M	CO2	L4
	b	Design a Full adder with a 3x8 decoder.	5M	CO2	L4
		OR			
5	a	Design a 32:1 Multiplexer using 4:1 Multiplexers.	5M	CO2	L4
	b	Draw the logic diagram for 4 bit binary adder-subtractor circuit and explain its operation.	5M	CO2	L4

		UNIT-III			
6	a	Explain the following "lexical conventions" with examples in Verilog. a) White space b) strengths c) Operators	5M	CO3	L3
	b	Write Verilog code for 1 to 4 demultiplexer module by using 2 to 4 decoder?	5M	CO3	L4
		OR			
7	a	Write Verilog module for a positive edge triggered flip flop with test bench.	5M	CO3	L2
	b	Explain port Declaration with an example using Verilog code.	5M	CO3	L3
		UNIT-IV			
8	a	Design a Mod-10 counter using RS flip-flops.	5M	CO4	L4
	b	Draw and explain NAND RS latch.	5M	CO4	L2
		OR			
9	a	Convert JK flip flop into SR flip flop.	5M	CO4	L2
	b	Design a 3-bit Johnson counter.	5M	CO4	L4
		UNIT-V			
10	a	Convert the following Mealy machine into a corresponding Moore machine:	5M	CO5	L2
	b	Discuss merits & demerits of PAL, PLA with neat sketches.	5M	CO5	L4
		OR			
11	a	Implement f (A,B,C,D) = $\sum m(0,1,3,5,6,8,9,11,12,13)$ using PAL.	5M	CO5	L4
	b	Compare and contrast CPLD and FPGA with neat sketches.	5M	CO5	L2

Table for Question 10a:

PS	NS	
	X = 0	X = 1
A	B,0	E,0
B	E,0	D,0
C	D,1	A,0
D	C,1	E,0
E	B,0	D,0

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RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June 2025
SUBJECT NAME: ELECTRONIC DEVICES AND CIRCUITS
BRANCH: ECE

Time: 3 Hours   **Max. Marks: 70**

Instructions:
1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

		PART-A			
1	a	Define diffusion capacitance and transition capacitance of a PN junction diode.	2M	CO1	BTL2
	b	List the applications of LED.	2M	CO1	BTL1
	c	What is the early effect?	2M	CO2	BTL1
	d	What is thermal runaway? How it can be avoided?	2M	CO2	BTL2
	e	Define threshold voltage.	2M	CO3	BTL1
	f	Define threshold voltage of a MOSFET.	2M	CO3	BTL2
	g	Write the advantages of h parameters.	2M	CO4	BTL1
	h	Define the transconductance of BJT.	2M	CO4	BTL1
	i	Define Intrinsic gain (AV) in small signal MOSSFET model.	2M	CO5	BTL1
	j	What is a source follower?	2M	CO5	BTL1
		PART-B			
		UNIT-I			
2	a	Discuss about effect of temperature on PN junction diode.	5M	CO1	BTL3
	b	A 230V, 60Hz voltage is applied to the primary of a 5:1 stepdown center tapped transformer used in a full wave rectifier having a load of 900Ω, if the diode resistance and secondary coil resistance together as a resistance of 100Ω. Determine i) DC values, RMS values, PIV ii) Efficiency iii) Output frequency iv) Form factor.	5M	CO1	BTL4
		OR			
3	a	Explain the operation of the CLC filter concerning the ripple factor for a full wave rectifier.	5M	CO1	BTL4
	b	Explain the operation of UJT and draw its I-V characteristics.	5M	CO1	BTL3
		UNIT-II			
4	a	Draw and explain the input and output characteristics of common collector configuration.	5M	CO2	BTL4
	b	A transistor has I_B=100mA and I_C =2 mA. Find α and β. If I_B changes by +25μA and I_C changes by +0.6 mA, find the new value of β.	5M	CO2	BTL3
		OR			
5	a	Explain the input and output characteristics of transistors in CE configuration.	5M	CO2	BTL3
	b	Discuss in detail about DC and AC load lines.	5M	CO2	BTL4

		UNIT-III			
6	a	Explain the device structure and physical operation of n-channel enhancement type MOSFET.	5M	CO3	BTL3
	b	Explain how the MOSFET acts as an amplifier and switch.	5M	CO3	BTL3
		OR			
7	a	Explain the separation of DC analysis and signal analysis of MOSFET.	5M	CO3	BTL3
	b	What is biasing? Explain the biasing of a MOSFET using drain to gate feedback resistor.	5M	CO3	BTL4
		UNIT-IV			
8	a	With a neat sketch explain the operation of the CE amplifier without emitter resistor.	5M	CO4	BTL4
	b	Discuss about separating the signal and DC quantities.	5M	CO4	BTL4
		OR			
9	a	Draw the common emitter amplifier with emitter resistor and explain its operation.	5M	CO4	BTL4
	b	Draw and explain the operation of common collector amplifier.	5M	CO4	BTL4
		UNIT-V			
10	a	Discuss about separating the DC analysis and signal analysis in MOSFET.	5M	CO5	BTL3
	b	The transistor is connected as a C.E. amplifier with Rs = 1 KΩ, R1 = 50 KΩ, R2 = 2KΩ, R=1KΩ, R1=1.2KΩ, h_{ie}=1100Ω, h_{re}=2.5x10^{-4}, h_{fe}=50, h_{oe}=25 µA/V. Find the various gains and the input and output impedances using small signal analysis.	5M	CO5	BTL4
		OR			
11	a	Derive the gain, input, output impedance of MOSFET common source amplifier without source resistance.	5M	CO5	BTL4
	b	With the small signal equivalent circuit of common gate MOSFET amplifier, derive Av, Zi, Zo.	5M	CO5	BTL4

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RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
B. Tech II Year I Semester Supplementary Examinations June 2025
Subject Name: **Probability and Complex Variables**

Time: 3 Hours   Branch: ECE   **Max. Marks: 70**

Instructions:
1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

		PART-A			
1	a	If A and B are independent events where $P(A) = 0.4$ and $P(A \cup B) = 0.7$, then find $P(B)$.	2M	CO1	L1
	b	For the continuous probability function $f(x) = Kx^2 e^{-x}$ when $x > 0$. Find K	2M	CO1	L1
	c	Write the properties of characteristic function	2M	CO2	
	d	Let X, and Y be the life spans (in hours) of two electronic devices, and their joint probability mass function is given below. Determine the value of k. $$f(x,y) = \begin{cases} ke^{-7x-14y}, 0 < x < y < \infty \\ 0, \quad Otherwise \end{cases}$$	2M	CO2	L3
	e	Define joint characteristic function.	2M	CO3	L1
	f	Test whether the function is valid joint density or not. $$f_{xy}(x,y) = \begin{cases} 1/24, 0 \le x \le 6, 0 \le y \le 4 \\ 0, \quad elsewhere \end{cases}$$	2M	CO3	L4
	g	Write the Cauchy Riemann equations in polar form	2M	CO4	L3
	h	Show that $f(z) = z^2$ is an analytic.	2M	CO4	L1
	i	What type of singularity has the function $f(z) = \dfrac{z - \sin z}{z^2}$	2M	CO5	L1
	j	Find the residue of $f(z) = \dfrac{ze^{2z}}{(z-1)^3}$ at its pole.	2M	CO5	L1
		PART-B			
		UNIT-I			
2	a	If A, B, C are mutually independent events, then prove that $A \cup B$ and C are also independent.	5M	CO1	L1
	b	In a bolt factory machines A1, A2, A3 manufacture respectively 25%, 35% and 40% of the total output. Of these 5, 4, and 2 percent are defective bolts. A bolt is drawn at random from the product and is found to be defective. What is the probability that it was manufactured by machine A2?	5M	CO1	L5
		OR			
3	a	The probability density $f(x)$ of a continuous random variable is given by $f(x) = ke^{-|x|}, -\infty < x < \infty$, Show that $k = 1/2$ and find the mean and variance of the distribution. Also find the probability that the variate lies between 0 and 4.	5M	CO1	L1
	b	A random variable X follows Poisson distribution. Find its variance?	5M	CO1	L1
		UNIT-II			
4	a	A random variable X has the density function e^{-x} for $x \ge 0$. Show that Chebychev's inequality gives $P(|X - 1| > 2) < \dfrac{1}{4}$ and show that the actual probability e^{-3}.	5M	CO2	L1

	b	The joint density of X and Y is given by $$f(x,y) = \begin{cases} e^{-(x+y)}, & 0 < x, y < \infty \\ 0, & Otherwise \end{cases}$$ Find the density function of the random variable X/Y.	5M	CO2	L1
OR
5	a	Define the joint distribution function? List out various properties.	5M	CO2	L2
	b	Let X, and Y be the life spans (in hours) of two electronic devices, and their joint probability mass function is given below. $$f(x,y) = \begin{cases} ke^{-7x-14y}, & 0 < x < y < \infty \\ 0, & Otherwise \end{cases}$$ Determine the value of k.	5M	CO2	L3
UNIT-III
6	a	Define characteristic function and its properties.	5M	CO3	L3
	b	Define correlation and covariance of two random variables X and Y	5M	CO3	L1
OR
7		The random variables X and Y have the joint pdf $f_{xy}(x,y) = \frac{1}{24}$ for $0 < x < 6$ & $0 < y < 4$	5M	CO3	L3
UNIT-IV
8	a	Determine whether the function $2x^2 y + i(x^2 - y^2)$ is analytic	5M	CO4	L3
	b	If $w(x,y) = \phi(x,y) + \psi(x,y)$ represents the complex potential for an electric field and $\phi = x^3 - 3xy^2$, determine the function ψ.	5M	CO4	L3
OR
9	a	Prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial x^2} \right) |Re\, f(z)|^2 = 2|f'(z)|^2$, where $f(z)$ is a analytic function	5M	CO4	L1
	b	Find the analytic function whose imaginary part is $e^x (x \sin y + y \cos y)$	5M	CO4	L1
UNIT-V
10	a	Evaluate using Cauchy's integral formula $\int_C \frac{e^{3z}}{(z-1)(z-2)} dz$ where C is the curve $|z| = 3$.	5M	CO5	L3
	b	Show that $\int_0^{2\pi} \frac{dz}{a+b\sin\theta} = \frac{2\pi}{\sqrt{a^2-b^2}}, a > b > 0$, using residue theorem.	5M	CO5	L3
OR
11	a	Find the Laurent series expansion of $f(z) = \frac{1}{z^2 - 4z + 3}$ for $(i) 1 < z < 3 \ (ii) 1 < z \ (iii)\ z < 3$	5M	CO5	L1
	b	Evaluate $\int_{-\infty}^{\infty} \frac{dz}{x^4 + 1}$, using residue theorem.	5M	CO5	L1

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RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June 2025
Subject Name: SIGNALS, SYSTEMS AND STOCHASTIC PROCESSES
BRANCH: ECE

Time: 3 Hours   **Max. Marks: 70**

Instructions:
1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

PART-A					
1	a	Find the even and odd components of the signal x(t) = cos t + sin t + sin t cos t.	2M	CO1	BTL1
	b	Write Dirichlet conditions for Fourier series	2M	CO1	BTL1
	c	What do you mean by BIBO stability?	2M	CO2	BTL2
	d	Write the modulation property of Fourier Transform.	2M	CO2	BTL2
	e	Write the condition for LTI system to be a distortion less system.	2M	CO3	BTL2
	f	Define system bandwidth.	2M	CO3	BTL1
	g	Prove the statement $R_{xx}(-\tau) = R_{xx}(\tau)$?	2M	CO4	BTL2
	h	Define Time average and Ergodicity?	2M	CO4	BTL1
	i	Define cross power spectral density of two random process?	2M	CO5	BTL1
	j	Show that $s_{xx}(\omega) = s_{xx}(-\omega)$.	2M	CO5	BTL2
PART-B					
UNIT-I					
2	a	Explain the various operations on signals?	5M	CO1	BTL3
	b	Find whether the signal f(t) = 10 Sin (12πt) + 2 u(t) is periodic or not? If periodic what is its fundamental period.	5M	CO1	BTL3
OR					
3	a	Define mean square error and derive the expression for evaluating mean square error.	5M	CO1	BTL4
	b	Determine whether the following function is periodic or not. If so, find the period. x(t)=3sin200πt + 4cos100t.	5M	CO1	BTL3
UNIT-II					
4	A	Solve by using Laplace transforms y''-3y'+2y=4 given that y=2, y'=3 when x=0.	5M	CO2	BTL3
	b	Distinguish between Fourier Series analysis and Fourier Transform?	5M	CO2	BTL3
OR					
5	a	Find L.T X(S) and sketch the pole-zero plot with ROC for following signals. i. x(t)= e^{-2t} u(t) + e^{-3t} u(t) ii. x(t) = t u(t)	5M	CO2	BTL4
	b	State and prove Convolution and Differentiation Properties of L.T?	5M	CO2	BTL3
UNIT-III					
6	a	Explain the effects of under sampling?	5M	CO3	BTL3
	b	Expain the how input and output signals are related to impulse of LTI system.	5M	CO3	BTL3

		OR			
7	a	Determine the relation between bandwidth and rise time.	5M	CO3	BTL3
	b	Explain the ideal characteristics of LPF, HPF, BPF and BSF using their Magnitude and Phase responses.	5M	CO3	BTL2
		UNIT-IV			
8	a	A random process x(t) = a sin $(\omega_0 t + \theta)$ where θ is uniform over (0,2π). Find if it is ergodic or not.	5M	CO4	BTL3
	b	Derive the equation for cross correlation function of Input and Output of a system.	5M	CO4	BTL4
		OR			
9	a	Show that the auto correlation function of a stationary random process is an even function of τ?	5M	CO4	BTL3
	b	Explain cross covariance and auto covariance functions?	5M	CO4	BTL3
		UNIT-V			
10	a	Find the cross-correlation function for cross power density spectrum in $S_{xx}(\omega) = \dfrac{8}{(\alpha+j\omega)^3}$.	5M	CO5	BTL3
	b	Explain Gaussian random process?	5M	CO5	BTL3
		OR			
11	a	Derive the relationship between Cross Power Density Spectrum and Cross- Correlation Function.	5M	CO5	BTL3

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RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June 2025
Subject Name: **Universal Human Values**

Branch: CSE

Time: 3 Hours   **Max. Marks: 70**

Instructions:
1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

		PART-A			
1	a	Why is happiness considered more important than prosperity?	2M	CO1	L1
	b	What are the three criteria that answers must fulfill to be considered from natural acceptance?	2M	CO1	L1
	c	What are the primary differences between the needs of the self and the body?	2M	CO2	L2
	d	Define "Sensation" and explain its role in forming desires.	2M	CO2	L2
	e	Describe the concept of reverence in relationships.	2M	CO3	L3
	f	How does showing respect contribute to harmony within a family?	2M	CO3	L3
	g	Describe one example of harmony observed in natural ecosystems.	2M	CO4	L1
	h	How does understanding harmony in nature influence human behavior towards the environment?	2M	CO4	L2
	i	What does a holistic understanding of ethics mean in a professional context?	2M	CO5	L2
	j	Define Utility Value (Upayogita Mulya).	2M	CO6	L4
		PART-B			
		UNIT-I			
2	a	How does value education address the deficiencies in the current education system? Discuss its potential impact on improving educational outcomes.	5M	CO1	L1
	b	Define Svatva, Swatantrata, and Swarajya. Explain their significance in the context of personal and societal values.	5M	CO1	L2
		OR			
3	a	What is meant by natural acceptance, and how can it improve human relationships?	5M	CO1	L2
	b	How do modern notions of wealth and prosperity impact ecological and social issues? Discuss the implications for human and environmental well-being.	5M	CO1	L6
		UNIT-II			
4	a	How does "Right Understanding" lead to definite human conduct and harmony?	5M	CO2	L3

	b	Why is it important to balance the needs of the body and the self for overall health and happiness?	5M	CO2	L4
		OR			
5	a	Discuss how imagination can be used as a tool for problem-solving and personal growth.	5M	CO2	L6
	b	How do the physical needs of the body differ from the emotional and mental needs of the self?	5M	CO2	L2
		UNIT-III			
6	a	Discuss the importance of gratitude in strengthening family bonds.	5M	CO3	L2
	b	Why is self-respect important, and how does it impact one's relationships with others?	5M	CO3	L1
		OR			
7	a	Explain how societal differentiation based on wealth impacts mutual respect.	5M	CO3	L4
	b	Discuss the importance of communication in maintaining harmony within families and communities.	5M	CO3	L6
		UNIT-IV			
8	a	Discuss the implications of misunderstanding the natural characteristics of the material and plant orders in Modern society, especially regarding the pursuit of growth and development.	10M	CO4	L4
		OR			
9	a	Describe the mutual fulfillment among the four orders of nature. How do the needs of one order contribute to the well-being of another?	5M	CO4	L3
	B	Explain the four orders of nature (material, plant, animal, and human). How are these orders interconnected and interdependent in maintaining the overall balance of nature?	5M	CO4	L5
		UNIT-V			
10	a	Discuss the implications of value-based living across all four levels: Individual, family, society, and nature. Provide specific examples for each level.	5M	CO5	L5
	b	How does ethical conduct affect personal integrity and social trust?	5M	CO5	L4
		OR			
11	a	Elaborate on the comprehensive human goal and its relevance to professional ethics. How can professionals align their activities with this goal?	10M	CO6	L4

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