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C-91

B.Tech. Electronics & Communication Engineering III Semester Examinations (Jun 2026)
Signals & Systems (BT-ECE-201A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all by selecting one question from each unit. Question 1 is compulsory and each Question carries 12 marks.

		Marks
Q.1		
(a)	Define energy signal and power signal with suitable examples.	**2**
(b)	State the condition for stability of an LTI system in terms of impulse response.	**2**
(c)	Define region of convergence in Laplace Transform.	**2**
(d)	State Dirichlet conditions for Fourier Series existence.	**2**
(e)	Define aliasing in sampling theory. How can it be avoided?	**2**
(f)	Define Unit Impulse Function δ(t). Prove its sifting property.	**2**

UNIT-I

Q.2(a)	Determine whether the following signals are periodic or not. If periodic, find the fundamental period: (i)$x(t) = sin(10\pi t) + cos(20\pi t)$ (ii) $x[n] = cos(\pi n/4)$	**6**
Q.2(b)	Test the system $y(t) = x(2t - 1)$ for linearity, time-invariance and causality.	**6**
Q.3	Describe the convolution sum for discrete-time systems and discuss its significance.	**12**

UNIT-II

Q.4	A system is represented by $\frac{dy(t)}{dt} + 2y(t) = x(t)$. Find the impulse response h(t).	**12**
Q.5(a)	Determine the Trigonometric Fourier Series coefficients for a square wave of amplitude A and period T	**6**
Q.5(b)	Explain waveform symmetry and its effect on Fourier coefficients.	**6**

UNIT-III

Q.6	Find the Fourier transform of $x(t) = e^{-at}u(t), a > 0$. Also sketch magnitude and phase spectrum.	**12**
Q.7(a)	Determine the Laplace transform and ROC of $x(t) = e^{-3t}u(t) - e^{-2t}u(-t)$.	**6**
Q.7(b)	Given H(s)=(s+1)/[(s+2)(s+3)], find the response y(t) for unit step input $x(t) = u(t)$.	**6**

UNIT-IV

Q.8	Find the z-transform and ROC of $x[n] = \left(\frac{1}{2}\right)^n u(n) + \left(-\frac{1}{3}\right)^n u(n)$.	**12**
Q.9(a)	Solve using z-transform: $y[n] - 0.5y[n-1] = x[n]$ for $x[n] = u[n]$ and initial rest conditions.	**6**
Q.9(b)	Analyze the causality and stability of an LTI system having system function $H(z) = \frac{1}{1-0.8z^{-1}}$.	**6**

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C-93

B.Tech. Electronics & Communication Engineering III Semester Examinations (June 2026)

Digital System Design (BT-ECE-205A)

Time- 3hrs

Max. Marks-60

Attempt 5 questions in all by selecting one question from each unit. Question 1 is compulsory and each Question carries 12 marks.

Q.1		Marks
(a)	Explain the concept of signed binary numbers with examples.	2
(b)	Differentiate between TTL and CMOS logic families.	2
(c)	Define SOP and POS forms in Boolean algebra.	2
(d)	Write the truth table of SR flip flop.	2
(e)	What is a synchronous counter?	2
(f)	Define EEPROM and mention its applications.	2
	UNIT-I	
Q.2(a)	Explain CMOS logic family with suitable diagrams and characteristics.	8
Q.2(b)	Convert the decimal number 245 into binary, octal and hexadecimal forms.	4
Q.3(a)	Discuss the characteristics of digital logic families in detail.	6
Q.3(b)	Perform the following subtraction using 2's complement method: $(101101)_2 - (011011)_2$	6
	UNIT-II	
Q.4(a)	Design and explain a Half subtractor with suitable block diagram.	4
Q.4(b)	Minimize the following Boolean function using K-Map: F (A, B, C, D)= Σ m (0,2,5,7,8,10,13,15)	8
Q.5(a)	Explain the working of a 4:1 multiplexer with truth table and logic diagram.	4
Q.5(b)	Design a parity generator and parity checker circuit for 4-bit data.	8
	UNIT-III	
Q.6	Explain the working of Master Slave JK flip flop with logic diagram and truth table.	12
Q.7(a)	Differentiate between synchronous and asynchronous counters.	4
Q.7(b)	Design a Mod-10 ripple counter using JK flip flops.	8
	UNIT-IV	
Q.8	Explain the working principle of successive approximation A/D converter with neat diagram.	12
Q.9(a)	Explain the architecture and working of Programmable Logic Array (PLA).	8
Q.9(b)	Differentiate between PROM, EPROM and EEPROM.	4

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C-92

B.Tech. Electronic & Communication Engineering III Semester Examinations (June 2026)

Electronic Devices & Circuits (BT-ECE-203A)

Time- 3hrs

Max. Marks-60

Attempt 5 questions in all by selecting one question from each unit. Question 1 is compulsory and each Question carries 12 marks.

Q.1		Marks
(a)	Compare intrinsic and extrinsic semiconductors.	2
(b)	Differentiate between depletion capacitance and diffusion capacitance.	2
(c)	Define base width modulation.	2
(d)	Why is FET called a voltage-controlled resistor?	2
(e)	Differentiate between positive and negative feedback.	2
(f)	What is meant by DC load line?	2

UNIT-I

Q.2(a)	Analyze the V-I characteristics of a PN junction diode in forward bias and Reverse bias region.	6
Q.2(b)	Draw and analyze the basic working of a diode as a clipper circuit.	6
Q.3(a)	Design a positive-bias clamper circuit and explain its operation.	6
Q.3(b)	Derive the relation of the built-in potential barrier and explain its role in a diode working.	6

UNIT-II

Q.4(a)	Explain the Hybrid-π model of a transistor with neat diagrams and discuss its importance in high-frequency analysis.	6
Q.4(b)	Derive the Ebers-Moll equations for a transistor and explain the significance of the Ebers-Moll model in transistor analysis.	6
Q.5(a)	Derive the expressions for current gain, input impedance, output impedance, and voltage gain using h-parameter analysis for a CE transistor amplifier.	6
Q.5(b)	Explain the basic principle of operation of a Bipolar Junction Transistor (BJT) with suitable diagrams and carrier movement in different regions.	6

UNIT-III

Q.6(a)	Draw and explain the drain characteristics of an n-channel JFET and discuss different regions of operation.	6
Q.6(b)	Draw and explain the small signal model of a JFET.	6
Q.7(a)	Draw and explain the drain and transfer characteristics of an enhancement-type MOSFET.	6
Q.7(b)	Explain the small signal model of MOSFET and discuss the significance of transconductance and output resistance.	6

UNIT-IV

Q.8(a)	Draw and explain the voltage divider bias circuit and discuss why it is widely used in transistor amplifiers.	**6**
Q.8(b)	Explain the concept of operating point (Q-point) in transistor biasing and discuss its importance in amplifier operation.	**6**
Q.9(a)	Explain the concept of feedback in amplifiers and discuss the advantages of negative feedback.	**6**
Q.9(b)	Explain the voltage series feedback topology with a neat block diagram and derive the expression for gain with feedback.	**6**

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B.Tech. Electronics & Communication Engineering III Semester Examinations (June 2026)

Network Analysis & Synthesis (BT-ECE-207A)

Time- 3hrs

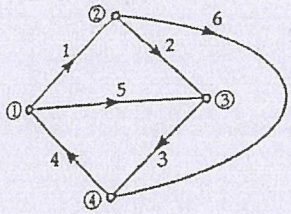
Max. Marks-60

Attempt 5 questions in all by selecting one question from each unit. Question 1 is compulsory and each Question carries 12 marks.

Q.1		Marks
(a)	What are singularity functions?	1.5
(b)	State KCL and KVL.	1.5
(c)	Describe the meaning of source-free RC, RL circuits.	1.5
(d)	What is the role of driving point functions?	1.5
(e)	What are constant-k filters?	1.5
(f)	What are hybrid parameters?	1.5
(g)	What are Hurwitz polynomials?	1.5
(h)	State the conditions of causality of a network?	1.5

UNIT-I

Q.2(a)	Give the significance of singularity function in network analysis.	6
Q.2(b)	A series RLC circuit with R=3 ohm, L=1 H, and C= 0.5 F is excited by a DC voltage source at t=0. find *i(t)* using Laplace transform.	6
Q.3	Write the incidence matrix, tie-set and cut-set matrix for the graph shown below.	12



UNIT-II

Q.4(a)	Find the current i(t) flowing through a series RC circuit, if the voltage source is $v(t) = 5e^{-2t}u(t)$ and $v_c(0-) = 0$.	6
Q.4(b)	Give the significance of initial and final conditions for network analysis in time domain.	6
Q.5(a)	The following equations give the voltages V_1 and V_2 at the two ports of a two-port network, $V_1 = 6I_1 + 2I_2 \qquad V_2 = 2I_1 + I_2$ Calculate Input impedance if a load resistance of 2Ω is connected across port 2.	6
Q.5(b)	Explain how the time domain response of a system can be determined from the s plane plot of the poles and zeros of its network function.	6

UNIT-III

Q.6(a)	Discuss the classifications of filters.	6

Q.6(b)	Design a constant K- low pass filter with cut-off frequency of 7.5 KHz and nominal characteristic impedance 600 ohm.	**6**
Q.7(a)	Explain short circuit admittance parameters with their formulas.	**6**
Q.7(b)	Establish the relationship between the transmission parameters and open circuit impedance parameters for a two-port network.	**6**

UNIT-IV

Q.8	Determine if $F(s) = \frac{2s^2+2s+4}{(s+1)(s^2+4)}$ is a positive real function or not?	**12**
Q.9(a)	Synthesize the L-C immittance function into second cauer form. $$Z(s) = \frac{2(s^2+1)(s^2+9)}{s(s^2+4)}$$	**6**
Q.9(b)	Test whether the polynomial is Hurwitz or not. $$s^3 + 6s^2 + 11s + 6$$	**6**

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C-95

B.Tech. Electronic & Communication Engineering III Semester Examinations (June 2026)

Analog Communication (BT-ECE-209A)

Time- 3hrs

Max.Marks-60

Attempt 5 questions in all by selecting one question from each unit. Question 1 is compulsory and each Question carries 12 marks.

		Marks
Q.1		
(a)	What are the disadvantages of modulation?	**2**
(b)	How over modulation is avoided in AM?	**2**
(c)	Why weuse separate carrier frequencies in VSB technique for Audio and Video?	**2**
(d)	What are different applications of AM and NBFM?	**2**
(e)	What is sensitivity. How it is helpful in radio receivers performance?	**2**
(f)	What is 1F (Intermediate frequency)? What are advantages of using 1F?	**2**
	UNIT-I	
Q.2(a)	What is Noise Figure? Derive relation between Noise Figure and Noise Temperature?	**6**
Q.2(b)	Explain effects of shot noise and Transit time noise in detail.	**6**
Q.3 (a)	What is Modulation? Why modulation is required.Give four reasons.	**6**
Q.3 (b)	Compare Analog and Digital communication systems with reference to application area of both system?	**6**
	UNIT-II	
Q.4 (a)	The Antenna current of an AM transmitter is 8 amperes (8 A) when only the carrier is sent, but it increases to 8.93 A when the carrier is modulated by a single sine wave. Find the percentage modulation. Determine the antenna current when the percent of modulation changes to 0.8.	**6**
Q.4 (b)	Explain Square Law diode detector indetail.	**6**
Q.5(a)	Explain filter method of SSB generation.	**6**
Q.5 (b)	What is VSB technique? Where it is used and why?	**6**
	UNIT-III	
Q.6 (a)	Compare NBFM and WBFM.	**4**
Q.6 (b)	What is Pre-Emphasis and De-emphasis.	**4**
Q.6 (c)	In an FM system, when the audio frequency (AF) is 500 Hz, and the AF voltage is 2.4 V, the deviation is 4.8 kHz. If the AF voltage is now increased to 7.2 V, what is the new deviation? If the AF voltage is further raised to 10 V while the AF is dropped to 200 Hz, what is the deviation? Find the modulation index in each case.	**4**
Q.7(a)	Explain Armstrong Frequency modulation technique.	**6**
Q.7 (b)	Explain the working and output of Balanced slope Detector.	**6**

UNIT-IV

Q.8 (a)	Explain the working of AM transmitter using High Level modulation?	**6**
Q.8 (b)	Explain the working of superheterodyne receiver.	**6**
Q.9(a)	What is 1F? How choice of 1F is made?	**4**
Q.9 (b)	How Frequency stabilization is achieved in FM transmitters.	**4**
Q.9 (c)	In a broadcast superheterodyne receiver having no RF amplifier, the loaded Q of the antenna coupling circuit (at the input to the mixer) is 100. If the intermediate frequency is 455 kHz, calculate (a) the image frequency and its rejection ratio at 1000 kHz, and (b) the image frequency and its rejection ratio at 25 MHz,	**4**

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B.Tech. Electronics & Communication Engineering III Semester Examinations (June 2026)

Engineering Mathematics III (ASH-MAT-209A)

Time- 3hrs

Max. Marks-60

Attempt 5 questions in all by selecting one question from each unit. Question 1 is compulsory and each Question carries 12 marks.

Q.1		**Marks**
(a)	Find the Laplace Transform of $e^{-2t}- e^{3t}$	**2**
(b)	Write first shifting property of Laplace Transform	**2**
(c)	Form the partial differential equation for $z =ax +by+a^2+b^2$	**2**
(d)	Find div $\vec{r}$ where $\vec{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$	**2**
(e)	Write the Cauchy Riemann Equations for function f(z) = u+iv	**2**
(f)	Write the statement of Residue theorem.	**2**

UNIT-I

Q.2(a)	Find the Laplace Transform of $\|t-3\| + \|t+3\|$, $t \geq 0$	**6**
Q.2(b)	Find the Laplace Transform of sin2t-2tcos2t	**6**
Q.3(a)	Find the Inverse Laplace Transform of $\frac{1}{(s)(s^2+4)}$ by Convolution theorem.	**6**
Q.3 (b)	Evaluate $\int_0^\infty te^{-3t}sint\ dt$	**6**

UNIT-II

Q.4 (a)	Solve the equation $x\,p + y\,q = 3z$.	**6**
Q. 4 (b)	Obtain the complete solution of equation pq+p+q=0	**6**
Q.5 (a)	Solve the equation $(p^2 + q^2)y = qz$ by Charpit method	**6**
Q.5(b)	Solve $\frac{\partial u}{\partial x} = 4\frac{\partial u}{\partial y}$ by method of separation of variables given that $u(0,y)= 8e^{-3y}$	**6**

UNIT-III

Q.6 (a)	Find the directional derivative of $\phi = xy^2+yz^3$ at (2, -1, 1) in the direction of vector $\hat{\imath} +2\hat{\jmath} + 2\hat{k}$	**6**
Q.6 (b)	Show that div $(r^n\vec{r}) = (n+3)\, r^n$ where $\vec{r} = x\hat{\imath} +y\hat{\jmath} + z\hat{k}$	**6**
Q.7(a)	Show that $2xyz^3\ \hat{\imath} +x^2z^3\hat{\jmath} + 3x^2yz\hat{k}$ is irrotational.	**6**
Q.7(b)	Prove that the vector space R^2 is an inner product space defined as $\langle u, v\rangle = (u_1v_1 + u_2v_2)$ where $u = (u_1, u_2)$ and $v = (v_1, v_2)$.	**6**

UNIT-IV

Q.8 (a)	Separate the cos(x+iy) into real and imaginary parts.	**6**
Q.8(b)	Determine the analytic function whose imaginary part is e^{-x}(xcosy + ysiny)	**6**

Q.9(a) Determine the poles of function f(z) = $\frac{Z^2}{(Z-1)^2(Z+2)}$ and the residue at each pole **6**

Q.9(b) Evaluate $\int \frac{e^{2z}}{(Z+1)^4} dz$ over the C where C is the circle $|z| = 2$ using Cauchy integral formula. **6**

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D-91

B.Tech. Electronics & Communication Engineering IV Semester Examinations (Jun 2026)

Digital Communication (BT-ECE-204A)

Time- 3hrs

Max.Marks-60

Attempt 5 questions in all by selecting one question from each unit. Question 1 is compulsory. Each Question carries 12 marks.

Q.1		Marks
(a)	State the Sampling Theorem.	2
(b)	Explain how adaptive delta modulation improves the performance of Delta Modulation.	2
(c)	Explain how eye patterns help in analyzing system performance.	2
(d)	Explain the significance of Passband transmission in digital communication.	2
(e)	Differentiate between QPSK and QAM techniques.	2
(f)	Define Spread Spectrum Communication.	2

UNIT-I

Q.2(a)	Explain the block diagram of the PCM system with Transmitter and Receiver operation.	6
Q.2(b)	Explain the working of delta modulation and analyze the effect of Slope overload and Granular Noise.	6
Q.3(a)	Draw and explain the working of the pulse width modulation system.	6
(b)	Define the need of multiplexing. Explain, with a suitable diagram, the working of a division multiplexing System.	6

UNIT-II

Q.4(a)	Explain the concept of Sampling Theorem. Also, explain the significance of the Nyquist sampling rate in digital communication systems. A voice signal with a frequency range from 300 Hz to 3.4 kHz is sampled for digital transmission. Determine: a) The minimum sampling frequency required for faithful reconstruction of the signal. b) The corresponding sampling interval. c) Explain why practical telephone systems use 8 kHz sampling frequency instead of the calculated minimum value.	6
(b)	Explain the Ideal Nyquist Channel, and discuss the significance of the Raised Cosine Spectrum in reducing ISI.	6
Q.5(a)	Explain the operation of the LMS Algorithm and its Application in Adaptive equalization.	6
(b)	Draw and explain the operation of duobinary Signaling and modified duo binary signaling with suitable example.	6

UNIT-III

Q.6(a)	Describe the Gram-Schmidt orthogonalization procedure and explain its significance in Signal Space representation.	6
(b)	Explain the generation and detection of the BPSK Signal with suitable signal	6

space diagram.

Q.7(a) Explain the operation of QAM. Draw and explain the working of the 8-QAM System. 6

(b) Explain the working of MSK and discuss its advantages over conventional PSK system. 6

UNIT-IV

Q.8(a) Explain the generation and properties of the PN Sequence used in the Spread Spectrum system. 6

(b) Describe the operation of a Direct Sequence Spread (DSSS) system using coherent BPSK with a suitable waveform. 6

Q.9(a) Explain the operation of Frequency Division Multiple Access (FDMA) technique with suitable diagram. 6

(b) Explain the Concept of Spread Spectrum Communication. Compare DSSS and FHSS Technique. 6

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B.Tech Electronics &Communication Engineering IV Semester Examination (Jun 2026)
Analog Circuits (BT-ECE-206A)

Time: 3Hours
Max. Marks: 60

Attempt 5 questions in all by selecting one question from each unit. Question 1 is compulsory and each question carries 12 marks.

Q 1		Marks
(a)	Describe the Barkhausen criteria for sustained oscillations.	(2)
(b)	List the factors affecting the bandwidth of RC coupled amplifier.	(2)
(c)	Draw the block diagram of a regulated power supply.	(2)
(d)	Classify power amplifiers on the basis of operation according to the position of Q point.	(2)
(e)	Explain the need of cascading of amplifiers.	(2)
(f)	What is mean by distortion in amplifier?	(2)

UNIT 1

Q 2 (a)	Draw the circuit diagram of CE transistor amplifier. Also derive an expression for input impedance, current gain and voltage gain for CE configuration.	(4)
Q 2 (b)	Explain the features of voltage, current, trans-conductance and trans-resistance amplifiers.	(8)
Q 3(a)	Draw the circuit diagram of CS JFET amplifier and also analyze the performance parameters of CS JFET amplifier.	(8)
Q 3 (b)	Discuss the various classifications of amplifiers.	(4)

UNIT 2

Q4(a)	How the distortion arise in a power amplifiers. Hence derive an expression for second harmonic distortion in Class-A power amplifier.	(5)
Q 4 (b)	Analyze the Class A power amplifier in terms of load line characteristics, power dissipation and power conversion efficiency	(7)
Q 5 (a)	Four identical stages are cascaded. The lower and upper 3 db frequencies of each stage are 40 Hz and 20 Hz respectively. Determine the overall bandwidth of cascaded amplifier.	(4)
Q 5 (b)	Draw the frequency response of RC coupled amplifier. Explain the effect of coupling and by pass capacitor on bandwidth.	(2+3+3=8)

UNIT 3

Q 6 (a)	Draw the neat and clean circuit diagram of Hartely oscillator. Derive an expression for its frequency of oscillations. Deduce the condition for sustained oscillation.	(3+3+2=8)
Q 6 (b)	Determine the frequency of oscillations generated in a Colpitt's oscillator if $C1= C2=5nF$, $L=100\mu H$. Draw the circuit diagram.	(2+2=4)
Q7 (a)	Derive an expression for frequency of oscillations of a Wien bridge oscillator. Also (a) Calculate the minimum value of $and\ \beta$. (b) Determine the frequency of oscillation for R=51 K Ohm and C=0.01 μF.	(3+3+2=8)

UNIT-4

Q 7(b)	Why crystal oscillator is needed. Draw the circuit of crystal oscillator.	(4)
Q 8(a)	Explain the working of transistor series voltage regulator circuit.	(6)
Q 8(b)	Explain how Zener diode acts as a voltage regulator with neat and clean diagram and with necessary mathematical analysis along with example.	(6)
Q 9(a)	Draw the circuit diagram of half wave rectifier.	(4)
Q 9 (b)	Explain op amp series or shunt voltage regulator with neat and clean diagram.	(8)

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B.Tech. Electronics & Communication Engineering IV Semester Examinations (Jun 2026)

Electromagnetic Field Theory (BT-ECE-208A)

Time- 3hrs

Max. Marks-60

Attempt 5 questions in all by selecting one question from each unit. Question 1 is compulsory and each Question carries 12 marks.

		Marks
Q.1		
(a)	Define Cartesian coordinate system and state its applications in electromagnetic analysis.	**02**
(b)	Differentiate between scalar and vector quantities with suitable examples.	**02**
(c)	State Gauss's law in electrostatics.	**02**
(d)	Define magnetic flux density and magnetic vector potential.	**02**
(e)	Explain the concept of uniform plane wave.	**02**
(f)	Define transmission line characteristic impedance.	**02**

UNIT-I

Q.2(a)	Derive the expression for gradient and divergence in Cartesian coordinate system.	**06**
Q.2(b)	Explain Stokes' theorem and verify it for a suitable vector field.	**06**
Q.3	Derive the expressions for divergence and curl in cylindrical coordinate system. Discuss their significance in electromagnetic field theory.	**12**

UNIT-II

Q.4	Derive Poisson's and Laplace's equations from Gauss's law. Discuss their applications in electrostatic field analysis.	**12**
Q.5(a)	Derive the continuity equation and explain its physical significance.	**6**
Q.5(b)	Explain Faraday's law and derive the expression for induced EMF in a closed loop.	**6**

UNIT-III

Q.6	Explain the propagation of plane electromagnetic waves in free space. Derive the wave equation for a lossless medium.	**12**
Q.7(a)	Define Poynting vector and derive Poynting theorem.	**06**
Q.7(b)	Explain reflection and refraction of plane waves at normal incidence.	**06**

UNIT-IV

Q.8	Derive the transmission line equations and obtain expressions for characteristic impedance and propagation constant.	**12**
Q.9(a)	Explain the concepts of reflection coefficient and VSWR in transmission lines.	**06**
Q.9(b)	Discuss impedance matching using quarter-wave transformer with neat diagram.	**06**

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B.Tech. Electronics & Communication Engineering IV Semester Examinations (Jun 2026)

Computer Communication Networks (BT-ECE-210A)

Time- 3hrs

Max. Marks-60

Attempt 5 questions in all by selecting one question from each unit. Question 1 is compulsory and each Question carries 12 marks.

Q.1		Marks
(a)	What is conditional and joint entropy?	2
(b)	Differentiate between zero-memory source and a Markov source.	2
(c)	Define a uniquely decodable code with an example.	2
(d)	What is code efficiency in Huffman coding?	2
(e)	Differentiate between the physical layer and data link layer.	2
(f)	Expand the terms HTTP and URL.	2

UNIT-I

Q.2(a)	Explain joint entropy and conditional entropy.	6
Q.2(b)	Discuss source coding and its importance in data compression.	6
Q.3(a)	Explain the concept of reliable communication using Shannon's noisy coding theorem.	6
Q.3(b)	Consider a telegraph source having two symbols, dot and dash. The dot duration is 0.2 sec. The dash duration is 3 times the dot duration. The probability of dots occurring is twice that of the dash, and the time between symbols is 0.2 sec. Calculate the information rate of the telegraph source.	6

UNIT-II

Q.4(a)	Explain the Viterbi decoding algorithm with a trellis diagram	6
Q.4(b)	The generator polynomial of a (6,3) cycle code is $G(x)= 1 + x^2$ Find all the code words.	6
Q.5(a)	Discuss prefix codes and instantaneous codes with suitable examples.	4
Q.5(b)	Construct a Huffman code for the following set of symbols, having given probabilities. Also, calculate the average code length.	8

Symbol	Probability
A	0.35
B	0.25
C	0.20
D	0.12
E	0.08

UNIT-III

Q.6(a)	Describe the layers of the TCP/IP protocol suite and compare it with the OSI model.	**8**
Q.6(b)	Differentiate between MAC address and IP address.	**4**
Q.7(a)	Explain signal attenuation, distortion, and noise in communication systems.	**6**
Q.7(b)	Describe the functions and services provided by the Data Link Layer.	**6**

UNIT-IV

Q.8(a)	Explain routing and forwarding functions in the Network Layer.	**6**
Q.8(b)	Discuss peer-to-peer communication in the Application Layer.	**6**
Q.9(a)	Describe the World Wide Web (WWW) and HTTP protocol.	**6**
Q.9(b)	What are the functions and design issues of the Transport Layer?	**6**

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B.Tech. Electronics & Communication Engineering IV Semester Examinations (Jun 2026)

Digital System Design with Verilog (BT-ECE-212A)

Time- 3hrs

Max. Marks-60

Attempt 5 questions in all by selecting one question from each unit. Question 1 is compulsory and each Question carries 12 marks.

Q.1		Marks
(a)	Define scalars and vectors.	2
(b)	Explain comments in Verilog HDL.	2
(c)	Define system tasks.	2
(d)	Identify bi-directional gates.	2
(e)	Describe case statement.	2
(f)	Explain the wait construct.	2

UNIT-I

Q.2(a)	Discuss the conventional approach to digital design.	6
Q.2(b)	Define and explain various identifiers used in Verilog HDL.	6
Q.3(a)	Differentiate between simulation and synthesis.	6
Q.3(b)	Describe test bench with example.	6

UNIT-II

Q.4	Design and explain a Verilog program for a JK flip-flop using gate-level modeling.	12
Q.5(a)	**(a)** Design 3-input NAND gate using active pull up.	8
Q.5(b)	**(b)** Construct a BCD adder using dataflow modeling.	4

UNIT-III

Q.6	Design a Verilog behavioral model for a JK flip-flop. Also develop a testbench and explain the expected output.	12
Q.7(a)	Classify and explain various types of operators used in Verilog HD	6
Q.7(b)	Explain the If statement with an example.	6

UNIT-IV

Q.8(a)	Explain the concept of functions with examples.	6
Q.8(b)	Discuss the concept of tasks with examples.	6
Q.9(a)	Explain and differentiate Moore and Mealy machines with examples.	8
Q.9(b)	Describe Parameters in Verilog HDL	4

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D-96

B.Tech. Electronics & Communication Engineering IV Semester Examinations (June 2026)
Data Structures & Algorithms (BT-CSE-214A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all by selecting one question from each unit. Question 1 is compulsory. Each Question carries 12 marks.

		Marks
Q.1		
a)	What is an Abstract Data Type? Explain with suitable examples.	**2**
b)	What is a Circular Queue? How does it overcome the limitation of a Linear Queue?	**2**
c)	Explain the evaluation of a postfix expression using stack.	**2**
d)	In what circumstances linked lists should be preferred over arrays?	**2**
e)	Differentiate between Adjacency Matrix and Adjacency List representation	**2**
f)	Define Primality Testing. Mention one method used for primality testing.	**2**
	UNIT-I	
Q.2 a)	Explain the concept of algorithm efficiency. Discuss worst-case, average-case and best-case performance with examples.	**6**
Q.2 b)	Differentiate between Selection Sort and Insertion Sort based on working principle, complexity, and applications.	**6**
Q.3 (a)	Design an algorithm for Binary Search and trace it for the array: 10, 20, 30, 40, 50, 60 to search an element 40.	**6**
Q.3 (b)	Sort the array 45, 12, 78, 34, 23 using Bubble Sort. Show all passes and identify the number of swaps performed.	**6**
	UNIT-II	
Q.4 (a)	Explain stack implementation using arrays and demonstrate push and pop operations with suitable examples.	**6**
Q.4 (b)	Convert the infix expression (A+B)*(C-D)/E into postfix and prefix forms step-by-step.	**6**
Q.5 (a)	Apply Quick Sort on the array 55, 23, 26, 2, 25, 78 using first element as pivot and show partitioning.	**6**
Q.5 (b)	Compare linear queue and circular queue based on memory utilization and operations	**6**
	UNIT-III	
Q.6 (a)	Explain the creation, traversal, insertion, and deletion operations in a singly linked list with suitable diagrams.	**6**

Q.6 (b) Explain how memory is managed in dynamic data structures using linked lists. 6

OR

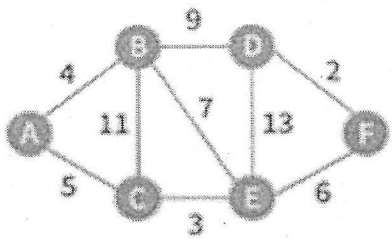
Q.7 (a) Explain insertion at the beginning and deletion at the end in a circular linked list using suitable diagrams 6

Q.7 (b) Create a doubly linked list with elements 5, 15, 25, 35. Insert 20 between 15 and 25 and show forward and backward traversal. 6

UNIT-IV

Q.8 (a) Compare the Breadth First Search (BFS) and Depth First Search (DFS) graph traversal techniques with suitable example. 6

Q.8 (b) Apply Prim's and Kruskal's algorithms on the following graph to construct minimum cost spanning tree. 6



OR

Q.9 (a) Apply the Naïve String-Matching Algorithm to find pattern "ABA" in text " ABABABA" and show all shift comparisons. 6

Q.9 (b) Discuss the Euclidean Algorithm. Extended Euclidean Algorithm with suitable examples. 6

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D-97

B.Tech. Electronics & Communication Engineering IV Semester Examinations (Jun 2026)
Machine Learning Algorithms (BT-AIML-210A)

Time- 3hrs
Max. Marks-60

Attempt 5 questions in all by selecting one question from each unit. Question 1 is compulsory and each Question carries 12 marks.

		Marks
Q.1		
(a)	Differentiate between supervised and unsupervised learning with one example each	2
(b)	Write two examples of Machine Learning applications in healthcare.	2
(c)	What is the role of K in k-NN algorithm?	2
(d)	What is dimensionality reduction?	2
(e)	What is the primary purpose of performing a "Train-Test Split" before training your model?	2
(f)	Define hyperparameter tuning.	2
	UNIT-I	
Q.2(a)	A bank wants to automate its credit card approval process. Identify which type of learning (Supervised, Unsupervised, or Reinforcement) should be used and describe the specific ML pipeline steps required for this use case.	6
Q.2(b)	Explain the importance of feature engineering.	6
Q.3	Explain the Machine Learning pipeline in detail with a suitable example.	12
	UNIT-II	
Q.4	Explain regression techniques used in Machine Learning with examples.	12
Q.5(a)	What is recommendation system in Machine Learning?	6
Q.5(b)	Compare MAE, RMSE, and R^2 metrics.	6
	UNIT-III	
Q.6	Explain the concept of Anomaly Detection. Why is Unsupervised Learning better suited for finding "frauds" or "outliers" than Supervised Learning?	6+6 =12
Q.7	Explain dimensionality reduction and discuss how PCA improves Machine Learning performance.	12
	UNIT-IV	
Q.8	A Machine Learning model shows very high training accuracy but poor testing accuracy. Explain the problem and suggest methods to improve performance.	12
Q.9(a)	Explain overfitting and underfitting with examples.	6
Q.9(b)	Explain conceptual working of Bagging and Boosting.	6

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