

CBCS SCHEME

BEC701

USN

--	--	--	--	--	--	--	--	--	--

Seventh Semester B.E/B.Tech. Degree Examination, Dec.2025/Jan.2026 Microwave Engineering and Antenna Theory

Time: 3 hrs.

Max. Marks:100

**Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.**

		Module – 1	M	L	C
1	a.	Explain clearly how GUNN diode is being a negative resistance device.	6	L2	CO1
	b.	A certain transmission line has the characteristics impedance of $(75 + j0.01) \Omega$ and is terminated in load impedance of $(70 + j50)\Omega$. Compute : i. The reflection coefficient ii. Transmission coefficient.	6	L3	CO1
	c.	Derive the equation of transmission line to find voltage and current on the line.	8	L3	CO1
OR					
2	a.	A transmission line is terminated in a resistive load of 1000Ω and has $L = 9\mu\text{H/m}$ and $C = 100 \text{ pF/m}$. Calculate reflection co-efficient and standing wave ratio.	6	L3	CO1
	b.	Define reflection coefficient. Derive an expression for reflection co-efficient at load in terms of characteristic impedance and load impedance.	8	L3	CO1
	c.	Explain Microwave System with relevant diagram.	6	L2	CO1
Module – 2					
3	a.	Deduce the relation between incident and reflected waves in terms of S-parameters for a two port network.	6	L3	CO2
	b.	Derive an expression for input reflection co-efficient for two port network with mismatched load.	10	L3	CO2
	c.	Write a note on different losses in microwave network.	4	L4	CO2
OR					
4	a.	Explain the following with necessary sketches : i. Flexible co-axial cable ii. Movable vane attenuator.	10	L2	CO2
	b.	Explain magic tee and write its S-Matrix representation.	10	L2	CO2

Module – 3

5	a.	Explain parallel strip line with relevant diagram.	6	L2	CO3
	b.	A lossless parallel strip line has a conducting strip of width 'W'. The substrate dielectric separating the 2 conducting strips has a relative dielectric constant ϵ_{rd} of 6 and a thickness 'd' of 4mm. Calculate : i. Value of W so that $Z_0 = 50\Omega$ ii. Strip line capacitance iii. Strip line inductance iv. Phase velocity.	10	L3	CO3
	c.	Explain the following terms related to antenna systems : i. Directivity ii. Power Density.	4	L2	CO4

OR

6	a.	Explain antenna radiation pattern. Prove that maximum effective aperture of short electric dipole is $0.119\lambda^2$.	10	L3	CO4
	b.	State and prove Frii's Transmission formula.	6	L2	CO4
	c.	Explain the construction and field pattern of micro strip line.	4	L2	CO3

Module – 4

7	a.	Derive the expression for radiation resistance of short electric dipole antenna.	10	L3	CO4
	b.	Obtain the expression for total electric field for array of n-point sources consider uniform linear array.	10	L2	CO4

OR

8	a.	Explain principle of pattern multiplication.	6	L2	CO4
	b.	Write a note on Thin Linear Antenna.	8	L1	CO4
	c.	A thin dipole antenna is $\lambda/10$ long. If its loss resistance is 2.5Ω . Find the radiation resistance and efficiency.	6	L3	CO4

Module – 5

9	a.	Explain different types of horn antenna with relevant diagrams.	10	L2	CO5
	b.	The radius of a circular loop antenna is 0.02λ . How many turns of the antenna will give radiation resistance of 35Ω ?	6	L3	CO5
	c.	Compare the far field components of small loop and short dipole antenna.	4	L1	CO5

OR

10	a.	Explain Yagi-Uda antenna and list its applications.	10	L2	CO5
	b.	Explain Parabolic dish antenna or microwave dish antenna with relevant diagram.	10	L2	CO5

CBCS SCHEME

BEC/BTE702

USN

--	--	--	--	--	--	--	--	--	--	--	--

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Computer Networks and Protocols

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module - 1			M	L	C
Q.1	a.	Explain the various types of physical topologies available in computer networks.	10	L2	CO1
	b.	With a neat diagram, explain the significance of layers in TCP/IP protocol suite.	10	L2	CO2
OR					
Q.2	a.	Explain LAN and WAN with the help of neat diagrams.	10	L2	CO1
	b.	What is an ARP? Explain the operation of ARP and its packet format with suitable diagrams?	10	L2	CO2
Module - 2					
Q.3	a.	Explain CSMA and show the behavior of the three persistence methods of CSMA.	10	L2	CO2
	b.	Describe flow control and error control in Data link layer.	5	L2	CO2
	c.	Write a 'C' program to perform Bit stuffing.	5	L2	CO3
OR					
Q.4	a.	Explain CSMA/CA protocol with a flow diagram.	10	L2	CO2
	b.	Explain the Ethernet frame format of standard Ethernet.	5	L2	CO2
	c.	Write a 'C' program to perform Byte stuffing.	5	L2	CO3
Module - 3					
Q.5	a.	Explain the working of Dynamic Host Configuration Protocol [DHCP].	10	L2	CO3
	b.	With a neat diagram, explain the virtual circuit packet network and its various phases of operation.	10	L2	CO3
OR					
Q.6	a.	Explain IPv4 Datagram format with a neat diagram.	10	L2	CO3
	b.	Explain distance vector routing and write a 'C' program to perform distance vector routing.	10	L2	CO3
Module - 4					
Q.7	a.	Explain connectionless and connection oriented protocols in transport layer.	10	L2	CO2
	b.	Explain the working of Go-back-N protocol.	10	L2	CO2
OR					
Q.8	a.	With a neat diagram, explain state transition diagram of TCP.	10	L2	CO2
	b.	Explain UDP services along with neat diagram of Pseudo header for checksum.	10	L2	CO2
Module - 5					
Q.9	a.	Explain the following with diagram : i) WWW iii) HTTP iii) FTP.	10	L2	CO4
	b.	Explain the architecture of electronic mail with a neat diagram.	10	L2	CO4
OR					
Q.10	a.	Explain DNS Name space, DNS in the internet and resolution.	10	L2	CO4
	b.	Explain remote logging in TELNET with a neat diagram.	10	L2	CO4

CBCS SCHEME

BEC703

USN

--	--	--	--	--	--	--	--	--	--

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Wireless Communication Systems

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module - 1			M	L	C
Q.1	a.	Derive an Expression for Rayleigh Fading Wireless Channel.	10	L2	CO2
	b.	In the wireless Rayleigh fading channel consider a transmit power P_t (dB) = 20 dB. What is the probability that the power at the receiver is greater than P_r (dB) = 10 dB?	10	L2	CO1
OR					
Q.2	a.	Explain the modeling of wireless systems with proper equations.	10	L2	CO1
	b.	Give the mathematical equations for RMS Delay Based on Average Power Profile.	10	L2	CO1
Module - 2					
Q.3	a.	Explain the Properties of PN sequences.	10	L2	CO1
	b.	Explain any two advantages of CDMA.	10	L2	CO1
OR					
Q.4	a.	Illustrate OFDM with an example.	10	L2	CO1
	b.	With neat schematic explain MIMO-OFDM Transmitter.	10	L2	CO1
Module - 3					
Q.5	a.	Explain GSM Network Architecture.	10	L2	CO1
	b.	Explain IP-Based Flat Network Architecture.	10	L2	CO1
OR					
Q.6	a.	Explain Multi-Antenna techniques.	10	L2	CO1
	b.	Explain LTE Network Architecture with necessary diagram.	10	L2	CO1
Module - 4					
Q.7	a.	Explain MIMO System Model.	10	L2	CO1
	b.	Derive Expression for MIMO Zero-Forcing (ZF) Receiver.	10	L2	CO1

OR

Q.8	a.	Compute the MIMO zero-forcing receiver for the channel matrix H given $H = \begin{bmatrix} 2 & 3 \\ 1 & 3 \\ 1 & 2 \end{bmatrix}$	10	L3	CO2
	b.	Derive expression for MIMO MMSE Receiver.	10	L2	CO1
Module - 5					
Q.9	a.	With neat diagram, explain design principles of LTE Network.	10	L2	CO1
	b.	Explain the Hierarchical Channel Structure of LTE.	10	L2	CO1
OR					
Q.10	a.	Explain the time domain frame structures of OFDM.	10	L2	CO1
	b.	Explain Uplink SC-FDMA Radio Resources.	10	L2	CO1

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

BEC714C

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Automotive Electronics

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module - 1			M	L	C
Q.1	a.	Explain 4 stroke operation of SI engine with suitable diagram.	12	L2	CO1
	b.	With neat diagram, explain the spark-plug operation.	8	L2	CO1
OR					
Q.2	a.	With neat diagram, explain the working of break system.	6	L2	CO1
	b.	With neat block diagram, explain the hybrid vehicle configuration.	6	L2	CO1
	c.	What are the three desired functions of catalytic converter? Discuss the three way catalyst.	8	L2	CO1
Module - 2					
Q.3	a.	With neat diagram, explain the working of EGO sensor and its switching characteristics.	8	L2	CO2
	b.	With neat diagram, explain magnetic reluctance Crankshaft sensor.	8	L2	CO2
	c.	Explain the principle of working of a solenoid with the help of diagram.	4	L2	CO2
OR					
Q.4	a.	With relevant diagram, explain the working of strain gauge MAP sensor.	6	L2	CO2
	b.	How does a typical coolant sensor work? Explain with diagram.	6	L2	CO2
	c.	Explain the working of EGR actuator with relevant diagram.	8	L2	CO2
Module - 3					
Q.5	a.	List seven modes of fuel control. Explain them briefly.	10	L2	CO3
	b.	What are the various digital modules in the control unit? Draw block diagram depicting those modules.	10	L2	CO3
OR					
Q.6	a.	What is the use of secondary air? With the help of diagram, explain how the secondary air is controlled.	10	L2	CO3
	b.	What are the various modules of control unit software? Explain them briefly.	10	L2	CO3
Module - 4					
Q.7	a.	Give examples for each of CAN and LIN applications. Write note on diagnostic interfaces.	10	L2	CO4
	b.	With neat diagram, explain digital speed sensor.	10	L2	CO4
OR					
Q.8	a.	Explain Digital cruise control system with the help of a relevant diagram.	10	L2	CO4
	b.	With neat diagram, explain vacuum operated throttle actuator.	10	L2	CO4
Module - 5					
Q.9	a.	Explain the principle of functioning of airbag with relevant diagrams.	10	L2	CO5
	b.	Write brief notes on ON-board diagnostics and OFF-board diagnostics.	10	L2	CO5
OR					
Q.10	a.	Explain low pressure warning system with relevant diagrams.	10	L2	CO5
	b.	With neat block diagram, explain the timing light used to measure and set timing.	10	L2	CO5

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

BEC755A

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 E-Waste Management

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Define E-Waste. Explain its sources, classification and characteristics with examples.	10	L2	CO1
	b.	Discuss global and Indian Scenario of E-waste generation of management.	10	L2	CO1
OR					
Q.2	a.	Explain how the rapid growth of the electronics Industry in India and how it contributes to E-waste generation.	10	L2	CO2
	b.	Describe the challenges faced in defining and quantifying e-waste globally and nationally.	10	L2	CO1
Module – 2					
Q.3	a.	Explain the basel convention and its importance in e-waste control.	10	L2	CO2
	b.	Explain the objective and impact of WEEE Directive.	10	L2	CO2
OR					
Q.4	a.	Discuss the evolution of E-waste regulations in India from 2011 to 2016.	10	L2	CO2
	b.	Describe the regulatory compliance mechanisms for E-waste in India.	10	L2	CO2
Module – 3					
Q.5	a.	Define EPR and explain its role in sustainable E-waste management.	10	L2	CO2
	b.	Explain in detail about E-waste value chain.	10	L3	CO2
OR					
Q.6	a.	Describe in detail about E-waste collection system in India with examples.	10	L2	CO2
	b.	Discuss the role and importance of Producer Responsibility Organizations (PRO's).	10	L2	CO2
Module – 4					
Q.7	a.	Explain key technique for sustainable E-Waste handling.	10	L2	CO3
	b.	Discuss hazards of improper E-Waste handling and suggest safety measures.	10	L2	CO3
OR					
Q.8	a.	Describe the role of classification of characterization in e-waste handling.	10	L3	CO3
	b.	Explain in detail about worker safety measures during e-waste handling.	10	L2	CO3
Module – 5					
Q.9	a.	Define ROHS directive. List restricted substances and their effects.	10	L2	CO3
	b.	Discuss ROHS compliance in India and compare it with global standards.	10	L2	CO3
OR					
Q.10	a.	Explain the operations involved in E-Waste recycling.	10	L2	CO4
	b.	Describe major e-waste recycling technologies. Compare their merits and limitations.	10	L2	CO4
