Reg. No.															

Question Paper Code	13526

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Third Semester

Computer Science and Engineering (IOT)

20ESCI301 - BASIC ELECTRONICS AND COMMUNICATION ENGINEERING

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Norton's theorem replaces a network by (a) Voltage source in series with resistance (b) Current source in parallel with resistance (c) Only a voltage source (d) Only a current source	1	K1	CO1
2.	KCL states that the algebraic sum of currents at a node is (a) Maximum (b) Zero (c) Equal to voltage (d) Infinite	1	K1	CO1
3.	The forward voltage drop across a silicon diode is approximately (a) 0.2 V (b) 0.7 V (c) 1.2 V (d) 5 V	1	K1	CO2
4.	The main purpose of a bypass capacitor in an amplifier is to (a) Block DC signals (b) Provide voltage gain (c) Bypass AC signals to ground (d) Bypass DC signals to ground	1	K1	CO2
5.	Marginal entropy measures (a) Uncertainty of a single random variable (b) Joint uncertainty of two variables (c) Conditional uncertainty (d) Mutual dependence	1	K1	CO3
6.	Information rate is defined as: (a) Entropy per second (b) Entropy per symbol × symbol rate (c) Bit error rate (d) Channel capacity	1	K1	CO3
7.	The bandwidth of an AM signal is (a) Equal to the carrier frequency (b) Twice the modulating signal frequency (c) Half the carrier frequency (d) Same as the modulating frequency	1	K1	CO4
8.	Pulse Modulation is used to transmit (a) Analog signals as digital pulses (b) Digital signals as analog waves (c) Only voice signals (d) Only video signals	1	K1	CO4
9.	For a signal with bandwidth 4 kHz, the Nyquist rate is (a) 2 kHz (b) 4 kHz (c) 8 kHz (d) 16 kHz	1	K1	CO5
10.	In BPSK, the phase shift used to represent bits is (a) 0° and 45° (b) 0° and 90° (c) 0° and 180° (d) 90° and 270°	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

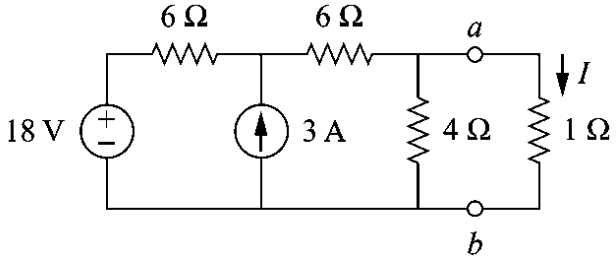
		Marks	K – Level	CO
11.	For a circuit with a 24V battery in series with a 6Ω resistor, find the Norton equivalent current and resistance.	2	K2	CO1
12.	A circuit has three resistors in series: R1 = 5 Ω, R2 = 10 Ω, and R3 = 15 Ω. If a total voltage of 60 V is applied across this series connection, find the current through R2.	2	K2	CO1
13.	Draw the V-I characteristics of a Zener diode.	2	K1	CO2
14.	What is the purpose of a coupling capacitor in an amplifier circuit?	2	K1	CO2
15.	How is marginal entropy different from conditional entropy?	2	K1	CO3
16.	How is information rate related to entropy and symbol rate?	2	K1	CO3
17.	Why is modulation necessary in communication systems?	2	K1	CO4
18.	How does phase modulation differ from frequency modulation?	2	K1	CO4

19.	What happens if the sampling rate is less than the Nyquist rate?	2	K1	CO5
20.	Why is quantization error introduced in PCM?	2	K1	CO5
21.	What is amplitude shift keying (ASK)?	2	K1	CO6
22.	Why is digital modulation preferred over analog modulation in modern systems?	2	K1	CO6

PART - C (6 × 11 = 66 Marks)

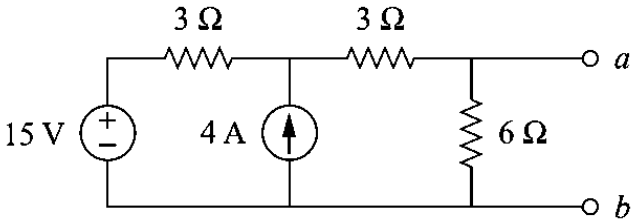
Answer ALL Questions

23.	a)	Determine the current *I* using Thevenin's theorem for the circuit shown in Figure.	11	K2	CO1



OR

	b)	Find the Norton equivalent circuit for the circuit shown in Figure at terminals a-b.	11	K2	CO1



24.	a)	Explain the working of a common emitter amplifier with circuit diagram and signal waveform.	11	K2	CO2

OR

	b)	Explain the operation of a bridge rectifier with waveform and circuit diagram. Mention its advantages over other types.	11	K2	CO2
25.	a)	Explain the significance of joint entropy. How is joint entropy useful in measuring total uncertainty in a communication model?	11	K2	CO3

OR

	b)	Explain the concept of channel capacity. State Shannon's channel capacity theorem and discuss its implications in communication systems.	11	K2	CO3
26.	a)	Explain Amplitude Modulation (AM) in detail. Derive the expression for the transmitted signal in AM and explain its spectrum.	11	K2	CO4

OR

	b)	Elucidate in brief about the working of a super heterodyne receiver.	11	K2	CO4
27.	a)	Explain the process of Pulse Code Modulation (PCM).Compare PCM with analog modulation schemes.	11	K2	CO5

OR

	b)	State and explain the Sampling Theorem. Discuss the effects of under-sampling and over-sampling.	11	K2	CO5
28.	a)	Explain Frequency Shift Keying (FSK) and how it is used for data transmission. Define Phase Shift Keying (PSK) and differentiate it from ASK and FSK.	11	K2	CO6

OR

	b)	What are multiple access techniques? Explain the basic principles of FDMA, TDMA, and CDMA.	11	K2	CO6