U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2025 Semester End Main Examinations

Programme: B.E. **Semester: I / II**
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 21EC1ESBEC / 21EC2ESBEC **Max Marks: 100**
Course: Basic Electronics and Communication Engineering

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	Explain the operational principle of a regulated power supply using a block diagram, highlighting the functions of each component and their interrelationships.	*CO 1*	-	**06**
	b)	Illustrate the application of a Full-Wave Bridge Rectifier by drawing a circuit diagram and waveform. Explain how the rectifier converts AC to DC and how the waveform is affected by the rectification process	*CO 2*	*PO1*	**08**
	c)	The following data were obtained during a test carried out on a d.c. power supply: (i) Load test: Output voltage (no-load) = 12 V, Output voltage (2 A load current) = 11.5 V (ii) Regulation test: Output voltage (mains input, 220 V) = 12 V, Output voltage (mains input, 200 V) = 11.9 V Determine (a) the equivalent output resistance of the power supply and (b) the regulation of the power supply.	*CO 2*	*PO 1*	**06**
		OR			
2	a)	Draw the circuit diagram of Wein Bridge Oscillator and explain its operation.	*CO 1*	-	**06**
	b)	Demonstrate how op-amps are used in various applications such as Voltage follower, Differentiator, Integrator, and Summing amplifier. Include circuit diagrams along with waveforms to illustrate these applications.	*CO 2*	*PO 1*	**08**
	c)	An amplifier with negative feedback applied has an open-loop voltage gain of 50, and one-tenth of its output is fed back to the input (i.e. $\beta = 0.1$). i) Determine the overall voltage gain with negative feedback applied. ii) If the amplifier's open-loop voltage gain increases by 20%, determine the percentage increase in overall voltage gain.	*CO 2*	*PO 1*	**06**

			UNIT-II			
	3	a)	Explain the following combinational logic circuits with truth table, Boolean expression and logical circuit. i) Half adder ii) Full adder	*CO 1*	-	**06**
		b)	Design a circuit diagram for a 3-bit asynchronous up counter using J-K flip-flops. Draw the truth table and timing diagram of the same.	*CO 4*	*PO 3*	**08**
		c)	Convert the following i) $(A3)_{16}$ to binary. ii) $(64)_{16}$ to binary iii) $(11101000)_2$ to hexadecimal. iv) $(01111111)_2$ to hexadecimal	*CO2*	*PO 1*	**06**
			OR			
	4	a)	Explain microcontroller system with a neat block diagram	*CO 1*	-	**06**
		b)	Construct 3 to 8 Decoder using basic logic gates and explain the same.	*CO 4*	*PO 3*	**08**
		c)	Convert the following i) $(3A)_{16}$ to binary. ii) $(46)_{16}$ to binary iii) $(11101000)_2$ to decimal. iv) $(01111011)_2$ to hexadecimal	*CO2*	*PO 1*	**06**
			UNIT - III			
	5	a)	List the major areas of applications in embedded systems with an example.	***CO1***	-	**06**
		b)	Illustrate a detailed block diagram for an Instrumentation and control system, incorporating various sensors, power amplifiers and signal conditioning.	***CO2***	***PO1***	**08**
		c)	Define transducers and give the classification of transducers with examples.	***CO1***	-	**06**
			OR			
	6	a)	How communication interface is applied in computer and mobile network	***CO1***	-	**06**
		b)	Illustrate a diagram 7-Segment LED Display. Mention the applications of 7 segment display	***CO2***	***PO1***	**08**
		c)	Define sensor and mention its relevant applications.	***CO1***	-	**06**
			UNIT - IV			
	7	a)	With a neat block diagram, explain the components of the basic communication System.	***CO1***	-	**08**
		b)	Compare 1G, 2G, 3G and 4G technologies of cellular communication.	***CO1***	-	**08**
		c)	A 15KHz audio signal is used to frequency modulate a 100MHz carrier, causing a carrier deviation of 75KHz. Determine Modulation Index and Carrier swing.	***CO2***	***PO1***	**04**
			OR			

	8	a)	Explain the need of modulation and different types of Analog modulation techniques available with relevant Waveforms. Mention the modulation index of AM and FM wave.	***CO1***	**-**	**08**
		b)	Discuss various network topologies commonly used in computer communication networks.	***CO1***	**-**	**08**
		c)	The initial SNR measured at the transmitter was 20 dB. In order to combat the channel conditions, the signal power was doubled prior to transmission. What is the new SNR at the transmitter?	***CO2***	***PO1***	**04**
			UNIT - V			
	9	a)	Explain various approaches for reducing the energy optimization in residential and commercial buildings.	***CO5***	***PO6***	**10**
		b)	Demonstrate the use of remote data flow in a healthcare scenario, such as remote patient monitoring.	***CO5***	***PO6***	**10**
			OR			
	10	a)	Discuss the Concept of sustainability and united nations sustainable development goals	***CO5***	***PO6***	**10**
		b)	Explain the various classification of WSN with relevant examples	***CO5***	***PO6***	**10**

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