USN | | | | | | | | | | **Course Code** | **2** | **1** | **E** | **L** | **N** | **1** | **4**

First Semester B.E. Degree Make-up Examinations, August 2022
ELECTRONICS & COMMUNICATION - FUNDAMENTALS AND APPLICATIONS
(Common to all Branches)

Duration: 3 hrs   **Max. Marks: 100**

*Note: 1. Answer any **FIVE** full questions, choosing **ONE** full question from each module.*
2. Missing data, if any, may be suitably assumed

Q. No		*Question*	*Marks*	*(RBTL:CO:PI)*
		MODULE – 1		
1.	**a.**	Explain the operation of PN-junction diode under the forward and reverse biased condition.	**08**	(2 :1 : 1.3.1)
	b.	Draw the common emitter circuit and sketch the input and output characteristics. Also explain active region, cut-off region and saturation region by indicating them on the characteristic curve.	**07**	(2 :1 : 1.3.1)
	c.	Discuss the design procedure of Zener voltage regulator for the following specifications: Input voltage = $10V \pm 20\%$, Output voltage=5 V, I_L=20 mA, I_{zmin} = 5 mA and I_{zmax}= 80 mA	**05**	(1 :1 : 1.3.1)
		(OR)		
2.	**a.**	Explain the characteristics of an ideal Op-Amp. Mention some of the applications of Op-Amp.	**08**	(1 :1 : 1.3.1)
	b.	Discuss the different types of amplifiers with its parameters.	**07**	(2 :1 : 1.3.1)
	c.	Explain with neat diagram the Wein bridge oscillator.	**05**	(2 :1 : 1.3.1)
		MODULE - 2		
3.	**a.**	Realize two input Ex-OR gate using only NAND gates.	**08**	(2 :2 : 1.4.1)
	b.	Discuss the design procedure of full adder and implement it using two half adders.	**07**	(2 :2 : 1.3.1)
	c.	Explain D-Flip flop with its functional diagram and truth table.	**05**	(2 :2 : 1.3.1)
		(OR)		
4.	**a.**	Explain the working of clocked RS Flip Flop with the help of logic diagram and truth table.	**08**	(2 :2 : 1.4.1)
	b.	Discuss the design procedure of logic circuit using basic gates with three inputs A, B, C and output Y that goes low only when A is high and B and C are different.	**07**	(2 :2 : 1.3.1)
	c.	Discuss the design procedure of 4:1 multiplexer. Explain its working with truth-table.	**05**	(2 :2 : 1.3.1)
		MODULE-3		
5.	**a.**	What is a Transducer? Distinguish between active and passive transducers.	**08**	(1 :3 : 1.3.1)
	b.	Explain I^2C bus in embedded system.	**07**	(2 :3 : 1.3.1)
	c.	List the differences between microprocessor and microcontroller.	**05**	(1 :3 : 1.3.1)
		(OR)		
6.	**a.**	Draw LIN hierarchy chart and explain the LIN workflow concept.	**08**	(2 :3 : 1.3.1)
	b.	Explain the classification of embedded systems based on complexity.	**07**	(1 :3 : 1.3.1)

Note: (**RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator**)

	c.	Differentiate between RISC and CISC.	**05**	(1 :3 : 1.3.1)

MODULE-4

7.	**a.**	Define AM. Draw the AM signal and its Spectrum.	**08**	(2 :4 : 1.3.1)
	b.	Explain quantization and encoding process in digital communication.	**07**	(2 :4 : 1.3.1)
	c.	What are the commonly used frequency ranges in communication systems? Mention the applications of each range.	**05**	(1 :4 : 1.3.1)

(OR)

8.	**a.**	Define modulation. Explain frequency modulation with suitable equations and waveform.	**08**	(1 :4 : 1.3.1)
	b.	Explain the elements of communication system with the help of neat block diagram.	**07**	(2 :4 : 1.3.1)
	c.	Explain pulse width modulation and its applications with relevant waveforms.	**05**	(2 :4 : 1.3.1)

MODULE-5

9.	**a.**	Differentiate between 1G, 2G, 3G and 4G with respect to different features.	**08**	(2 :5 : 1.3.1)
	b.	What is cluster? Explain the concept of frequency reuse.	**07**	(2 :5 : 1.3.1)
	c.	Define IoT and explain any one application in real life example.	**05**	(2 :5 : 1.3.1)

(OR)

10.	**a.**	What are LEO, MEO and GEO? Explain with respect to elements of satellite.	**08**	(2 :5 : 1.3.1)
	b.	Describe the concept of cellular telephone system with relevant block diagram.	**07**	(2 :5 : 1.3.1)
	c.	Explain the concept of AI and ML mentioning one real life example.	**05**	(2 :5 : 1.3.1)

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Note: (**RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator**)