DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary – Summer 2023

Course: B. Tech. **Branch: Electronics & Telecommunication Engineering**

Semester: III

Subject Code & Name: BTEXC302 Analog Circuits

Max Marks: 60 **Date: 10/08/2023** **Duration: 3Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	Describe the block diagram of an operational amplifier (OP-AMP) and its main components.	**Level 1**	**6**
B)	Explain the working principle of a differential amplifier.	**Level 1**	**6**
C)	Discuss the need for level shifters in electronic circuits and explore the different types of level shifters commonly used.	**Level 2**	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	Explain the working principle and circuit configuration of an integrator amplifier.	**Level 3**	**6**
B)	Calculate the output voltage of an inverting amplifier with a gain of -5 when the input voltage is 2V.	**Level 2**	**6**
C)	Describe the circuit of a summing amplifier and how it can add multiple input signals together.	**Level 1**	**6**
Q. 3	**Solve Any Two of the following.**		**12**
A)	How does a square wave generator circuit work? Describe a circuit that can generate a square wave output from a sine wave input.	**Level 1**	**6**
B)	What is the need for precision rectifiers? Explain the challenges faced when rectifying low-level signals and how precision rectifiers overcome these issues.	**Level 1**	**6**
C)	Explain the working principle of a triangular wave generator.	**Level 2**	**6**
Q.4	**Solve Any Two of the following.**		**12**
A)	Describe the concept of a voltage-to-frequency (V-F) converter. How does it convert an input voltage into a corresponding frequency output?	**Level 1**	**6**
B)	Explain the operation and design of a voltage-to-current (V-I) converter.	**Level 1**	**6**
C)	Explain the working principle of a single slope analog-to-digital converter (ADC)	**Level 1**	**6**

Q. 5	**Solve Any Two of the following.**		**12**
A)	Explain the working principle of RC oscillators. Describe the design of a phase-shift oscillator	**Level 1**	**6**
B)	Explain the operation of a Colpitts oscillator.	**Level 2**	**6**
C)	Explain the principle of oscillators and how they generate periodic waveforms.	**Level 1**	**6**

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