K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:I
Class:FY	Program:B.Tech
Branch Code:FYE	Pattern:2023
Name of Course:Fundamentals of Electronics Engineering	Course Code:2300107A
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 pages.
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

		Marks	CO
Question No. 1			
1a)	With the help of a neat circuit diagram and waveforms, explain the working of a full wave bridge rectifier.	(6)	CO3
Question No. 2			
2a)	How the BJT can be used as an amplifier? Explain.	(6)	CO3
Question No. 3			
3a)	Draw and explain the symbol of an operational amplifier. Also explain the following Op-Amp parameters with their ideal and practical values: i) Slew Rate ii) CMRR	(8)	CO1
	OR		
3b)	Draw and explain the pin diagram of IC 741. Also explain the following Op-Amp parameters with their ideal and practical values: i) Input offset current ii) Input impedance	(8)	CO1
3c)	Derive the expression for the voltage gain of an Op-Amp based non inverting amplifier. In an Op-Amp based non inverting amplifier, if Rf = 47 kΩ, R1 = 4.7 kΩ, ±Vcc = ±15V and Vin = 2 Vdc then find output of the circuit and comment on the output.	(8)	CO3
	OR		
3d)	Design an Op-Amp based circuit to convert a sine wave to a square wave without phase shift between input and output. Draw the input and output waveforms for the same circuit considering Vin = 10 Vpp sine wave and ±Vcc = ±12 V.	(8)	CO3
Question No. 4			
4a)	With the help of the symbol, logic expression and truth table, explain NAND gate and NOR gate. Also convert $(A1B.3)_{16}$ to octal.	(8)	CO2
	OR		
4b)	With the help of the symbol, logic expression and truth table, explain EX-OR gate and EX-NOR gate. Also convert $(126.12)_{10}$ to hexadecimal.	(8)	CO2

4c)	What is full adder? Derive the expression for its sum and carry outputs using truth table. Also draw its logic diagram.	(8)	CO4

OR

4d)	Implement SR flipflop using NAND gates and explain its working.	(8)	CO4

Question No. 5

5a)	Draw and explain the block diagram of electronic communication system. Also write a short note on optical fibre cable.	(8)	CO2

OR

5b)	Explain simplex and duplex modes of transmission. Also compare wired communication and wireless communication.	(8)	CO2
5c)	What is modulation? Explain the need of modulation.	(8)	CO2

OR

5d)	Explain Electromagnetic Frequency Spectrum.	(8)	CO2

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