



**K. K. Wagh Institute of Engineering Education and Research,
Nashik**

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

Winter 2024

Exam Seat No.									
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Academic Year: 2024-25

Semester: I

Name of Programme: FY B.Tech.

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 column indicates the Course Outcome of the Question / sub-question

Q. No.	Details	Marks	CO
Q.1	With the help of a neat circuit diagram and waveforms, explain the working of full wave bridge rectifier	(6)	CO3
Q.2	How the BJT can be used as a switch? Explain	(6)	CO3
Q.3	a) Explain the following OpAmp parameters with their ideal and practical values: i) PSRR ii) Output Impedance		
	OR	(5)	CO1
	b) Explain the following OpAmp parameters with their ideal and practical values: i) Slew rate ii) Input impedance		
	c) Derive the expression for the voltage gain of an OpAmp based non inverting amplifier.		
	OR		
	d) For inverting amplifier using Op-Amp, if $R_f = 15\text{ k}\Omega$, $R_1 = 1\text{ k}\Omega$, $V_{CC} = \pm 15\text{V}$, $V_i = 2\text{V dc}$.	(5)	CO3
	i) Calculate output voltage		
	ii) Is the result in part (i) practically possible? Justify		

e) Design an OpAmp based circuit to convert triangular wave to square wave without phase shift between input and output.

OR

(6) CO3

f) Design an OpAmp circuit for which output is inverted average of two inputs.

Q.4 a)

1) Draw the symbol and truth table of 3 input EX-NOR gate. Write its logic expression. (3)

2) Convert $(F24A)_{16}$ to octal. (2)

OR

CO2

b)

1) Draw the symbol and truth table of 3 input EX-OR gate. Write its logic expression. (3)

2) Convert $(C5A6)_{16}$ to octal. (2)

c) Implement OR gate and EX-OR gate using NAND gates only.

OR

(5) CO4

d) prove $\bar{A}. \bar{B}. C + \bar{A}. B. \bar{C} + A. \bar{B}. \bar{C} + A. B. C = A \oplus B \oplus C$

e) Draw NAND gate implementation of the SR flip-flop and explain its working

OR

(6) CO2

f) Draw NAND gate implementation of the JK flip-flop and explain its working.

Q.5 a) Compare wired and wireless media.

OR

(5) CO2

b) Explain simplex and duplex modes of transmission.

c) Explain the block diagram of communication system.

OR

(5) CO2

d) Compare twisted pair cable with optical fiber cable.

e) Explain the amplitude modulation with waveforms. If modulating signal frequency is 5 kHz and carrier signal frequency is 250 kHz then calculate the bandwidth of resulting AM signal.

OR

(6) CO2

f) Explain the need of modulation. Calculate the minimum height of a monopole antenna required to transmit 6 MHz signal.

.....End of question paper.....