



**K. K. Wagh Institute of Engineering Education & Research, Nashik**  
(An Autonomous Institute From A.Y. 2022-23)

SUMMER-2024	
Exam Seat No.:	
Academic Year: 2023-2024	Semester: II
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.

**Question No. 1 Attempt following Question**

- 1a) With the help of a neat circuit diagram and waveforms, explain the working of full wave bridge rectifier. (6) CO3

**Question No. 2 Attempt following Question**

- 2a) How the BJT can be used as an amplifier? Explain. (6) CO3

**Question No. 3 Attempt following Question**

- 3a) Explain the following OpAmp parameters with their ideal and practical values: i) CMRR ii) Input offset voltage (5) CO1

**OR**

- 3b) Explain the following OpAmp parameters with their ideal and practical values: i) Slew rate ii) Input impedance (5) CO1

- 3c) Derive the expression for the voltage gain of an OpAmp based inverting amplifier. (5) CO3

**OR**

- 3d) In an OpAmp based non inverting amplifier,  $R_f = 22\text{ k}\Omega$ ,  $R_1 = 2.2\text{ k}\Omega$ ,  $V_{cc} = 15\text{V}$ . If  $V_{in} = 1\text{ Vdc}$  then find output of the circuit. If  $R_1$  is changed to  $1.1\text{ k}\Omega$  then what will be the output of the circuit? (5) CO3

- 3e) Design a zero crossing detector circuit using OpAmp without phase shift between input and output. (6) CO3

**OR**

- 3f) Design an OpAmp circuit for which output is inverted average of two inputs. (6) CO3

**Question No. 4 Attempt following Question**

- 4a) 1) Draw the symbol and truth table of 3 input EX-OR gate. Write its logic expression. (5) CO2  
2) Convert  $(1B4F)_{16}$  to octal.

**OR**

- 4b) 1) Draw the symbol and truth table of 3 input EX-NOR gate. Write its logic expression. (5) CO2  
2) Convert  $(C5A6)_{16}$  to octal.

- 4c) Implement OR gate and EX-OR gate using NAND gates only. (5) CO4

**OR**

- 4d) Draw the truth table for full adder and prove  $\bar{A} \cdot \bar{B} \cdot C + \bar{A} \cdot B \cdot \bar{C} + A \cdot \bar{B} \cdot \bar{C} + A \cdot B \cdot C = A \oplus B \oplus C$  (5) CO4

- 4e) Draw NAND gate implementation of the SR flip-flop and explain its working. (6) CO4

**OR**

- 4f) Draw NAND gate implementation of the JK flip-flop and explain its working. (6) CO4

**Question No. 5 Attempt following Question**

- 5a) Compare wired and wireless communication. (5) CO2

**OR**

- 5b) Compare twisted pair cable with optical fibre cable. (5) CO2

- 5c) Explain the block diagram of communication system. (5) CO2

**OR**

- 5d) Explain simplex and duplex modes of transmission. (5) CO2

- 5e) Explain the amplitude modulation with waveforms. Find the expression of bandwidth of AM. If modulating signal frequency is 2 kHz and carrier signal frequency is 200 kHz then calculate the bandwidth of resulting AM signal. (6) CO2

**OR**

- 5f) Explain the need of modulation. Calculate the minimum height of a monopole antenna required to transmit 3 MHz signal. (6) CO2

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