



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

	SUMMER-2023		
	Exam Seat No.:		
	Academic Year:2022-2023	Semester:II	
	Name of Programme: B.Tech	Pattern:2022	
	Name of Course: Fundamentals of Electronics Engineering	Course Code FYE221007	
	Max. Marks:60	Duration:2.30 Hrs	

	<ol style="list-style-type: none"><li>1. This question paper contains 3 pages.</li><li>2. Answer to each new question is to be started on a new page.</li><li>3. Assume suitable data wherever required, but justify it.</li><li>4. Draw the neat labelled diagrams, wherever necessary.</li><li>5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.</li></ol>	
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**Question No. 1**

- 1 With the help of neat circuit diagram and waveform, explain the working of full wave rectifier with centre tapped transformer. (6) CO3

**Question No. 2**

- 2 Explain with neat circuit diagram how the BJT can be used as a switch. (6) CO3

**Question No. 3**

- 3.a)
1. Draw pin diagram of Op-Amp IC 741. (4) CO1
  2. Define and give typical values of the following op-amp parameters: i) CMRR ii) Input offset voltage.

**OR**

- 3.b)
1. Explain the concept of virtual ground and virtual short. (4) CO1

2. Define and give typical values of the following op-amp parameters:

i) Slew Rate ii) Input bias current

3.c) Draw and explain inverting summing amplifier using OpAmp. (6) CO3

**OR**

3.d) Draw and explain inverting comparator using OpAmp. (6) CO3

3.e) For the inverting amplifier using Op-Amp, if  $R_F=100K\Omega$ ,  $R_1=10K\Omega$ ,  $V_{CC}=\pm 10V$ ,  $V_i=2V$   
i) Calculate output voltage (6) CO3

ii) Is the result in part (i) practically possible? Justify.

**OR**

3.f) An op-amp is used in a non inverting mode with  $R_1=10K\Omega$ ,  $R_F=12k\Omega$ ,  $V_{CC}=\pm 15$ . Calculate Output voltage for i)  $V_{in}=250mV$  ii)  $V_{in}=3V$  and comment on the result. (6) CO3

#### Question No. 4

4.a) 1. Name the derived gates. Draw symbol and their truth table.  
2. i) Convert  $(155.33)_{10}$  to binary. (4) CO2  
ii) Convert  $(110111010111.101101)_2$  to hexadecimal

**OR**

4.b) 1. Why NAND and NOR gates are called as universal gates? Draw truth table and symbol.  
2. i) Convert  $(26)_{10}$  and  $(32)_{10}$  into binary numbers and add binary numbers. (4) CO2  
ii) Perform  $(8)_{10} - (3)_{10}$  using 1's complement method.

4.c) State law of commutation, law of association and law of distribution. (6) CO2

**OR**

4.d) State and prove De Morgan's sum & product theorem with the help of truth table. (6) CO2

- 4.e) Design and implement full adder circuit. Write the expressions for sum and carry. (6) CO4

**OR**

- 4.f) What is flipflop? Draw & Explain the working SR flip-flop. (6) CO4

**Question No. 5**

- 5.a) Write short note on Amplitude modulation. (4) CO2

**OR**

- 5.b) Write short note on Frequency modulation. (4) CO2

- 5.c) Explain different types of cables used in communication system with neat diagrams. (6) CO2

**OR**

- 5.d) Draw and explain electromagnetic spectrum along with their applications. (6) CO2

- 5.e) Explain the elements of communication system with the help of block diagram. (6) CO2

**OR**

- 5.f) Explain GSM architecture. (6) CO2