DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular Winter Examination – 2025

Course: (Computer Science and Engineering) **Semester: III**

Subject Code & Name: 25AF1928MD306, Electronic Devices & Circuits. **Course Code: 11242**

Max Marks: 60 **Date: 09/02/26** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *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.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

					(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**					**12**
1	In a BJT operating in the active region, the base–emitter junction is				CO1	1
	a) Reverse biased and collector–base forward biased	b) Forward biased and collector–base reverse biased	c) Both junctions reverse biased	d) Both junctions forward biased		
2	The stability factor of a transistor biasing circuit indicates its sensitivity to				CO1	1
	a) Base current	b) Collector current	c) Temperature variation	d) Supply voltage variation		
3	Which transistor configuration provides high current gain and moderate voltage gain?				CO1	1
	a) Common Base	b) Common Emitter	c) Common Collector	d) Emitter Follower		

4	Pinch-off voltage in a JFET is the drain voltage at which				CO2	1
	a) Drain current becomes zero	b) Channel is completely closed	c)Drain current becomes constant	d) Gate current increases sharply		
5	Which FET configuration offers high input impedance and low output impedance?				CO2	1
	a) Common Source	b) Common Drain	c) Common Gate	d) Source Follower		
6	An enhancement-type MOSFET operates only when				CO2	1
	a) VGS = 0	b) VGS is negative	c) VGS exceeds threshold voltage	d) VDS is zero		
7	The ideal input impedance of an operational amplifier is				CO3	1
	a) Zero	b) Very low	c) Infinite	d) Equal to output impedance		
8	The main purpose of a differential amplifier in an op-amp is to				CO3	1
	a) Amplify AC signals	b) Amplify DC signals	c) Amplify the difference between two inputs	d) Increase output power		
9	Which IC is commonly used as a general-purpose operational amplifier?				CO4	1
	a) IC 555	b) IC 741	c) IC 4046	d) IC 7400		
10	An op-amp integrator produces an output proportional to				CO4	1

	a) Input voltage	b) Input current	c) Integral of input voltage	d) Derivative of input voltage		
11	An active low-pass filter allows				CO5	1
	a) Only high frequencies	b) Only low frequencies	c) Only mid frequencies	d) All frequencies		
12	The main function of a Phase Locked Loop (PLL) is to				CO5	1
	a) Amplify signals	b) Generate noise	c) Track and lock input frequency	d) Rectify AC signals		
Q. 2	**Solve the following.**					12
A)	Explain working of BJT in Common Emitter Configuration. Explain what is β				CO1	6
B)	Explain transistor configurations (CB, CE, CC). Compare them in terms of current gain, voltage gain, input impedance, and output impedance.				CO1	6
Q.3	**Solve the following.**					12
A)	Explain the construction, operation, and static characteristics of a JFET. Define pinch-off voltage.				CO2	6
B)	Explain the construction and operation of an n-channel enhancement MOSFET. Draw and explain its output characteristics.				CO2	6
Q. 4	**Solve Any Two of the following.**					12
A)	Draw and explain the block diagram of an operational amplifier. Mention the function of each block.				CO3	6
B)	An inverting amplifier uses an op-amp with an input resistance Ri = 5 kΩ and feedback resistance Rf = 50 kΩ. Determine the voltage gain of the amplifier. If the input voltage is 0.2 V, calculate the output voltage.				CO3	6
C)	Explain the inverting and non-inverting amplifier configurations using op-amp with expressions for voltage gain.				C03	6

Q.5	**Solve Any Two of the following.**		12
A)	An op-amp integrator has a resistor R = 100 kΩ and capacitor C = 0.1 µF. Find the output voltage when a DC input of 2 V is applied for 0.5 seconds. Assume the initial output voltage is zero.	CO4	6
B)	Draw the circuit diagram of inverting summing amplifier using IC 741 and derive the expression for output voltage.	CO4	6
C)	Explain the operation of a Schmitt trigger using op-amp , defining hysteresis and threshold levels. Mention its applications.	CO4	6
Q. 6	**Solve Any Two of the following.**		12
A)	Design an active low-pass filter with a cut-off frequency of 1 kHz .Explain the role of op-amp and RC network.	CO5	6
B)	Describe the band-pass and band-stop active filters with neat diagrams and frequency response.	CO5	6
C)	Draw and explain the block diagram of Phase Locked Loop (PLL) and describe its working principle.	CO5	6
	***** End *****		