Reg. No. : | | | | | | | | | | | | |

Question Paper Code:R3B04

B.E./B.Tech. DEGREE EXAMINATION, NOV 2025

Third Semester

R21UBM304- SEMICONDUCTOR DEVICES AND CIRCUITS

BioMedical Engineering

(Regulations R2021)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1.	Define switching time of a PN diode.	CO1- U
2.	Write one key property of a Tunnel diode.	CO1- U
3.	Define pinch-off voltage in a JFET	CO2- U
4.	State one application of a UJT.	CO2- U
5.	List the three configurations of a transistor amplifier.	CO3 - U
6.	What is the input impedance range of a CB amplifier?	CO3 - U
7.	Differentiate between series feedback and shunt feedback	CO4 - U
8.	Mention one application of a Wein bridge oscillator.	CO4 - U
9.	Draw the symbol of a Schmitt trigger and state its use.	CO5 - U
10.	Write the condition for UJT oscillation.	CO5 - U

PART – B (5 x 16= 80 Marks)

11.	(a)	Analyze the V-I characteristics of Tunnel and Schottky diodes, highlighting their differences in operation.	CO1- Ana	(16)
		Or		
	(b)	Analyze how biasing stability is affected by temperature variations in a transistor biasing circuit.	CO1- Ana	(16)
12.	(a)	Discuss the working principle of JFET biasing methods (self-bias and voltage divider bias.	CO2- U	(16)
		Or		

	(b)	Describe the construction, operation, and characteristics of UJT and SCR.	CO1- U	(16)
13.	(a)	Discuss the input impedance and output admittance of CE, CB, and CC amplifiers.	CO3- U	(16)
		Or		
	(b)	Describe the frequency response of a single-stage transistor amplifier and define bandwidth.	CO3- U	(16)
14.	(a)	Design a Weinbridge oscillator have values of R1 and R2 are the same at: 12kΩ, capacitors C1 and C2 are the same at: 3.9nF and the supply frequency, f is 3.4kHz with circuit diagram.	CO4- Ana	(16)
		Or		
	(b)	Enumerate the effects of negative feedback on the various characteristics of the amplifier and also examine the steps to identify the feedback topology and feedback factor for analyzing the feedback	CO4 - Ana	(16)
15.	(a)	Analyze the performance of full-wave rectifiers with capacitor and inductor filters.	CO5- Ana	(16)
		Or		
	(b)	Draw the block diagram of current series feedback amplifiers and derive the expressions of input and output impedance.	CO5- Ana	(16)