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

Question Paper Code:U3B04

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Third Semester

Biomedical Engineering

21UBM304- SEMICONDUCTOR DEVICES AND CIRCUITS

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

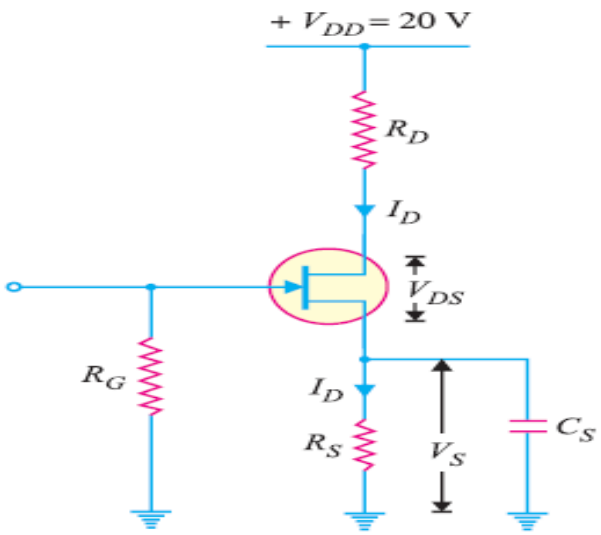
PART A - (10x 2 = 20 Marks)

1.	Compare and contrast Zener breakdown and Avalanche breakdown.	CO1-U
2.	BJT is called current controlled device. Givethe reason.	CO1-U
3.	Why is FET preferred as a Buffer Amplifier?	CO1-U
4.	Classify the operating region of MOSFET.	CO1-U
5.	Compare and Contrast CE, CC and CB amplifiers.	CO1-U
6	Identify which amplifier is called as voltage follower? Justify your answer.	CO1-U
7	List out the application of current shunt feedback amplifier.	CO1-U
8	Sketch the diagram for RC Phase shift oscillator.	CO1-U
9	Give any two applications of Multivibrators.	CO1-U
10	Compare clippers and clampers.	CO1-U

PART – B (5 x 16= 80 Marks)

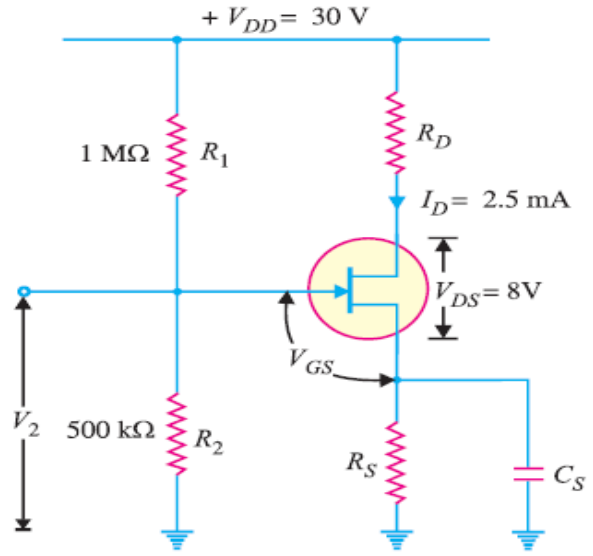
11.	(a)	(i) Explain the operation of forward biased and reverse biased PNJunction Diode.	CO1-U	(8)
		(ii) Briefly explain about avalanche and zener breakdown.	CO1-U	(8)
		Or		
	(b)	Draw the CE and CC configurations of NPN transistor and explain its input and output characteristics with neat diagram.	CO1-U	(16)

12. (a) In a self-bias n-channel JFET, the operating point is to be set at ID= 1.5 mA and VDS =10 V. The JFET parameters are IDSS = 5 mAand VGS (off) = − 2 V. Find the values of RS and RD. Given thatVDD = 20 V. CO2-App (16)



Or

(b) In an n-channel JFET biased by potential divider method, it is desired to set the operating point at ID = 2.5 mA and VDS = 8V. If VDD = 30 V, R1 = 1 MΩ and R2 = 500 kΩ, find the value of RS. The parameters of JFET are IDSS = 10 mA and VGS (off) = – 5 V. CO2-App (16)



13. (a) Examine the small signal equivalent circuit of FET amplifier in CO3-Ana (16)

CB connection and derive the equations for voltage gain, Input Impedance and output impedance.

Or

	(b)	Investigate the hybrid model for transistor in Common Base configuration.	CO3-Ana	(16)
14.	(a)	Design a RC Phase shift oscillator to generate 5KHz sine wav using BJT with 20V peak to peak amplitude. Draw the desired circuit. Assume hfe=250 and C=1000Pf.	CO5-C	(16)
		Or		
	(b)	Design a Colpitts Oscillator circuit having two capacitors of 24nF and 240nF respectively are connected in parallel with an inductor of 10mH. Determine the frequency of oscillations of the circuit, the feedback fraction and draw the circuit.	CO5-C	(16)
15.	(a)	Explain in brief the construction and working of Free running multivibrator and regenerative comparatorwith neat diagram.	CO1-U	(16)
		Or		
	(b)	(i) Draw and explain the functional diagram of 723 general purpose regulator.	CO1-U	(8)
		(ii) Explain in detail about clipper and clamper with neat diagram.	CO1-U	(8)