Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐

**Question Paper Code: 93B05**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2022

Third Semester

Biomedical Engineering

19UBM305 - Semiconductor Devices and Circuits

(Regulations 2019)

Duration: Three hours                                        Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

| | | |
|---|---|---|
| 1. | What is doping? | CO1 U |
| 2. | How does the avalanche breakdown voltage vary with temperature? | CO3 Ana |
| 3. | Compare JFET and MOSFET. | CO3 Ana |
| 4. | Analyze the region of operation for the types of MOSFET. | CO3 Ana |
| 5. | Define critical frequency($f_c$). | CO1 U |
| 6. | What are the benefits of h-parameter? | CO1 U |
| 7. | Why RC phase shift oscillator called so? | CO3 Ana |
| 8. | How does an oscillator differ from an amplifier? | CO3 Ana |
| 9. | Give the definition for Clipper. | CO1 U |
| 10. | Compare positive and negative clippers. | CO3 Ana |

PART – B (5 x 16= 80Marks)

11. (a) Draw and explain the input and output characteristics of a transistor in CE configuration.      CO1- U      (16)

Or

(b) Explain in detail about transistor circuit bias.      CO1- U      (16)

12. (a) Explain with the help of neat diagrams, the structure of an N-channel FET and its Volt-ampere characteristics. In what ways it is different from a bipolar transistor.      CO2- App      (16)

Or

(b) Describe the construction and explain the operation of depletion mode MOSFET. Also draw the static characteristics.    CO2- App    (16)

13. (a) Analyze the single stage CE amplifier using the parameters voltage gain, current gain, input impedance and output admittance.    CO3- Ana    (16)

Or

(b) Analyze the frequency response of single stage transistor amplifier circuit.(BJT or FET)    CO3- Ana    (16)

14. (a) Draw the circuit diagram of a current series feedback amplifier and derive expressions for voltage gain with and without feedback.    CO2- App    (16)

Or

(b) With a neat sketch explain the working of an RC phase shift oscillator and derive an expression for frequency of oscillation for an RC phase shift oscillator.    CO2- App    (16)

15. (a) What do you understand by clamping circuits? Discuss with the help of waveforms, the operation of a clamping circuit to clamp a sine wave input positively at 0 V.    CO1- U    (16)

Or

(b) With a neat sketch, explain the working of an astable multivibrator.    CO1- U    (16)