B **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 53B05

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2019

Third Semester

Biomedical Engineering

15UBM305- SEMICONDUCTOR DEVICES AND CIRCUITS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The diffused impurities with _____ valence electrons are called donor atoms. CO1-R

   (a) 4 (b) 3 (c) 5 (d) 0

2. If I_B =1 mA, β= 50 for a transistor, I_E is _____ CO1-App

   (a) 51 mA (b) 50 mA (c) 101 mA (d) 49 mA

3. Which of the following equipment can check the condition of a transistor? CO2-U

   (a) Current tracer (b) Digital display meter (DDM)

   (c) Ohmmeter (VOM) (d) All of the above

4. g_m of MOSFET is controlled by _____ CO2- R

   (a) Drain-source voltage (b) Gate-source voltage (c) Drain current (d) Gate current

5. The approximate current gain of CE transistor amplifier is _____. CO3- R

   (a) h_{ie} (b) - h_{ie} (c) - h_{fe} (d) h_{fe}

6. The main feature of a large-signal amplifier is the circuit's _____ CO3- U

   (a) power efficiency (b) maximum power limitations

   (c) impedance matching to the output device (d) All of the above

7. Oscillator is similar to _____ CO4- R

   (a) Rectifier (b) Amplifier (c) D.C source (d) A.C source

8. Which of the following improvements is (are) a result of the negative feedback in a circuit? CO4- R

(a) Lower output impedance (b) Reduced noise

(c) More linear operation (d) All of the above

9. Bistable multivibrator is _____ in any state. CO5- R

(a) Stable (b) Unstable (c) Saturated (d) Independent

10. Which of the following equipment can check the condition of a transistor? CO5- U

(a) Current tracer (b) Digital display meter (DDM)

(c) Ohmmeter (VOM) (d) All of the above

PART – B (5 x 3= 15Marks) (5 Out of 7)

11. Define drift current? CO1- R

12. BJT as a current controlled device – Justify CO1- E

13. Why do we choose q point at the center of the load line? CO2- E

14. Compare the operations of Class A and Class B amplifiers. CO3- Ana

15. Point out the advantages of negative feedback. CO4- Ana

16. State and explain Barkhausen criterion for oscillation. CO4- U

17. What is meant by hysteresis voltage in a Schmitt trigger? CO5- Ana

PART – C (5 x 15= 75 Marks)

18. (a) Illustrate the operation of a zener diode and discuss its V-I characteristics. Also discuss zener diode as a voltage regulator CO1- U (15)

Or

(b) Compare the operation of voltage divider bias circuits, base bias circuits and Emitter bias circuits. CO1- Ana (15)

19. (a) With neat diagram explain the operation of MOSFET in Enhancement mode and derive its current equations CO2-U (15)

Or

(b) Explain the working and characteristics of SCR and its applications CO2-U (15)

20.	(a)	Determine the h-parameters from transistor characteristics.	CO3- App	(15)
		Or		
	(b)	Find the input impedance, output impedance, voltage and current gain for CE amplifier	CO3- Ana	(15)
21.	(a)	Explain the concept of negative feedback in amplifier. Derive the expressions for voltage gain, input impedance and output impedance	CO4-U	(15)
		Or		
	(b)	Draw the circuit of Hartley oscillator and explain its working. Also derive the expressions for frequency of oscillation for starting of oscillation.	CO4-U	(15)
22.	(a)	Write the operation of collector coupled monostable multivitrator with neat circuit diagram and draw the various waveforms.	CO5-U	(15)
		Or		
	(b)	Illustrate the construction, equivalent circuit and operation of UJT and also explain the characteristics of UJT.	CO5-U	(15)