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

Question Paper Code: 53B05

B.E./B.Tech. DEGREE EXAMINATION, NOV 2018

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. Diode is used as _____ CO1-R

   (a) Current source (b) Voltage source (c) Photo diode (d) Rectifier

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. JFET acts as a current source when it is operating _____ CO2-U

   (a) Along the horizontal part of drain curve (b) At V_{GS} =0

   (c) Along linear part of drain curve (d) At V_{GS}< 0

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. Hybrid equivalent circuit of a transistor amplifier is valid at ____ frequencies. CO3- U

   (a) Low (b) High (c) Very low (d) Very high

7. Oscillator is similar to _____ CO4- R

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

8. The phase shift required by RC phase network in a transistor oscillator is _____ CO4- R

(a) 90º (b) 180º (c) 360º (d) 0º

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

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

10. Output of an integrator producing waveforms of unequal rise and fall time are called _____ CO5- U

(a) Triangular waveform (b) Sawtooth waveform

(c) Pulsating waveform (d) Spiked waveform

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

11. Define Peak Inverse Voltage of diode. CO1- R
12. BJT as a current controlled device – Justify CO1- E
13. JFET as a Variable Voltage Resistor – Justify 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. Differentiate between Astable and Monostable multivibrators. CO5- Ana

PART – C (5 x 15= 75 Marks)

18. (a) (i) Illustrate the principle of operation of PN junction diode. CO1- U (8)

(ii) Derive an expression for transition and diffusion capacitance of PN junction diode. CO1- U (7)

Or

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

19. (a) Summarize the working of JFET and draw it's drain and transfer characteristics. CO2-U (15)

Or

(b) Explain the construction, working of n channel enhancement MOSFET and also draw their characteristics. CO2-U (15)

20.	(a)	Determine the h-parameters from transistor characteristics.	CO3- App	(15)
		Or		
	(b)	Analyze of single stage transistor amplifier using parameters voltage gain, current gain, input impedance and output admittance.	CO3- Ana	(15)
21.	(a)	Interpret the principle of operation and derive the expression for frequency of oscillation for RC phase shift Oscillator.	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)	With neat sketch, explain the operation and characteristics of Astable multivibrator.	CO5-U	(15)
		Or		
	(b)	Illustrate the construction, equivalent circuit and operation of UJT and also explain the characteristics of UJT.	CO5-U	(15)