A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 53B05

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

Third Semester

Biomedical Engineering

15UBM305 Semiconductor Devices and Circuits

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (10x 1 = 10 Marks)

1. At room temperature the current in an intrinsic semiconductor is due to CO1- R

   (a) holes (b) electrons (c) ions (d) Holes and Electrons

2. The configuration which provides both high current and voltage gain CO1- R

   (a) CE (b) CB (c) CC (d) None

3. Field Effect Transistors (FET) can be used as a variable CO2- R

   (a) inductor (b) capacitor (c) resistor (d) voltage source

4. With the E-MOSFET, when gate input voltage is zero, drain current is CO2- R

   (a) At Saturation (b) Zero (c) Wide (d) Narrow

5. Astable multivibrator is _____ in any state. CO3- R

   (a) Stable (b) Unstable (c) Saturated (d)Both B & C

6. The Hysteresis can be eliminated in Schmitt Trigger by keeping CO3- R

   (a) RC1=RC2 (b) RC1>RC2

   (c) RC1<RC2 (d) RC1 and RC2 has no effect

7. Only the condition = _____ must be satisfied for self-sustained oscillations to result. CO4- U

(a) 0 (b) -1 (c) 1 (d) none of these

8. The crystal oscillator frequency is very stable due to _____ of the crystal CO4- R

(a) High Q (b) Low Q (c) Rigidity (d) Vibrations

9. A 180 degree output swing will be in _____ amplifier. CO5- R

(a) Class A (b) Class B (c) Class AB (d) None

10. What is the maximum efficiency of a class A circuit with a direct or series-fed load connection? CO5- R

(a) 90% (b) 78.5% (c) 50% (d) 25%

PART – B (5 x 2= 10Marks)

11. Distinguish between avalanche break down and Zener break down. CO1- U

12. State the applications of SCR CO2- U

13. If an astable multivibrator has C1=C2=1000pF,and R1=R2=20KΩ, calculate the frequency of oscillation. CO3- U

14. Outline the reason for not preferring LC oscillators to generate low frequency signals? CO4- U

15. Illustrate the reason behind the rejection of Class C mode in Audio frequency power amplifiers. CO5- U

PART – C (5 x 16= 80Marks)

16. (a) Explain the operation of common emitter connection of transistor with its characteristics CO1-U (16)

Or

(b) Explain the working of Zener diode and draw its V-I characteristics CO1 -Ana (16)

17. (a) Discuss the structure and operation of n Channel JFET with its V-I and Transfer Characteristics. CO2 -U (16)

Or

	(b)	(i) Distinguish the D-MOSFET and E MOSFET	CO2 -U	(6)
		(ii) Explain the Construction, operation and characteristics of n Channel E – MOSFET with neat sketches.	CO2 -U	(10)
18.	(a)	Explain the operation of Astable multivibrator with Triggering methods.	CO3- U	(16)

Or

	(b)	(i) Evaluate the operation of Zener voltage regulator with Varying input voltage and varying load.	CO3- E	(10)
		(ii) Determine the minimum and maximum values of current limiting resistor, if Vz=8V, Source voltage = 30V, load Current = 0-50mA, Pzmax=1W in a Zener regulator.	CO3- App	(6)
19.	(a)	Explain in detail the Voltage series feedback connection and Current shunt feedback connection of amplifiers.	CO4-App	(16)

Or

	(b)	(i) Draw and Explain the construction of Wien Bridge Oscillator and derive the frequency expression.	CO4 -App	(10)
		(ii) The frequency sensitive arms of the Wien bridge oscillator uses C1=C2=0.001μF and R1=10KΩ, R2 is variable. The frequency is varied from 10KHz to 50 KHz by varying R2. Find the minimum and Maximum values	CO4 -App	(6)
20.	(a)	Derive the expressions for Voltage gain, Current gain, input and Output impedance for CE amplifier using h parameter analysis.	CO5- C	(16)

Or

	(b)	Explain the operation of a class B amplifier with neat diagram. Derive the expression for its maximum efficiency. Mention its drawback and the methods to overcome it.	CO5- C	(16)