Q. Code: 221226

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

B.E / B.TECH. DEGREE EXAMINATION, MAY 2023

Third Semester

EE18301 – ELECTRON DEVICES AND CIRCUITS

Electrical and Electronics Engineering

(Regulation 2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

CO 1 Describe and analyse different types of PN devices.
CO 2 Describe and analyse different types of current and Voltage controlled devices
CO 3 Analyse performance of devices using small signal model
CO 4 Design and implementation of various electronic devices in circuits

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Define dynamic resistance.	**1**	**1**
2.	A half-wave rectifier has its peak value (Vm) as 10V. Calculate the average and RMS values of current.	**1**	**3**
3.	What are the consequences of early effect in transistor?	**2**	**2**
4.	Consider the single stage CE amplifier with R_s=1KΩ and R_L=1.2KΩ.Calculate the current gain if h_{fe}=50 and h_{oe}=25μA/V.	**3**	**3**
5.	Compare BJT and FET.	**2**	**3**
6.	Draw the small signal model of common source amplifier.	**3**	**2**
7.	Why neutralization used in tuned amplifiers?	**4**	**3**
8.	A voltage series feedback amplifier has a voltage gain with feedback as 83.33 and feedback ratio as 0.01.Calculate the voltage gain of the amplifier without feedback.	**4**	**3**
9.	List the applications of opto-coupler.	**1**	**2**
10.	Why silicon is not a preferable LED material?	**1**	**2**

PART- B (5 x 14 = 70 Marks)

			Marks	CO	RBT LEVEL
11. (a)	**(i)**	Explain the Volt ampere characteristics of pn junction diode in forward and reverse bias.	**(7)**	**1**	**3**
	(ii)	Draw the circuit diagram of half wave rectifier for producing a positive output voltage .Explain the circuit operation and sketch the waveforms.	**(7)**	**1**	**3**

(OR)

(b)	**(i)**	Briefly discuss about the capacitance effect of pn junction under reverse bias condition.	**(7)**	**1**	**3**
	(ii)	Explain the operation of Zener diode as voltage regulator.	**(7)**	**1**	**3**
12. (a)		Explain the operation of NPN transistor in CE configuration with its input and output characteristics. Also define active, saturation and cutoff regions.	**(14)**	**2**	**3**
		(OR)			
(b)		Explain the need for biasing and different biasing methods of BJT.	**(14)**	**2**	**3**
13. (a)		Analyze the performance of common drain MOSFET amplifier and derive its input impedance, output impedance and voltage gain.	**(14)**	**3**	**4**
		(OR)			
(b)		For a CS amplifier, draw the small signal equivalent circuit and determine the expression for voltage gain, input impedance and output impedance.	**(14)**	**3**	**4**
14. (a)		Analyze the operation of differential amplifier for common mode and differential mode inputs and derive its CMRR.	**(14)**	**4**	**4**
		(OR)			
(b)		Draw the circuit for voltage series feedback and derive the expression for input impedance, output impedance and voltage gain.	**(14)**	**4**	**4**
15. (a)		Discuss the principle and operation of a Colpitts oscillator with a circuit. Also deduce an expression for frequency of oscillations.	**(14)**	**4**	**3**
		(OR)			
(b)		With neat diagram explain the Wien bridge oscillator and derive an expression for frequency of oscillations.	**(14)**	**4**	**3**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	The device parameters for an n-Channel JFET are: Maximum current I_{DSS} = 10mA, Pinch off voltage, V_P = - 4V. Calculate the drain current for (a) V_{GS} = 0, (b) V_{GS} = -1.0V and(c) V_{GS} = - 4V.	**(10)**	**2**	**4**