

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

**B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY
2025**

Third Semester

Electrical and Electronics Engineering

EC3301 – Electron Devices and Circuits

Regulations - 2021

Duration : 3 Hrs

Maximum : 100 Marks

PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

Q.No	Questions	BLT	CO	Marks
1.	Calculate the voltage at which the reverse current in a germanium PN junction diode attains a value of 90% of its saturation value at room temperature.	L2	1	2
2.	Recall the differences between drift and diffusion current.	L2	1	2
3.	Point out the reasons behind the popularity of common emitter configuration of BJT.	L2	2	2
4.	Compare MOSFET and IGBT.	L2	2	2
5.	State how the body effect changes the small signal equivalent of MOSFET.	L2	3	2
6.	Frequency compensation is required in amplifiers. Comment on the statement with your answer.	L2	3	2
7.	Define CMRR and give its mathematical expression.	L1	4	2
8.	Sketch the ideal response and actual response of tuned amplifiers.	L1	4	2
9.	Illustrate the impact of distortion in negative feedback amplifiers.	L2	5	2
10.	Develop the factors which contribute to the change in frequency.	L2	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BLT	CO	Marks
11. a	Demonstrate the working mechanism of a PN junction diode in both forward bias and reverse bias conditions with neat diagrams?	L2	1	16
	Or			
b	Starting from the basic principles, develop the expression for the ideal PN junction diode current with a neat mathematical background.	L2	1	16
12. a	With relevant diagrams, explain the input and output characteristics of bipolar junction transistor working under common emitter configuration?	L3	2	16

Or

	b	Delineate in detail about the construction and working principle of IGBT along with their input and output characteristics.	L3	2	16
13.	a	With the help of small signal model, derive the expression for gain of common emitter amplifier with R_E bypassed by C_E along with neat mathematical expression.	L3	3	16
		Or			
	b	Demonstrate the working of MOSFET source follower with its small signal equivalent circuit. Also derive the expression for voltage gain, current gain and output impedance.	L3	3	16
14.	a	Discuss the effect of cascading single and double tuned amplifier on bandwidth with neat sketch?	L3	4	16
		Or			
	b	With the help of neat diagrams, derive the expression for gain and cut off frequency of single tuned amplifiers?	L3	4	16
15.	a	Sketch the Wien bridge oscillator and derive the expression for the frequency of oscillation for the same with a neat diagram?	L3	5	16
		Or			
	b	Discuss the effect of a current series feedback on input and output resistance of a BJT amplifier. Explain the same with necessary circuit, equations and equivalent circuit?	L3	5	16