Subject code: 24EC11RC04 R-24 Date of Exam: 30-06-2025

Gayatri Vidya Parishad college of Engineering For Women

(Affiliated to Andhra University, Visakhapatnam)

I B.Tech., -II Semester Regular Examinations, June/July-2025

Elements of Electronics Engineering

(Common to CSE & IT

SCHEME OF EVALUATION

Q.No	Sub Q.No	Solution / Description	Marks
1	a	Differentiate between conductors, insulators and semiconductors based on energy bands	7M
		Any: Energy band diagram for conductors	1M
		Energy band diagram for insulators	1M
		Energy band diagram for semiconductors	2M
		Explaination about conductors, insulators and semiconductors	3M
1.	b	what is the total current in a semi-conductor under both drift and diffusion mechanisms?	7M
		Any: Drift current definition and expression	3M
		Diffusion current definition and expression	3M
		Total current due to drift and diffusion in a semiconductor	1M

Q.No	Sub Q.No	Solution / Description	Marks
2.	a.	Derive an expression for carrier concentration in intrinsic Semiconductors	7M
		Ans: Statement of mass action law	1M
		Intrinsic Semiconductor condition	1M
		Mathematical relation of Intrinsic carrier concentration with temperature	4M
		Simplified resultant expression	1M
2.	b.	How does conduction occur in conductors, Semiconductors, and insulators?	7M
		Ans: conduction in conductors explaination	2M
		conductivity in Semiconductors	3M
		Explaination about conduction in insulators	2M
3.	a.	Sketch and explain the V-I characteristics of a PN junction diode.	7M
		Ans: V-I characteristics of PN junction diod	3M
		comparision between the characteristics of Silicon diode and germanium diode, its explaination	4M
3.	b.	Draw the circuit of a bridge rectifier without filter and explain its operation	7M
		Ans: Bridge rectifier circuit diagram	2M
		working operation	3M
		Input and output waveforms	2M

Q.No	Sub Q.No.	Solution / Description	Marks
4.	a.	Differentiate between transition capacitance and diffusion capacitance	7M
		Ans: Transition capacitance definition, expression, explaination, diagram	3M
		Diffusion capacitance diagram, definition, mathematical expression and its explaination	4M
		(or)	
		Minimum 7 differences between the transition and diffusion capacitance	7M
4.	b.	What is the role of a capacitor filter in a halfwave rectifier circuit with the help of circuit diagram?	7M
		As: Half wave rectifier with capacitor filter circuit diagram	2M
		Input and output waveforms	2M
		Explaination about role of a capacitor filter, ripple factor expression	3M
5.	a.	Draw the circuit and explain the operation of a BJT in CE configuration	7M
		As: BJT in CE configuration circuit	3M
		Input and output characteristics with explaination	4M

Q.No	Sub Q.No	Solution/Description	Marks
5.	b.	What are the three operating regions of a transistor? Explain each briefly	7M
		Ans: Transistor operating regions and its applications	1M
		(i) Saturation mode	
		(ii) cutoff region	6M
		(iii) Active region	
		(iv) Inverse active region	
6.	a.	Analyze the input and output characteristics of a BJT in a CB configuration and discuss the effect of base width modulation.	7M
		Ans:- BJT in CB configuration circuit diagram, its working operation	3M
		Input characteristics }	2M
		Output characteristics }	
		Base width modulation effect	2M
6.	b.	How do biasing techniques prevent thermal runaway?	7M
		Ans: Thermal runaway explaination	3M
		Biasing need in transistors	2M
		Biasing techniques and prevent thermal runaway explaination	2M

Q.No.	Sub Q.No	Solution / Discription	Marks
7.	a.	Draw the circuit diagram of a two-stage Rc coupled amplifier and explain its working.	7M
		Ans :- Two stage Rc coupled amplifier	3M
		circuit diagram	3M
		Explaination (working)	1M
		Frequency response	
7.	b.	Derive the expressions for voltage gain, current gain, input and output resistance of a CE amplifier using h-parameters.	7M
		Ans: CE amplifier h-parameter model	2M
		circuit diagram	
		Four parameters definition,	5M
		final resultant expressions	
8.	a.	Explain the small signal model of a transistor using h-parameters	7M
		Ans: Two-port network model	1M
		h-parameter model	1M
		Four parameters with	
		definition and its expressions	5M

Q.No	Sub Q.No	Solution / Description	Marks
8.	b.	Explain how gain changes in the low, mid and high-frequency ranges in a two-stage amplifier	7M
		As: Frequency response graph	1M
		Gain expression for two-stage amplifier	1M
		Explaination about gain changes in (i) low frequency	5M
		(ii) mid frequency	
		(iii) high frequency	
9.	a.	Define and explain the JFET parameters.	7M
		As Definition and mathematical expression for	
		(i) Transconductance	2M
		(ii) Input resistance	1M
		(iii) Drain resistance	1M
		(iv) Amplification factor & relation	3M
9.	b.	Draw and explain the construction of n-channel Depletion MOSFET.	7M
		As construction of n-channel MOSFET	2M
		characteristics of MOSFET.	2M
		working operation	3M

Q.No	Sub Q.No.	Solution / Description	Marks
10.	a.	Differentiate between Enhancement-mode and Depletion-mode MOSFETs	7M
		Ans: Minimum 7 differences between the Enhancement-mode and Depletion mode MOSFETs	7M
10.	b.	Draw and explain the transfer characteristics of N-channel JFET.	7M
		Ans:- Transfer characteristics waveform	2M
		Definition	1M
		Explaination about transfer characteristics of N-channel JFET	4M

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