NARASIMHA REDDY ENGINEERING COLLEGE
(Autonomous)
Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad
Accredited by NAAC with A Grade, Accredited by NBA

ELECTRONICS AND COMMUNICATION ENGINEERING

QUESTION BANK

Course Title   :Electronic Devices   and Circuits

Course Code   :EC

Regulation   :NR23

Course Objectives:

1. To introduce components such as diodes, BJTs and FETs.
2. To know the applications of devices.
3. To know the switching characteristics of devices.

Course Outcomes: Upon completion of the Course, the students will be able to:

1. Acquire the knowledge of various electronic devices and their use on real life.
2. Know the applications of various devices.
3. Acquire the knowledge about the role of special purpose devices and their applications.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	-	-	1	1	-	-	-	-	1
CO2	3	2	3	-	-	2	1	-	-	-	-	1
CO3	3	3	3	-	-	2	1	-	-	-	-	1

UNIT—I

S.No	Questions	BT	CO	PO

Part — A (Short Answer Questions)

1	Define Static and Dynamic resistance of PN diode	2	1	2
2	What is meant by depletion region	2	1	1
3	For what voltage will the reverse current in pn ge diode reach 90%of its sturation value at room temperature	2	1	1
4	Write the effect of temperature on diode characteristics	4	1	2
5	Define static resistance	3	1	2
8	Draw the Diode Equivalent Circuit. Mention the applications of PN-junction diode.	3	1	1
9	Explain how P-N junction diode acts as a Rectifier.	4	1	1

Part — B (Long Answer Questions)

11	a)	write Short notes on load line analysis of PN Diode	4	1	2
	b)	Explain the avalanche and Zener break down in pn diode	3	1	3
12	a)	.Derive the expression for Transition capacitance of PN Diode	3	1	2
	b)	Derive the expression for diffusion capacitance	3	1	1

			BT	CO	PO
		of a diode			
13	a)	Explain pn diode characteristics in forward and reverse bias regions	4	1	3
	b)	Find the width of the depletion layer in a germanium junction diode which has the following specifications: Area A = 0.001 cm^2, σ_n = 1 mhos / cm, μ_n = 3800 cm^2/sec, μ_p = 1800 cm^2/sec. [5+5]	3	1	2
14	a)	.Discuss switching characteristics of PN junction diode	3	1	3

UNIT—II

S.No	Questions	BT	CO	PO
	Part — A (Short Answer Questions)			
1	what is a rectifier and its types	2	2	1
2	Distinguish between series and shunt clippers	2	2	1
3	Explain about collector feedback bias.	4	2	2
4	What is the necessity of filters .List the types of filters	2	2	1
5	Define regulation and efficiency of a rectifier.	2	2	1
6	Define ripple factor and PIV	2	2	1
7	Explain the necessity of filter circuit after the rectifier circuit	2	2	1

8	Derive the ripple factor for full wave rectifier	1	2	1
9	List the difference between different filters	1	2	1
10	Define clampers	2	2	1

Part — B (Long Answer Questions)

11	a)	A sinusoidal voltage whose Vm=12V is applied to half-wave rectifier. The diode may be considered to be ideal and R_L=1.5 KΩ is connected as load. Find out peak value of current, RMS value of Current, DC value of current and Ripple factor.	3	2	1
	b)	Derive the expression for Ripple factor for Full Wave Rectifier with L-Section filter. [6+4]	3	2	2

OR

12	a)	Draw the circuit diagram and explain the operation of full wave rectifier using center tap transformer and using bridge rectifier without center tap transformer. Obtain the expression for peak inverse voltages of both. [10]	4	2	3
	b)	A full wave rectifier circuit with C-type capacitor filter is to supply a D.C. Current of 20 mA at 16V. If frequency is 50 Hz ripple allowed is 5%. Calculate: i) Required secondary voltage of the transformer. ii) Ratio of I peak/ I_{max} through diodes and the value of C required.	2	2	2
13	a)	With a neat circuit diagram and necessary wave forms explain the operation of half wave rectifier. [5+5]	4	2	3
	b)	An ac supply of 220V is applied to a half wave rectifier circuit through a transformer with a turns ratio of 10:1. Assume the ideal diode. Find: i) dc output voltage ii) PIV.	3	2	3
14	a)	Compare half wave, full wave and bridge rectifier circuits.	2	2	2
	b)	Derive the expression for halfwave rectifier with c- filter	2	2	2
15	a)	With suitable wave forms explain bridge rectifier	2	2	2
	b)	Explain the operation of full wave rectifier with pi section filter	2	2	1
16	a)	A 50 Hz transformer having 60 V r. m. s. on each side of the centre tap supplies a full wave rectifier circuit. The circuit load is 210 Ω with a shunt capacitor filter of 1000 µF. Find the ripple factor. [5+5]	2	2	2

UNIT—III

S.No	Questions	BT	CO	PO
Part — A (Short Answer Questions)				
1	What is meant by thermal runaway? Explain.	2	3	1
2	What do you mean by early effect	1	3	1
3	Explain about collector feedback bias.	2	3	1
4	Compare CE,CC and CB configurations	2	3	1
5	What is the need of biasing?	2	3	1
6	Explain Bias Compensation using Diodes.	2	3	1
7	Explain the working of a transistor as a switch	4	3	2
8	Define stability factors	2	3	1
9	Define alpha and beta DC amplification factors of BJT.	2	3	2
10	Mention different types of biasing circuits	1	3	1
Part — B (Long Answer Questions)				

11	a)	With neat diagram explain various current components in an PNP bipolar junction transistor.	3	3	1
	b)	Explain the concept of DC load lineanalysis of a transistor	2	3	1
12	a)	With a neat diagram explain the voltage divider biasing and calculate stability factor	3	3	2
	b)	what are the factors affecting the stability factor	2	3	1
13	a)	Draw the transistor biasing circuit using collector to base bias and Derive stability factor	4	3	2
	b)	Design a fixed bias circuit using silicon transistor, with the following specifications: VCC = 16V, VBE = 0.7V, VCEQ= 8V, ICQ = 4 mA & β= 50.	2	3	1
14	a)	Draw and explain input and output characteristics of CB configuration	2	3	1
	b)	With a neat diagram explain any two bias compensation technique	2	3	1
15	a)	Draw and explain input and output	4	3	2

		characteristics of CE configuration			
	b)	Explainthe different operating regions of transistor.	2	3	3
16	a)	Draw and explain input and output characteristics of CC configuration	3	3	3
	b)	Derive general equation for collector current Ic	2	3	2

UNIT—IV

S.No	Questions	BT	CO	PO
Part — A (Short Answer Questions)				
1	Compare BJT and FET.	2	4	1
2	Explain classification of FET	1	4	1
3	Define Transconductance of FET	2	4	1
4	Define MOSFET how it is different from JFET	2	4	1
5	What is meant of enhancement MOSFET	2	4	1
6	What is meant of Depletion MOSFET	2	4	1
7	What is the input impedace of common soure	2	4	1

		amplifier			
8		For a p-channel Silicon FET, with effective width 'a'=2×10^{-4} cm and channel resistivity ρ =10 Ω. Find the pinch off voltage.	1	4	2
9		Explain how to avoid thermal runway	2	4	1
10		How FET acts as voltabe variable resistor	1	4	1

Part — B (Long Answer Questions)					
11	a)	With the help of a neat diagram explain the operation of an n-channel enhancement type MOSFET	4	4	2
	b)	Derive expression for Av for common source amplifier	4	4	2
12	a)	With neat diagram explain the functioning of common gate amplifier	2	4	2
	b)	.Detail the construction of an n-channel MOSFET of depletion type. Draw and explain its characteristics	4	4	2
13	a)	Explain in detail about generalised FET amplifier	2	4	1
	b)	Differentiate Enhancement MOSFET and Depletion MOSFET	4	4	2
14	a)	.Derive the expressions for input impedance for common Gate FET amplifier	4	4	2

	b)	Why the input impedance in FET is very high in comparison with BJT?	2	4	1
15	a)	Draw and explain Common drain biasing circuit	4	4	2
	b)	Explain drain and transfer characteristics of JFET	3	4	3
16	a)	Illustrate the working mechanism of JFET with necessary diagram	4	4	3
	b)	What is the relation among FET parameters	3	4	3

UNIT—V

S.No	Questions	BT	CO	PO
Part — A (Short Answer Questions)				
1	Draw zener diode characteristics	2	5	1
2	Write the applications of photo diode	2	5	1
3	Write a short notes on varactor diode	2	5	1
4	Explain voltage regulation using Zener diode	2	5	1
5	What is regulation	2	5	1

6		What are the applications of UJT	2	5	2
7		Draw V-I characteristics of UJT and explain graph	2	5	2
8		Write short notes on SCR	2	5	2
9		Write short note on LED	2	5	2
10		Write short notes on Schottky diode	2	5	1
Part — B (Long Answer Questions)					
11	a)	Write short notes on varactor diode	3	5	2
	b)	Describe the construction and working of UJT with its equivalent circuit and V-I characteristics	4	5	2
12	a)	Distinguish between Avalanche and Zener breakdown	2	5	2
	b)	Explain about silicon controlled rectifier	3	5	2
13	a)	With neat diagram explain the operation of zener diode and its forward and reverse characteristics	3	5	1
	b)	Mention some advantages and disadvantages of tunnel diode	2	5	1
14	a)	Explain the tunneling phenomenon in detail	4	5	2

	b)	Describe the principle of operation of tunnel diode	4	5	2
15	a)	Explain the working of semiconductor photo diode	4	5	2
	b)	Explain static characteristics of SCR	4	5	2
16	a)	Define varactor diode? Explain the operation of varactor diode with its equivalent circuit and mention its applications	4	5	2
	b)	With the help of V-I characteristics, explain SCR operation	4	5	2

* **Blooms Taxonomy Level (BT)** (L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analyzing; L5 – Evaluating; L6 – Creating)
Course Outcomes (CO)
Program Outcomes (PO)

Prepared   **B:**   **G. BHAGYALAKSHMI**