C. U. SHAH UNIVERSITY Summer Examination-2022

Subject Name : Advances in Solid State Electronic Devices

Subject Code : 5SC0	4ASS1	Branch: M.Sc. (Physics)		
Semester: 4	Date: 09/05/2022	Time: 11:00 To 02:00	Marks: 70	

Instructions:

Q-1

- (1) Use of Programmable calculator and any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.

Attempt the Following questions

(4) Assume suitable data if needed.

SECTION – I

(07)

	a.	List the requirements for Bipolar devices.	01
	b.	What problems can be observed in Bipolar devices?	01
	c.	What is the full form of HBTs?	01
	d.	How emitter is doped in HBTs?	01
	e.	Band gap of amorphous Si is?	01
	f.	What do you mean by MOSFET?	01
	g.	Name the terminals of MOSFET and list the types of MOSFET.	01
Q-2		Attempt all questions	(14)
-	a.	Write a note on JFET and discuss its various regions with necessary	07
		diagram with the necessary formulation.	
	b.	What are the requirements of BJT and list the demands, problems and solutions for it.	07
		OR	
Q-2		Attempt all questions	(14)
-	a.	Explain and discuss with necessary diagram the Current-Voltage characteristics of JFET and MESFET.	08
	b.	Explain the channel length modulation in detail with diagram.	06
Q-3		Attempt all questions	(14)
-	a.	Write a note on MOSFET structure and Fabrication in detail with necessary diagrams.	07
	b.	Explain Depletion and enhancement modes of MOSFETs.	07
		OR	
0-3			

Write a note on MOS capacitor in detail with necessary diagrams and 07 explain its three important regions.



	SECTION – II	
	Attempt the Following questions	(07)
a.	If the energy of a light is greater than the band gap of material then radiation is?	01
b.	What is the unit of intensity of incident radiation?	01
c.	Write Beer- Lambert law.	01
d.	Define photon detector.	01
e.	What do you mean by the spectral response?	01
f.	List out the three mechanisms for the recombination in LED.	01
g.	In GaN LED covers, which regions of the spectrum?	01
	Attempt all questions	(14)
a	Explain in detail the important effects in short channel MOSFETs.	07
b	Write a note on complementary MOSFET.	07
	OR	
	Attempt all questions	
a	Write a note on optical absorption and derive absorption coefficient.	08
b	Write a note on organic LEDs.	06
	Attempt all questions	(14)
a	Write a note on double heterojunction LEDs.	07
b	Explain in detail avalanche photodiode with necessary diagram.	07
	OR	
	Attempt all Questions	
a	Explain specialty LASERs: Quantum well, wire and dot.	07
b	Write a note on n-channel and p-channel enhancement type MOSFETs.	07
	a. b. c. d. e. f. g. a b a b a b	SECTION – II Attempt the Following questions a. If the energy of a light is greater than the band gap of material then radiation is? b. What is the unit of intensity of incident radiation? c. Write Beer- Lambert law. d. Define photon detector. e. What do you mean by the spectral response? f. List out the three mechanisms for the recombination in LED. g. In GaN LED covers, which regions of the spectrum? Attempt all questions a Explain in detail the important effects in short channel MOSFETs. b Write a note on complementary MOSFET. Attempt all questions a Write a note on optical absorption and derive absorption coefficient. b Write a note on optical absorption and derive absorption coefficient. b Write a note on optical absorption LEDs. b Explain in detail avalanche photodiode with necessary diagram. OR Attempt all Questions a Write a note on double heterojunction LEDs. b Explain in detail avalanche photodiode with necessary diagram. OR Attempt all Questions a Explain specialty LASERs: Quantum well, wire and dot. b Write a note on n-channel and p-channel enhancement type MOSFETs.

