Enrollment No: _____ Exam Seat No:_____

C. U. SHAH UNIVERSITY
Winter Examination-2018

Subject Name : Advances in Solid State Electronic Devices

Subject Code : 5SC04ASS1 **Branch: M. Sc. (Physics)**

Semester : 4 **Date :23/10/2018** **Time : 10:30 To 01:30** **Marks : 70**

Instructions:

(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.
(4) Assume suitable data if needed.

SECTION – I

Q-1 **Attempt the Following questions** **(07)**

a. What is HBT ? Give its full form. 01
b. What is MODFET? Give its full form. 01
c. Which are the different types of regions in the current-voltage characteristics of JFET distributed? 01
d. What is the Pinch-Off voltage for JFET? Give its formula. 01
e. Draw schematic of MODFET structure. 01
f. What are the HMOS and SIMOX? 01
g. What are the Heterojunction FETs? 01

Q-2 **Attempt all questions** **(14)**

(a) Describe in detail : MODFET. 07
(b) Discuss: InGaAs / InAlAs and InGaAs/InP types of HBTs. 07

OR

Q-2 **Attempt all questions** **(14)**

(a) Explain in detail the saturation and Ohmic regimes in the I-V characteristics of JFET and its significance. 07
(b) Write a note on: The GaAs/AlGaAs HBTs 07

Q-3 **Attempt all questions** **(14)**

(a) Briefly explain the I-V characteristics of the MODFET and discuss the significance of different regions in it. 07
(b) Write a note on the Si-based HBTs. 07

OR

Q-3		**Attempt all Questions**	**(14)**
	(a)	Explain in detail the saturation and Ohmic regimes in the I-V characteristics of MESFET and its significance.	07
	(b)	What are the HMOS and SIMOS? Write their characteristics and applications.	07

SECTION – II

Q-4		**Attempt the Following questions**	**(07)**
	a.	Define : MOSFET	01
	b.	Name different types of MOSFETs.	01
	c.	Define : LED.	01
	d.	Name different types of LEDs.	01
	e.	Define : Impact ionization.	01
	f.	Define : Avalanche Photodetector	01
	g.	What is the optical absorption in semiconductors?	01
Q-5		**Attempt all questions**	**(14)**
	(a)	Give a brief account of important effects in the long and short channel MOSFETs.	07
	(b)	Explain Depletion type MOSFET with proper circuit diagram.	07

OR

Q-5		**Attempt all Questions**	**(14)**
	(a)	Discuss MOS Capacitor with Accumulation, Depletion and Inversion regions.	07
	(b)	Explain the I-V characteristics of MOSFETs. Derive its necessary parameters.	07
Q-6		**Attempt all questions**	**(14)**
	(a)	Write a note on different materials used for the Light Emitting Devices.	07
	(b)	Write a note on: The Edge emitting LEDs.	07

OR

Q-6		**Attempt all Questions**	**(14)**
	(a)	Describe the light-current characteristics of an LED.	07
	(b)	Write a note on the Semiconductor Laser.	07