

# C.U.SHAH UNIVERSITY

## Summer Examination-2018

**Subject Name: Advances in Solid state Electronic Devices**

**Subject Code: 5SC04ASS1**

**Branch: M.Sc. (Physics)**

**Semester: 4**

**Date: 08/05/2018**

**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. Give full form of HBT's.      (01)
  - b. Give the types of regions in I-V characteristics of JFET distributed.      (01)
  - c. Define pinch-off voltage  $V_p$  and gives its formula for JFET.      (02)
  - d. What is MODFET?      (01)
  - e. Draw only schematic of MODFET device structure.      (02)
- Q-2      Attempt all questions      (14)**
- A** Explain in details Saturation regime in current-Voltage characteristic of JFET.      (09)
- B** Explain in details GaAs/AlGaAs HBT's in details.      (05)
- OR
- Q-2      Attempt all questions      (14)**
- A** Explain in details InGaAs/InAlAs and InGaAs/ InP HBT's in details.      (08)
- B** Write a short note on MODFET.      (06)
- Q-3      Attempt all questions      (14)**
- A** Explain in details Ohmic regime in current-Voltage characteristic of JFET.      (09)
- B** Explain Si- Based HBT's in details.      (05)
- OR
- Q-3      Attempt all questions      (14)**
- A** Explain in details I-V characteristics of MODFET with different types of regions.      (08)
- B** Why need for band tailoring and HBT's.      (06)

### SECTION – II

- Q-4      Attempt the Following questions.      (07)**
- a. Which types of material used for light emitting devices.      (01)
  - b. Give names of advanced LED structures.      (01)
  - c. Define MOSFET and gives its types.      (02)
  - d. Write basic operating principle of Photoconductors and give its types.      (02)



- e. What is impact ionization? (01)
- Q-5 Attempt all questions (14)**
- A** Write a short note on Hetrojunction LEDs. (06)
- B** Explain in details depletion type MOSFET with proper circuit diagram. (08)
- OR**
- Q-5 Attempt all questions (14)**
- A** Explain in details MOS Capacitor and its accumulation, Depletion and Inversion regions. (08)
- B** Explain in details Surface emitting LEDs. (06)
- Q-6 Attempt all questions (14)**
- A** Explain in details current-Voltage characteristics of MOSFET and give its parameters. (08)
- B** Explain in details edge emitting LEDs. (06)
- OR**
- Q-6 Attempt all Questions (14)**
- A** Explain in details Complementary MOSFET. (05)
- B** Explain in details operating principle and characteristics of LASER Diode. (06)
- C** Explain in details Light- current characteristics of LED. (03)

