

S.No. 10273

- (a) Name of the Department: Department of Physics and Astrophysics
- (b) Name of the Course: B.Sc. Prog.– (Physics)_NEP: UGCF-2022
- (c) Name of the Paper : *Semiconductor Devices- Fabrication and Applications*
- (d) Semester: VII
- (e) Unique Paper Code: 2223010037
- (f) Question paper Set number: 3

Duration: 2 Hours

Maximum Marks: 60

Instructions:

1. Question 1 is compulsory.
2. Attempt any **three questions** from the remaining four (Q2, Q3, Q4, Q5).
3. Each question carries 15 marks.
4. Symbols have their usual meaning.
5. Scientific calculator is allowed.

Q1. Compulsory Question (Short Answer Type)

Answer any five short questions. Each carries 3 marks.

(5 × 3)

- a. What are Schottky and Frenkel defects?
- b. Define doping and explain how it can be done?
- c. Write the principle of operation of a cryogenic pump.
- d. Define clean room classification and its importance in VLSI fabrication.
- e. Differentiate between wet and dry etching.
- f. Mention any two materials used in MEMS fabrication and state one property of each.

Q2.

- a. Explain Czochralski crystal growth technique for the preparation of single crystal silicon. (7)
- b. Describe the working principle of rotary and diffusion vacuum pumps. (8)

Q3.

- a. Discuss the difference between sputtering and thermal evaporation techniques for thin film deposition with the help of suitable diagrams. (7)
- b. Explain the thermal oxidation process. What is dry and wet oxidation. Draw characteristic graph of thickness v/s time (8)

Q4.

(5x3)

- a. What is electron beam lithography

- b. Describe the basic fabrication process of BJT and JFET
- c. Explain Wafer bonding and wafer cutting.

Q5.

Write short notes on any three of the following:

(5x3)

- a) Pressure Sensor
- b) Cantilever
- c) Etching
- d) Developing