

19002099



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Reg. No.....

Name.....

**M.Sc. DEGREE (C.S.S.) EXAMINATION, NOVEMBER 2019**

**Third Semester**

Faculty of Science

Branch II–Physics–A–Pure Physics

Elective : Bunch–C–Material Science

PH3EC2—CRYSTAL GROWTH TECHNIQUES

(2012—2018 Admissions)

Time : Three Hours

Maximum Weight : 30

**Part A**

*Answer any **six** questions.*

*Each question carries 1 weight.*

1. State the basics of BCF theory.
2. Explain homogeneous nucleation.
3. Explain crystal pulling process.
4. State the demerits of Czochralski method.
5. Explain the properties of gel.
6. Explain the features of physical vapor deposition.
7. What is liquid phase epitaxy ?
8. Give the optoelectronic properties of semiconductors.
9. What are quaternary alloys ? Explain.
10. State the features of microwave FET.

(6 × 1 = 6)

**Part B**

*Answer any **four** questions.*

*Each question carries 2 weights.*

11. Bring out the Muller Krumbhaar model.
12. Briefly explain the periodic bond chain theory for crystal growth.

**Turn over**





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13. Describe the experimental setup of Czochralski method.
14. Explain the growth of KTP crystals.
15. Give the specifications of STP and LTVTP.
16. Describe the action of Laser diodes with a diagram.

(4 × 2 = 8)

### Part C

*Answer all questions.*

*Each question carries 4 weights.*

17. (a) Bring out KSV theory for surface discontinuities as nucleation sites.

*Or*

- (b) Discuss the historical development of crystal growth and growth techniques.

18. (a) Describe the cylindrical shape nucleus with its free energy changes.

*Or*

- (b) Discuss the high temperature solution growth for crystals .Bring out the advantages over other techniques.

19. (a) Describe the growth of quartz and sapphire crystals in detail.

*Or*

- (b) Compare the various types of epitaxial techniques.

20. (a) Bring out the lattice mismatch and lattice mismatched alloy structures.

*Or*

- (b) Discuss on photo cathodes, FETs and LEDs.

(4 × 4 = 16)

