

10. (a) Explain the principle, construction and applications of Solar cell devices.

Or

- (b) Write a note on :
- (i) Quantum dot
 - (ii) Sensor and
 - (iii) Data storage.
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S.No. 196

12PPHZ06

(For the candidates admitted from 2012 – 2013 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2017.

First to Fourth Semester

Physics

MATERIALS SYNTHESIS AND
CHARACTERIZATION

Time : Three hours

Maximum : 75 marks

SECTION A — (5 × 5 = 25 marks)

Answer ALL questions.

1. (a) What do you understand about single crystal and polycrystal?

Or

- (b) Discuss how ion implantation is useful in incorporating dopant/impurity atoms in Silicon substrate.

2. (a) Explain briefly the slow evaporation method of growing single crystal.

Or

- (b) Discuss how thin film can be prepared by chemical vapour transport.

3. (a) Discuss briefly about vacuum pump in thin film technology.

Or

- (b) Describe a method to prepare transparent conducting oxide film by spin coating method.

4. (a) Explain the Hall Effect and mention its advantages.

Or

- (b) Discuss the principle of ellipsometry and its uses in optical materials characterization.

5. (a) Explain how quantum dots can be prepared using chemical method.

Or

- (b) Discuss in detail of the fabrication of thin film.

SECTION B — (5 × 10 = 50 marks)

Answer ALL questions.

6. (a) Discuss in detail the importance of crystal growth technology.

Or

- (b) Explain the various theory of nucleation.

7. (a) Explain in detail the Bridgman technique to grow single crystals.

Or

- (b) Describe in detail gel growth technique and mention merits/demerits over slow evaporation method.

8. (a) Write a note on :

- (i) electron beam evaporation and
(ii) laser gun evaporation techniques.

Or

- (b) Discuss in detail on sputtering technique to fabricate thin films.

9. (a) Explain the principle, working and applications of SIMS in optoelectronics.

Or

- (b) Write a note on the principle and applications of microhardness measurements.