

10. (a) List the different types of lithographic technique. Explain one method with suitable diagram.

Or

- (b) Explain the function of DNA and explain in detail about the DNA microarray.
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12PPHZ03

(For the candidates admitted from 2012–2013 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2017.

First to Fourth Semester

Physics

NANO SCIENCE AND TECHNOLOGY

Time : Three hours

Maximum : 75 marks

PART A — (5 × 5 = 25 marks)

Answer ALL questions.

1. (a) What are the milestones in the scientific evolution of nanotechnology?

Or

- (b) Classify the nanomaterials based on their dimension. Explain with suitable examples.

2. (a) Explain any two methods for the preparation of supported metal nanoparticles.

Or

- (b) Write a short note on “Nano manipulations and nano tweezers”.

3. (a) Define carbon nano tube. What are the types of carbon nano tubes? Explain shortly.

Or

- (b) Describe in detail the pyrolytic synthesis of carbon nano tubes.

4. (a) Discuss the working principle of electron probe micro analysis.

Or

- (b) What is quantum well? Describe the optical process in quantum wells.

5. (a) What makes nanoparticles attractive in biology? What are their applications?

Or

- (b) Write a short note on "Colorants and pigments".

PART B — (5 × 10 = 50 marks)

Answer ALL questions.

6. (a) (i) What are the salient points addressed by Feynman in his lecture "there is plenty of room at the bottom"?

- (ii) What is nanotechnology? Discuss its types with suitable examples.

Or

- (b) Explain the bottom-up and top-down methods of preparation of nanomaterials.

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7. (a) Discuss briefly about the background on quantum semiconductors and reverse micellar solutions.

Or

- (b) Explain the synthesis of cadmium telluroid and cadmium sulphide semiconducting nano crystals.

8. (a) Discuss schematic diagram of chemical vapour deposition (CVD) and explain its process. How carbon nanotubes are prepared by using CVD.

Or

- (b) Explain the following methods for the formation of carbon nanotubes.

(i) Plasma arcing and

(ii) Electro deposition.

9. (a) Write an essay about the instrumentation and applications of low temperature SEM.

Or

- (b) Discuss briefly about the semi conducting and organic optoelectronic devices.

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