



Printed Pages : 2

TOE11

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0911

Roll No.

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B.Tech.

(SEM VII) ODD SEMESTER THEORY EXAMINATION 2009-10
NANO TECHNOLOGY

Time : 3 Hours]

[Total Marks : 100

- Note :**
- (i) Attempt all questions.
 - (ii) All questions carry equal marks.
 - (iii) Be precise in your answer.
 - (iv) No second answer book will be provided.

1 Attempt any **four** parts of the following : **5×4=20**

- (a) Discuss the possibility of observing the negative differential conductivity effect in a bulk semiconductor crystal.
- (b) Define Bravais lattice and describe the condition when two Bravais lattice are equivalent.
- (c) What will happen when exciton interacts with another excitation ?
- (d) Enlist the applications of Nano technology.
- (e) What are the applications of crystallography in material engineering ?
- (f) Write a note on optical spectroscopy.

2 Attempt any **two** parts of the following : **10×2=20**

- (a) Describe transmission electron microscope. Also write the applications and drawbacks of TEM. What are the differences between SEM and TEM ?



- (b) Define and explain the Nano clusters. What are magnetic Nano particles? Describe its properties and its applications.
- (c) Write a note on synthesis of Nano particles.
- 3 Attempt any **two** parts of the following : $10 \times 2 = 20$
- (a) Is a carbon Nano tube a fullerene? Explain in detail. Enlist the properties of carbon Nano tubes.
- (b) What kind of ring structures are present in C_{60} ? Discuss its superconductivity properties.
- (c) Give the industrial applications of carbon Nano tubes in detail.
- 4 Attempt any **two** parts of the following : $10 \times 2 = 20$
- (a) What are solid disordered Nano structures? Also discuss their properties.
- (b) Define magnetic Nano particles. Enlist its properties and explain in detail the applications.
- (c) (i) What are Ferro-fluids? Discuss their applications.
(ii) Write a note on Nano devices.
- 5 Attempt any **two** parts of the following : $10 \times 2 = 20$
- (a) Write in detail about NEMS.
- (b) Write notes on (i) Excitons (ii) Infrared Detectors.
- (c) Write notes on (i) applications of X-ray spectroscopy, (ii) molecular and super-molecular switches.