Menofia University **Faculty of Engineering, Shebin El-Kom** **Basic Engineering Science Department** **2nd Semester Examination,2013-2014** **Date of Exam: 8 / 6 / 2014**	**Subject: Advanced materials Physics** **Code: BES707** **Year: Postgraduate (Engineering Physics)** **Time Allowed : 3 hours** **Total Marks : 100 marks**

Answer the following questions.

Question 1 *(20 marks)*

Write short notes on:

i. One technique from the fabrication processes of nanomaterials (top down approach).
ii. Two techniques from the fabrication processes of nanomaterials (bottom up approach).

Question 2 *(15 marks)*

Show that, how X-ray scattering can be used to deterimine the particle size distribution of nanomaterials?

Question 3 *(20 marks)*

Clarify, how aqueous and non-aqueous sol chemistry can be used in synthesis metal oxide nanostructures? Illustrate your answer using chemical equation?

Question 4 *(20 marks)*

What is the difference between scanning tunneling microscope (STM) and atomic force microscope (AFM) in view of their working principles?

Question 5 *(25 marks)*

Polymer nanocomposites (PNCs) are from the most important emerging advanced materials with wide potential application especially in electrical engineering. In view of the latter, write notes on; how PNCs are used as dielectric and electrical insulation? Clarify your discussion using outline on the multi core model of interface.

With my Best Wishes