 **Chemistry department Date: 4th Jan, 2015**

**Course name: Modern technologies in the appointment of inorganic compositions** **for Preliminary Ph.D. (final): time allowed (120 min) course No: 703 K**

***Answer the following Questions:***

1. **a**- Show how can you determine lattice fringe spacings in a sample of SWCNT using HRTEM?

Then how can you refer the results obtained with those achieved from XRD analysis. **(20 points)**

**b**- What is CryoTEM mean? **(10 points)**



**c-**Explain how Raman can be used to analyze the above Figure? **(10 points)**

1. **a**- Verify and explain **Bragg formulation of X-ray diffraction** and illustrate how can you determine the particle size of specific nanomaterial.  **(10 points)**

 **b**- Explain the relation between Bragg scattering of visible light with colloids? **(10 points)**

1. **a**- What inelastic scattering means in Raman. State the differences between Raman and IR techniques. **(20 points)**
2. Explain how Raman bands are affected by Stokes and anti-Stokes lines? **(20 points)**

*With my best wishes and great success*

*Prof. Dr. Mohamed Mokhtar*