Date: **Reg. No.**

ENGINEERING APPLICATION OF NANOMATERIALS

Tools Required:

- XRD pattern (uploaded in the course page)
- Peak fitting program (Open source/free software like `fityk, gnuplot and qtiplot` is preferable)
- **Usage of any pirated or cracked software is strictly prohibited**

SLO:

✓ To determine the average crystallite size from the given X-ray diffraction (XRD) pattern of a polycrystalline material.

Formula to use:

The Scherrer equation is to calculate the crystallite size. This method gives qualitative results.

The Scherrer Equation is:

$$D = \frac{K\lambda}{\beta \cos\theta}$$

Here,

- Peak width (***β*** in radians)
- Crystallite size (***D***)
- Scherrer constant (***K***)
- X ray wavelength (***λ***)
- Peak position (***θ***)

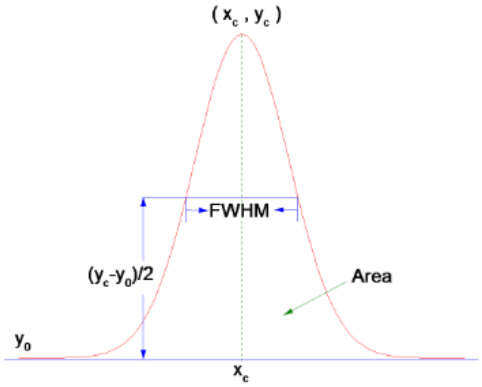

Fig 1 Peak fitting using Gaussian/Pseudovoigt function

Data given:

Instrumental broadening: 0.01^{o}

Wavelength of the X- ray used: 1.546 Å

Scherrer constant: 0.94 (assuming that crystallites are spherical in shape)

[IMPORTANT - Use ''Pseudovoigt' function for fitting in fityk)

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Tabulation

Peak Center ( )	**FWHM ( )**	**FWHM after instrumental broadening correction ( )**	$\boldsymbol{FWHM}$ (in Radian)	**Average crystallite size ( )**

Inference:

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