

IV B.Tech II Semester Supplementary Examinations, Apr/May 2006**X-RAY METALLOGRAPHY
(Metallurgy & Material Technology)****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions
All Questions carry equal marks**

1. Discuss the history of X-radiations. Describe the methods for X-ray production. [16]
2. Write short notes on the following:
 - (a) Thomson equation [5]
 - (b) Polarisation factor [6]
 - (c) Compton effect. [5]
3. Write short notes on the following:
 - (a) Multiplicity factor
 - (b) Lorentz factor. [8+8]
4. The first three lines from the powder pattern of a cubic crystal have the following S values : 24.95, 40.9, and 48.05 mm. The camera radius is 57.3 mm. Molybdenum $K\alpha$ radiation of wavelength 0.71\AA are used. Determine the structure and lattice parameter of the material. [16]
5. Given a square piece of X-ray film 10 Cm X 10 Cm radiation of $\lambda = 0.152\text{ nm}$ and powdered NaCl with a lattice parameter 0.563 nm, devise a diffraction experiment in such a fashion that the rays from (111) planes produce a circle of diameter 0.1m. [16]
6. Write notes on the following:
 - (a) Depth of X-ray penetration [6]
 - (b) Crystal orientation [5]
 - (c) Special diffractometer. [5]
7. Explain the following:
 - (a) Chemical analysis by parameter measurement [5]
 - (b) Techniques used in stress measurement [5]
 - (c) What are the errors that can be occurred and how they are classified in the precise parameter measurements? [6]

8. Explain in detail the steps involved in Determination of Phase Diagram by X-ray diffraction methods. Clearly sketch and explain. [16]

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