M.Sc. (Physics) Third Semester

MSc23108 - Optional - X-Rays-I Paper-IV

P. Pages : 2 **GUG/W/18/2309**

Time : Three Hours * 1 8 0 3 * Max. Marks : 80

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1. Either

a) What are the continuous and characteristics x-ray spectra? What are their practical application? **8**

b) Discuss the vacuum system that can be used for function of x-ray tube. **8**

OR

e) Explain the use of a Pelletron for the generation of x-ray. **8**

f) What are the insertion devices? How do they enhance the quality of Synchrotron radiation? **8**

2. Either

a) Explain the experimental setup of x-ray Fluorescence spectroscopy. **8**

b) Explain the phenomenon of x-ray absorption and how x-ray absorption coefficients are determined from the spectra. **8**

OR

e) What are Auger electron? How they differ from photoelectron? **8**

f) Discuss micro radiology and their application? **8**

3. Either

a) How elemental composition of materials is determined by using x-ray fluorescence spectroscopy. **8**

b) What is x-ray emission spectroscopy. How quality of x-ray is influed by various factors, discuss with suitable example. **8**

OR

e) What are the main differences between Bragg's and double crystal spectrograph. How Double crystal spectrograph is superior over single spectrograph. **8**

f) What is role of dispersive power in precision x-ray spectroscopy? Does it affect the efficiency of spectrometer? How wavelength dispersive x-ray spectroscopy separates -x-ray diffraction with crystals. **8**

4. a) Discuss the chemical effect in x-ray absorption spectra. **8**

b) Explain XANES and EXAFS with application of each in detail. **8**

OR

e) Derive an expression for dielectric constant of materials on the basis of dispersion theory. **8**

f) State and explain factor affecting the intensity of diffraction line. **8**

5. Attempt all questions.

a) Described sealed x-ray tube **4**

b) Discuss theory of photoelectron spectroscopy. **4**

c) Compare advantages and disadvantages of wavelength and energy dispersive spectroscopies. **4**

d) Discuss significance of the complex dielectric constant. **4**

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