

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP2023)

CLASS: IMSc
BRANCH: PHYSICS

SEMESTER : VI
SESSION : SP2023

SUBJECT: PH321 ADVANCED EXPERIMENTAL TECHNIQUES (AET)
TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

		CO	BL
Q.1(a)	How are X-rays produced? Briefly explain with a suitable diagram.	[2]	1 2
Q.1(b)	Determine the lattice parameter of Al from the following Cu K α x-ray diffraction data 2theta (degree)- 38.43, 44.67, 65.02, 78.13, 82.33 Intensity (a.u)- 100, 46.9, 26.4, 27.9, 7.8	[3]	1 3
Q.2(a)	Why do we observe peaks of different heights in the XRD pattern?	[2]	1 2
Q.2(b)	Explain an experimental procedure for finding the XRD pattern.	[3]	1 2
Q.3(a)	Discuss major advantages and drawbacks of optical microscopes compared to electron microscopes.	[2]	2 2
Q.3(b)	Briefly discuss two methods to generate electrons from an electron gun used in electron microscope.	[3]	2 2
Q.4(a)	Schematically show different processes that occur when an electron beam interacts with matter.	[3]	2 3
Q.4(b)	Briefly describe two of them.	[2]	2 2
Q.5(a)	Show different components of a scanning electron microscope.	[3]	2 2
Q.5(b)	Briefly describe the working mechanism of SEM.	[2]	2 2

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