22P309 (Pages: 2) Name: .....

Reg.No: .....

THIRD SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

(CBCSS - PG)

(Regular/Supplementary/Improvement)

CC19P PHY3 E05 - EXPERIMENTAL TECHNIQUES

(Physics)

(2019 Admission onwards)

Time : 3 Hours Maximum : 30 Weightage

Section A

Answer ***all*** questions. Each question carries 1 weightage.

1. How do getter ion pump works?
2. Write a note on resistive heating technique.
3. Explain the term sputtering yield.
4. What is a cascade accelerator ?
5. What is ion implantation technique ?
6. What is the principle of Neutron activation analysis technique?
7. What are different parts of X Ray Diffractometer?
8. How will you calculate grain size of the material from XRD pattern?

(8 × 1 = 8 Weightage)

Section B

Answer any ***two*** questions. Each question carries 5 weightage.

9. What do you mean by Vacuum accessories? Explain the working of liquid nitrogen traps and sorption traps with a neat diagram. How are they useful in attaining better vacuum?
10. Describe the optical interference methods for determining the thickness of thin films.
11. Differentiate between electron synchrotron and proton synchrotron.
12. Explain General experimental arrangement for Elemental Analytical Method.

(2 × 5 = 10 Weightage)

Section C

Answer any ***four*** questions. Each question carries 3 weightage.

13. Determine the pumpdown time for a chamber of 1.5m diameter and 0.6m height pumped by a rotary pump with a speed of 2000 litres/min to attain a pressure of 10^{-1} torr, 10^{-2} torr and 10^{-3} torr.
14. What are vacuum gauges? Explain the working of Pirani gauge.
15. Discuss in detail, Interference filters.
16. Differentiate between Electron impact ionization and Ion impact ionization.
17. Explain Rutherford backscattering technique for elemental analysis.

18. Explain PIXE technique for elemental analysis.

19. The Bragg's angle for (220) reflection from nickel (fcc) is 38.2^{o} when x-rays of wavelength 1.54Å are employed in a diffraction experiment. Determine the lattice parameter of nickel.

(4 × 3 = 12 Weightage)

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