



QP CODE: 21000716



21000716

Reg No :

Name :

M Sc DEGREE (CSS) EXAMINATION, JULY 2021

Fourth Semester

Faculty of Science

M Sc PHYSICS

Elective - PH810403 - NANOSTRUCTURES AND MATERIALS

CHARACTERISATION

2019 Admission Onwards

011677F8

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

Answer any **eight** questions.

Weight **1** each.

1. Explain quantum confinement in one dimension with an example.
2. What are the features of self assembled monolayers.
3. What is bottom up approach? Mention its salient features with an example.
4. What are fullerenes?
5. Discuss the properties and application of TiO_2 .
6. Explain spectrophotometric accuracy.
7. Explain photoacoustic effect.
8. Give an important application of X-Ray photoelectron spectroscopy.
9. How can SEM provide enlarged and highly resolved 3D view of specimen's exposed structure?
10. What is meant by thermal analysis? Explain DTA.

(8×1=8 weightage)

Part B (Short Essay/Problems)

Answer any **six** questions.

Weight **2** each.

11. Explain single electron tunneling.
12. Discuss the experimental method for measuring magnetic moments in nanometal clusters.





13. With necessary theory discuss any two applications of ferrofluids.
14. What is biomimetics? Explain with an example.
15. What is the role of molecular electronic state of a compound in fluorescence and phosphorescence emission?
16. What is meant by fluorescence quenching? What are the types of quenching?
17. What is the significance of Moseley's law in periodic table?
18. What accelerating voltage is required to direct a single charged water molecule through the exit slit of a magnetic sector mass spectrometer if the magnet has field strength of 0.240 T and the radius of curvature of the ion through the magnetic field is 12.7 cm?

(6×2=12 weightage)

Part C (Essay Type Questions)

Answer any **two** questions.

Weight **5** each.

19. Explain the principle and application of nanolithography.
20. Discuss the conceptual ideas of potential nanodevices. What are the hindering factors in realizing them in practice?
21. What is the principle behind the working of FT-IR spectrometer? Explain.
22. Discuss in detail about the analysis of surface chemical composition with Auger Emission Spectroscopy method.

(2×5=10 weightage)

