



Avinashilingam Institute for Home Science and Higher Education for Women

(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)

Re-accredited with 'A+' Grade by NAAC. Recognised by UGC Under Section 12B

Coimbatore - 641 043, Tamil Nadu, India

Master's Degree Examination – June / July 2021

II Semester

Class : I PG
Major : Physics

Time : 3 Hours
Max. Marks : 100

20MCHI01 IDC - Nanomaterials and their Applications

PART A

10 x 1 = 10

Choose the Correct Answer

1. The phrase "There is plenty of room at the bottom" was stated by
a. Eric Drexler b. Richard Feynman c. Harold Croto d. Richard Smalley
2. Nanomaterials are the materials with at least one dimension measuring less than _____
a. 1 nm b. 10 nm c. 100 nm d. 1000 nm
3. The colour of nano gold particles is _____
a. yellow b. orange c. red d. variable
4. What ratio decides the efficiency of nanomaterials?
a. weight/volume b. volume/weight
c. surface area/volume d. pressure/volume
5. Tapping technique is used in
a. SEM b. TEM c. AFM d. STEM
6. Where do we obtain the magnified image of the specimen in SEM?
a. cathode ray tube b. phosphorescent screen
c. anode d. scanning generator
7. Nanowires are _____ dimensional.
a. 0 b. 1 c. 2 d. 3
8. What is a buckyball?
a. C 60 b. C 20 c. C 4 d. C 111
9. _____ is the field in which the nano particles are used with silica coated iron oxide.
a. Magnetic applications b. Electronics
c. Medical diagnosis d. Structural and mechanical materials
10. Nano particles target the _____ causing cells and remove them from blood.
a. tumour b. fever c. infection d. cold

Part B

5 x 6 = 30

Answer ALL questions

Each answer should not exceed 400 words or two pages

- 11.a. Account on Electric arc deposition method for preparation of nanoparticles.
(or)
- 11.b. What are inorganic and organic nanomaterials? Give example for both.
- 12.a. How can you control the size of a nanoparticle?
(or)
- 12.b. Contrast the role of nanomaterials in catalysis.
- 13.a. How UV-Visible spectroscopy is useful in the characterisation of nanomaterials.
(or)
- 13.b. Discuss the principles of AFM and TEM
- 14.a. What are carbon nanotubes? Give their synthesis method.
(or)
- 14.b. List out the applications of carbon nanowires.
- 15.a. Write a short note on nanosensors and nanomedicine.
(or)
- 15.b. Interpret the applications of nanotechnology.

Part C

5 x 12 = 60

Answer ALL questions

Each answer should not exceed 800 words or four pages

- 16.a. Describe how nanomaterials can be prepared by High energy Ball Milling, Melt mixing and Physical vapour deposition methods.
(or)
- 16.b. Discuss the following i) Sol-gel method ii) Combustion method iii) Wet chemical method
- 17.a. Explain the optical, electric and magnetic properties of nanoparticles.
(or)
- 17.b. What is surface plasmon band? Brief about its various applications
- 18.a. Analyse how X ray diffraction and Photoluminescence spectroscopy are used in the nanoparticle characterisation.
(or)
- 18.b. Give a detailed note on SEM and STEM.
- 19.a. Discuss the structure and characterisation of single and multi-walled carbon nanotubes.
(or)
- 19.b. Write about the applications of carbon dots and carbon nanotubes.
- 20.a. Give the applications of metal nanoparticles in various field.
(or)
- 20.b. Explain the biological applications of nanoparticles .
