

R-3042

Sub. Code

533201

M.Sc. DEGREE EXAMINATION, APRIL 2019

Second Semester

Nanoscience and Technology

SYNTHESIS OF NANOMATERIALS

(CBCS – 2016 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is the role of inert gases inert gas condensation process?
2. Define Plasma.
3. What is hydrolysis?
4. What is the use of templates in a chemical synthesis?
5. Which are more stronger nanotubes or nanorods? Why?
6. Define Quantum dots.
7. What is the main advantage of mechanical milling process?
8. What are the differences between quenching and annealing?
9. Give an example for herbal synthesis of nanoparticle.
10. Define mycosynthesis.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain the target preparation for ultra high vacuum units to synthesis nanoparticles.

Or

- (b) Describe in detail the transferred arc plasma reactor with a neat diagram.

12. (a) Explain the principle, working and applications of electrochemical synthesis of nanoparticles.

Or

- (b) Write a note on sol-gel process of nanostructures with example.

13. (a) Explain in detail the nanotubes, nanorods, nanoflowers and their preparation.

Or

- (b) Write a detailed note on bulk nanomaterials and their advantages.

14. (a) Mention the advantages and disadvantages of mechanical methods.

Or

- (b) Discuss in detail the annealing. Mention how it is essential in nanoparticle synthesis?

15. (a) Explain phytosynthesis method of nanoparticle synthesis. Give its advantages.

Or

- (b) Explain in detail the nanoparticles synthesized by biological methods.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the principle, mechanism and working of thermal evaporation method of nanomaterial synthesis.
17. Describe the solvothermal route of nanoparticle synthesis. Explain how micelle formation helps in synthesis.
18. Explain in detail the Schienky synthesis of Quantum dots. Compare 0, 1, 2 and 3D nanostructures.
19. Describe in detail the mechanical milling method of nanoparticle synthesis. Explain how the particle size is controlled with the ball to powder weight ratio.
20. Discuss in detail the bioproduct mediated synthesis of nanomaterials. Also, write its advantages.

R-3043

Sub. Code

533202

M.Sc. DEGREE EXAMINATION, APRIL 2019

Second Semester

Nanoscience and Technology

CHARACTERIZATION OF NANOMATERIALS

(CBCS – 2016 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is Micro hardness?
2. What is meant by plastic deformation?
3. What is Hall effect?
4. What is meant by activation energy?
5. Write down the applications of Uv-vis spectra.
6. Why stokes's line more intense than anti-stoke's lines?
7. List out the properties of paramagnetic materials.
8. What is ESR?
9. How does the AFM works?
10. Write down the application of STM.

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Briefly explain nanoindentation.
Or
(b) Write a short note on Superplasticity.
12. (a) How to measure the DC conductivity of nanomaterials?
Or
(b) Explain the Grain boundary effect on Conduction.
13. (a) Classify the dia, para and ferromagnetic materials.
Or
(b) Briefly explain Surface plasma Resonance.
14. (a) Explain the cathodluminescence of materials.
Or
(b) Explain the principle of Photoluminescence.
15. (a) Explain the principle of Electron microscopy.
Or
(b) With neat diagram explain the principle of SEM.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Briefly explain (a) Elasticity of Nanomaterials
(b) Nanomembranes.
17. Discuss the impedance spectroscopy and find the electrical parameters of Nanomaterials.

18. Discuss the principle instrumentation, interpretation of spectra of FTIR.
 19. Describe the principle, working and applications of ESR.
 20. With neat sketch explain the principle, modes of operation and imaging process of AFM.
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R-3044

Sub. Code

533203

M.Sc. DEGREE EXAMINATION, APRIL 2019

Second Semester

Nanoscience and Technology

APPLICATIONS OF NANOMATERIALS

(CBCS – 2016 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is molecular electronics?
2. Name the printing systems used in photolithography.
3. What are hard magnets?
4. Why we need high energy density batteries?
5. Name any four nanomaterials used in water purification.
6. Where are ceramic valves used?
7. Define nanotoxicology.
8. What are lightening arresters?
9. What is nanobiosensor? Give examples.
10. Define dendrimers.

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write a note on density of microcomponents.

Or

- (b) Write in detail on CMOS technology.

12. (a) What are soft magnets and explain how they are used in high speed memories?

Or

- (b) Write a detailed note on hyperthermia.

13. (a) Describe how nanoceramics are used as teeth and bone substitute.

Or

- (b) Explain in detail the applications of nanomaterials in Aerospace industry.

14. (a) Explain how nanotechnology is used in removal of bacteria and microbes.

Or

- (b) Write a note on environmental applications of nanomaterials.

15. (a) Discuss in detail the applications of self-assembly process.

Or

- (b) Explain how nanotechnology is useful in making long lasting medical implants.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss in detail the applications of nanomaterials in dye sensitized solar cells.
 17. Write a detailed note on targeted drug delivery.
 18. Discuss in detail the uses of nanocomposites in purification of water, blood and air.
 19. Write in detail the applications of nanotechnology in detoxification of organic and inorganic pollutants.
 20. Illustrate biomimetic applications of nanoparticle homing to tumors.
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R-3045

Sub. Code

533504

M.Sc. DEGREE EXAMINATION, APRIL 2019.

Fourth Semester

Nano science and Technology

INFORMATION STORAGE MATERIALS AND DEVICES

(CBCS – 2016 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define Floppy disk.
2. Write the working principle of magnetic storage materials.
3. Give any four advantages of magnetic tape.
4. Explain about frequency modulation.
5. What is magnetic moment?
6. Explain the magnetic anisotropy.
7. Write the media noise.
8. List out the limitation of super magnetic materials.
9. Define DRAM.
10. Write the principle of Read and Write of optical data storage.

Part B**(5 × 5 = 25)**

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain in detail about magnetic storage materials.

Or

- (b) Elaborate on optical memory storage materials.

12. (a) Short notes on :

- (i) Disk format,
(ii) Data reproduction.

Or

- (b) Write in detail about magnetic disk and its type.

13. (a) Elaborate the ferromagnetic and antiferromagnetic materials.

Or

- (b) Give short notes on hysteresis loop.

14. (a) Explain the Spin-valve sensor.

Or

- (b) Write in detail about GMR and its applications.

15. (a) Write a note on Magneto resistive random-access memory.

Or

- (b) Briefly explain the FERAM and RRAM.

Part C $(3 \times 10 = 30)$ Answer any **three** questions.

16. Explain the Role of nanotechnology in data storage.
 17. Describe the optical media and near field optical recording.
 18. Describe the super paramagnetic materials.
 19. Write a short introduction of solid state memory.
 20. Write in detail about Magnetic tunneling junction.
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R-3046

Sub. Code

533508

M.Sc. DEGREE EXAMINATION, APRIL 2019

Fourth Semester

Nanoscience and Technology

NANOTOXICOLOGY

(CBCS – 2016 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define Nanotoxicology.
2. Briefly write about impact of nanoparticle on environment.
3. Define Cytotoxicity.
4. What is reactive oxygen species?
5. Define Nanopollution.
6. Write about examples of air born disease.
7. Define Nanomaterials.
8. Mention any two respiratory tract infection.
9. Define oxidative stress.
10. Write any two points about ecotoxicology.

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Give a short notes on laboratory rodent studies.

Or

- (b) Explain about concept of nanotoxicology.

12. (a) Explain about mechanism of nanosize particle toxicity.

Or

- (b) Write in detailed about cell and cellular nanotoxicology.

13. (a) Explain the Nanomaterials in environment.

Or

- (b) Write brief notes on physicochemical properties of Nanomaterials as mediators of toxicity.

14. (a) Describe about disposition of NSPs in the respiratory track.

Or

- (b) Explain about nanoparticle exposure via GT tract and skin.

15. (a) Explain about legal and social implications of nanomaterials.

Or

- (b) Differentiate the toxicology and ecotoxicology.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss in detail about Ecotoxicology studies.
 17. Describe about Immunotoxicity.
 18. Discuss in detail about Nanopollution.
 19. Explain about translocation to the circulatory system.
 20. Discuss in detail about Risk assessment of nanomaterials.
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