R7320	Sub. Code
	533301

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Third Semester

Nanoscience and Technology

NANOBIOTECHNOLOGY AND NANOMEDICINE

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Nanotweezers.

2. Define Molecular Processor.

3. Define Protein based biosensor.

4. Comment on DNA nanostructure.

5. Define metal based Nanocomposite.

6. Define regenerated cellulose fibre with example.

7. What is the usage of Flurophore?

8. What is Ultrasonography?

9. Define gene therapy.

10. What are Peptides?

Part B (5 × 5 = 25)

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

11. (a) Describe the applications of Dendrimers**.**

Or

(b) Give an account of biology inspired concept with example.

12. (a) Explain the role of lipids as Bricks and Mortar in Nanostructure.

Or

(b) How will you explain DNA Nanowire?

13. (a) Give an account of Nanocomposite.

Or

(b) Discuss the applications of nanotechnology in agriculture.

14. (a) How will you explain the design and applications of Protein based biosensors?

Or

(b) Elaborate the usage of nanoparticles for bio analytical applications.

15. (a) Write a short note on Lipid nanoparticles.

Or

(b) Discuss in detail about the Prospects of Nanomedicine.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the application of DNA as a molecular processor or Biochip.

17. Explain the characteristics of self- assembled monolayer (SAM) and its applications.

18. Explain the different types of Nanocomposites with suitable example.

19. Explain the role of DNA in Nanobiosensor device and its importance.

20. Explain the different strategies applied in Nanobased drug delivery for Cancer.

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R7321	Sub. Code
	533302

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Third Semester

Nanoscience and Technology

NANOELECTRONICS AND NANODEVICES

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. How is nanotechnology used in electronics?

2. Write any two uses of nanodevices.

3. What are the types of memory devices?

4. What is sensor?

5. What is spintronic device?

6. Write any two applications of semiconductor device.

7. Write down the full form of MOSFET.

8. Write any two uses of LED.

9. What is diode?

10. What is laser?

Part B (5 × 5 = 25)

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

11. (a) Write short notes on nanoelectronics devices.

Or

(b) Explain detailed about capabilities of nano electronics.

12. (a) Write short notes on electrochemical cells.

Or

(b) Make notes on Semiconductor sensor array.

13. (a) Discuss in detail about spin dependent scattering.

Or

(b) Explain briefly Micro magnetic.

14. (a) Write short notes on Single electron transistors.

Or

(b) Write about Gas based nanodevices.

15. (a) Define Quantum dot lasers.

Or

(b) Discuss electroluminescent organic materials.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write about micro and nano fabrication for nanoelectronics.

17. Briefly explain Ferroelectrics random access memories.

18. Explain detailed about Ballistic spin transport.

19. Discuss about Nanorobotics and Nanomanipulations.

20. Explain detailed accounts on Quantum well infrared photo detectors.

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R7322	Sub. Code
	533303

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Third Semester

Nanoscience and Technology

NANO ENGINEERING

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is semiconductor and type of semiconductor?
2. Define write heads and read heads.
3. Differentiate graphene arid Reduced Grapheme Oxide (RGO).
4. What is allotropy carbons and classified allotropy carbons?
5. What is sensor and types of sensors?
6. Define working principle of nano-electrochemical system.
7. Define spine injection in semiconductors.
8. Define spin relaxation and dephasing an interphase layer.
9. Describe conducting polymers based on conjugation.
10. What is hybridisation and it's significant in photonic materials?

Part B (5 × 5 = 25)

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

11. (a) Define Lorentz force and its significance in nanostructures.

Or

(b) What are steps involved in semiconductor device fabrication and explain it?

12. (a) Briefly explain about fullerene structure and their applications.

Or

(b) Describe details about RGO synthesis, structure properties, and application.

13. (a) Describe details about micro and nano-electrochemical sensors and its application.

Or

(b) Merits and demerits of nano-electronics in different approaches.

14. (a) What is spin polarized field effect transistor and concept of Datta-Das transistor?

Or

(b) Describe details about non-equilibrium spin dynamics in nanostructure.

15. (a) Describe conducting and semiconductor polymers and its electronic and photonic application.

Or

(b) Aggregation effect of electronic and photonic properties in super molecular materials.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Briefly explain about

    (a) Lorentz microscopy (5)

    (b) Magnetic force microscopy. (5)

17. (a) Classified types, properties and application of CNT based on its structure. (6)

    (b) Explain basic electronic structure of field-effect transistor and its usage in day-to-day life. (4)

18. Briefly explain about

    (a) Radiation sensors (5)

    (b) Chemical sensors. (5)

19. (a) Describe effect of disorder in magnetic multilayer electron transfer processes. (5)

    (b) Describe Rashba effect in multilayer nanostructure. (5)

20. Briefly explain about ECL mechanism and their applications. (10)

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R7323	Sub. Code
	533503

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Third Semester

Nanoscience and Technology

MICROSYSTEM TECHNOLOGY

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is MOCVD?
2. Define sputtering.
3. Define Silicon fabrication Process.
4. Comment on Microsystem fabrication.
5. What is Synchrotron?
6. What is mean by MEMS?
7. What are Communicable diseases?
8. What is pressure sensor?
9. Define Micro stereo lithography
10. Write the applications of BioMEMS.

Part B (5 × 5 = 25)

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

11. (a) Describe the principle and preparation of sol gel method.

Or

(b) Give an account of Rapid prototyping.

12. (a) Explain fabrication process of etching technology.

Or

(b) How will you differentiate semiconductor and insulators with examples?

13. (a) Discuss in detail about electron beam lithography technique.

Or

(b) Explain the advantages and applications of Nano imprint lithography.

14. (a) Illustrate the design, performance and evaluation of MEMS device.

Or

(b) Briefly explain about the overview of MEMS Packaging.

15. (a) Write a short note on the materials used for Non Silicon MEMS.

Or

(b) Give an account of Micro stereolithography.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the Physical vapour deposition methods in detail through a suitable example

17. Explain the technology of Microsystem fabrication technique and its applications.

18. Describe about Silicon MEMS fabrication technology and MEMS applications

19. Explain the applications of Bionanosensor devices in communicable diseases and microbial infection

20. How will you justify the application of silicon carbide for MEMS? Explain

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