Seat No. _____

# HAJ-003-049901

## B. Sc. / M. Sc. (Applied Physics)

## (Sem. IX) (CBCS) Examination

**May - 2023**

## Paper - IX : Nanomaterials - II

## (Properties & Applications)

## (New Course)

**Faculty Code : 003**

**Subject Code : 049901**

Time : $2\frac{1}{2}$ / Total Marks : **70**

**Instructions:**

(1) All questions are compulsory

(2) Numbers in the right margin indicate marks

**1** Attempt any **seven** short questions : (Two marks each) **14**

1. What is the role of chemistry in creating nanostructures?
2. What is nucleation phenomenon in nanostructures?
3. What are supported nanoscale catalyst?
4. What is electrochemical reactivity?
5. What remains of a nanostructure when exposed to molecules with which chemical reactions can occur?
6. What is Nanotribology?
7. What are the sensors?
8. What is nanobiosensor?
9. What are applications of nanotribology?
10. What are nanoshells and nanopores?

**2** Write answers of any two : **14**

1. Explain the effect of nanoscale materials on chemical reactivity in detail with some examples.
2. What are the Colloids? Classify them with examples.
3. Write a detailed note on
   a) Electro-Optic effect
   b) Acousto-Optic effect
4. Discuss the correlation between electronic conduction and magnetic data of nanoparticles.

**3** Write answers of any two : **14**

1. Write a detailed note on DC conduction of nanoparticles.
2. Explain the electrical conduction in Bi-Se glasses and nanoparticles.
3. Write a detailed note: Giant magneto resistance.
4. Discuss the electrical properties of nanostructures in metallic and insulating regime.

**4** Write answer of any two : **14**

1. Discuss the effect of particle size on magnetic properties of nanomaterials.
2. Write a note on nano tribometer and QCM.
3. Discuss various diagnostic and therapeutic applications of nanomedicines.
4. Discuss the Particle size variation and distribution effect of metal nanoparticle.

**5** Write answers of any two : **14**

1. Discuss the electrochemical sensors and nano biosensors
2. What are the requirement of nanosensors?
3. Write a detailed note: Nanosensor based on quantum size effect.
4. What are the typical applications of Nanotribology?

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