Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST 1

Even Semester: 2021 – 22 | **Date**: 27/04/2022

Course Code: MEC 103 | **Time**: 10.00 AM to 11.00 AM

Course Name: Nanotechnology [Open Elective-1] | **Max Marks**: 30

Program & Sem: B. Tech & VI Sem | **Weightage**: 15%

Instructions:

(i) Read the all questions carefully and answer accordingly.

(ii) Calculator is allowed during the exam

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries TWO marks. (5Qx 2M= 10M)

1 What is the difference between NANO SCIENCE & NANO TECHNOLOGY? (C.O. No.1) [Knowledge]

2. Write a note on nature manufacturer Geckos (Lizard)? (C.O. No.1) [Knowledge]

3. What do you mean by quantum dots (C.O. No.1) [Knowledge]

4. Define (i) CNT (C.O. No.1) [Knowledge]

5. What are zero, one and two dimensional nano structures? (C.O. No.1) [Knowledge]

Part B [Thought Provoking Questions]

Answer both the Questions. Each question carries SIX marks. (2Qx6M=12M)

6 The Method involves the breaking down of the bulk material into nanosized structures or nanomaterial from a size of 1000nm to 10nm.Identify the method and explain with suitable diagram. (C.O.No.2) [Comprehension]

7. Humans have not shown interest to mimic natures million of years of evolution, because nature is undoubtedly the most experienced and tested laboratory ever available to us and capable of making sophisticated materials, capturing energy, self-healing, and storing information with incredible efficiency. Identify any two nano structures in nature and explain? (C.O.No.2) [Comprehension]

Part C [Problem Solving Questions]

Answer the Question. The question carries EIGHT marks. (1Qx8M=8M)

8. Consider a 1 Ice Cube volume, the surface area is $6m^2$. Further Divide this cube into 8 and 27 parts and calculate the surface area and discuss the effect on nanomaterials (C.O. No. 2) [Application]

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GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST 2

Even Semester: 2021 – 22

Course Code: MEC 103

Course Name: Nanotechnology [Open Elective-1]

Program & Sem: B. Tech & VI Sem

Date: 2nd June 2022

Time: 10.00 AM to 11.00 AM

Max Marks: 30

Weightage: 15%

Instructions:

(i) Read the all questions carefully and answer accordingly.

(ii) Calculator is allowed during the exam

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries THREE marks. (4Qx 3M= 12M)

Q.NO.1 Define Lithography and list the different types. [3M](C.O. No.3) [Knowledge]

Q.NO.2.Explain Ball milling Method. [3M] (C.O. No.3) [Knowledge]

Q.NO.3. With a neat sketch Explain Chemical Vapour Deposition Method in nano Fabrication. [3M] (C.O. No.3) [Knowledge]

Q.NO.4. List the Difference between SEM and TEM. [3M] (C.O. No.3) [Knowledge]

Part B [Thought Provoking Questions]

Answer both the Questions. Each question carries SIX marks. (2Qx6M=12M)

Q.NO.6. The chemical method (wet chemical method) for the synthesis of various nanostructures, especially metal oxide nanoparticles. In this method, the molecular precursor (usually metal alkoxide) is dissolved in water or alcohol and converted to gel by heating and stirring by hydrolysis/alcoholysis. With a neat sketch Explain the different process in syntheses of nano material (C.O.No.4) [Comprehension]

Q. NO.6 A scanning electron microscope (SEM) is a type of electron microscope that produces images of a sample by scanning the surface with a focused beam of electrons. The electrons interact with atoms in the sample, producing various signals that contain information about the surface topography and composition of the sample. In this aspect with a neat sketch explain Electron/Specimen Interaction's. [6M] (C.O.No.4) [Comprehension]

Part C [Problem Solving Questions]

Answer the Question. The question carries SIX marks. (1Qx6M=06M)

Q. NO. 7. Explain i) Stokes Lines ii) intensity iii) Antistoke Lines in Raman Spectroscopy [6M](C.O. No. 4) [Application]

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SCHOOL OF ENGINEERING

END TERM EXAMINATION

Winter Semester: 2021 – 22
Course Code: MEC 103
Course Name: Nanotechnology [OE-1]
Program & Sem: B.Tech & VI Sem

Date: 1st July 2022
Time: 09.30 AM to 12.30 PM
Max Marks: 100
Weightage: 50%

Instructions:

(i) Read the all questions carefully and answer accordingly.

(ii) Calculator is allowed during the exam.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries 5 marks. (6Qx 5M= 30M)

Q.NO.1 What is Nanotechnology? List and explain the applications of Nanotechnology.

(C.O. No.1) [Knowledge]

Q.NO.2. What are the differences between SEM and TEM? (C.O. No.1) [Knowledge]

Q.NO.3. What are the different classifications of Nano materials based on dimensions? Explain with suitable diagram. (C.O. No.2) [Knowledge]

Q.NO.4 With suitable diagram explain Scanning lithography process. (C.O. No.3) [Knowledge]

Q.NO.5 What are graphene? What are the applications of graphene? (C.O. No.4) [Knowledge]

Q. NO.6. What are Nano fluids? What are the different methods of preparation of Nano fluids?

(C.O. No.5) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries 10 marks. (4Qx10M=40M)

Q.NO.7 A type of lithography process which uses a hard master with a 3D nanostructure to mould another material, which assumes its reverse 3D structure to imprint. Identify the process and explain with suitable diagram. (C.O.No.3) [Comprehension]

Q. NO.8 Method that involves the breaking down of the bulk material into Nano sized structures or particles and this technique is extension of those that have been used for producing micron sized particles. Identify the method and explain with suitable diagram. (C.O.No.2) [Comprehension]

Q. NO.9 The Nanomaterial are class of materials which are extremely broad because it can include all the previous classes of materials, provided they are composed of a structural component at the nanoscale or they exhibit one of the **dimensions** at the nanoscale. With suitable examples and diagram list and explain different types of Nano materials based on the dimensions.
(C.O.No.3) [Comprehension]

Q. NO.10 Instrument that produces images of a sample by scanning the surface with a focused beam of electrons. The electrons interact with atoms in the sample, producing various signals that contain information about the surface topography and composition of the sample. Identify the instrument and explain with suitable diagram. (C.O.No.4) [Comprehension]

Part C [Problem Solving Questions]

Answer both the Questions. Each question carries 15 marks. (2Qx15M=30M)

Q. NO.11 One of the most fundamental difference between Nano materials and large scale materials is that Nano scale materials have an extraordinary ratio of surface area to volume. Write and explain surface to volume ratio equations for sphere, cylinder and cube. (C.O. No. 2) [Application]

Q. NO.12 Transmission Electron Microscopy (TEM) is a technique that uses an electron beam to image a nanoparticle sample, providing much higher resolution than is possible with light-based imaging techniques. With suitable diagram explain the principle and working of TEM.
(C.O. No. 4) [Application]