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**Presidency University**

**Bengaluru**

**SCHOOL OF ENGINEERING**

**MAKE-UP EXAMINATION JULY 2024**

**EVEN Semester**: 2023-24

**Course Code**: CHE 1006

**Course Name**: Introduction to Nanotechnology

**Program & Sem**: B.Tech II Sem

**Date**: 01 July 2024

**Time**: 1:30PM – 4:30 PM

**Max Marks**: 100

**Weightage**: 50%

**Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Use of Non-Programmable calculators is permitted*

**Part A [Memory Recall Questions]**

**Answer ANY TEN Questions. Each question carries TWO marks. (10Qx 2M= 20M)**

**Q.NO. 1** Mention the ratio that decides the efficiency of nanosubstances.

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

**Q.NO. 2.** Name any two basic properties pocessed by the nanoparticles **(C.O.No.1) [Knowledge]**

**Q.NO. 3.** Which is the force affecting all the atoms that make up the nanomaterial?

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

**Q.NO. 4.** Give reason why gravity becomes negligible in case of nanoparticles

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

**Q.NO. 5.** Name the Carbon based nanoparticle which is a cylindrical molecule that consist of rolled-up sheets of single-layer carbon atoms

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

**Q.NO. 6.** Define the top-down approach for the preparation of nanomaterial

**(C.O.No.2) [Knowledge]**

**Q.NO. 7.** Which property of nanomaterials make them suitable to be used in elimination of pollutants?

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

**Q.NO. 8.** Name the basis of Electrodeposition **(C.O.No.2) [Knowledge]**

**Q.NO. 9.** Mention the applications of Nanostructured Solar cells.  **(C.O.No.3) [Knowledge]**

A. solar cells B. composites C. catalysts D. None of the above

**Q.NO. 10** List the semiconductor nanoparticles which exhibit size and composition-dependent optical and electronic (optoelectronic) properties **(C.O.No.3) [Knowledge]**

**Q.NO. 11** Mention the types of nanomaterials that are ideal as thin-film photovoltaics because they absorb light across a wide range of wavelengths from the visible to the near-infrared and possess charge carriers **(C.O.No.3) [Knowledge]**

**Q.NO. 12** Name that nanomaterial that allows manufacturers to make clear conductive panels for displays that are extremely thin **(C.O.No.3) [Knowledge]**

**Part B [Thought Provoking Questions]**

**Answer ANY FIVE Questions. Each question carries TEN marks. (5Qx10M=50M)**

**Q.NO. 13.** Physical and chemical properties of the nanomaterials change significantly. Elaborate considering melting point and reactivity as example. **(C.O.No.1) [Comprehension]**

**Q.NO. 14.** Field Emission Scanning Electron Microscopy produces images of the surface of samples using a low energy electron beam thanks to a Field Emission Gun. Describe its principle, construction and applications **(C.O.No.2) [Comprehension]**

**Q.NO. 15.** A chemical reaction is carried out between precursor(s) in a solvent, in a closed system, at a temperature higher than the boiling temperature of this solvent and under high pressure. Name the process and explain the synthetic procedure in detail **(C.O.No.2) [Comprehension]**

**Q.NO. 16.** Explain in brief about photolithography **(C.O.No.2) [Comprehension]**

**Q.NO. 17.** Nanostructures can allow efficient solar cells to be made from cheaper, more conventional materials, like silicon and titanium dioxide. Explain the above statement **(C.O.No.3) [Comprehension]**

**Q.NO. 18.** Give a comparison between a conventional Li ion battery and the Li ion battery with a nanomaterial modification. Explain the advantages **(C.O.No.3) [Comprehension]**

**Q.NO. 19.** Nanocomposites are the solid combination of а bulk matrix and nаnodimensionаl phase(s) which differ in properties due to dissimilarities in structure and chemistry. Explain any two properties with its applications **(C.O.No.3) [Comprehension]**

**Part C [Problem Solving Questions]**

**Answer ANY TWO Questions. Question carries FIFTEEN marks. (2Qx15M=30M)**

**Q.NO. 20.** Explain the process that involves mills are equipped with grinding media composed of wolfram carbide or steel. List the different types of nanomaterials that can be synthesized using this process **(C.O.No.2) [Application]**

**Q.NO. 21.** Explain the role of nanotechnology in catalysis along with different types and its applications in various fields and the advantages **(C.O.No.3) [Application]**

**Q.NO. 22.** Medicinal applications of nanotechnology includes the repair, construction and control of human biological systems using devices built upon nanotechnology standards. Explain the statement with various examples **(C.O.No.3) [Application]**