



**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

MAKEUP EXAMINATION – JAN 2023

Course Code: CHE 1006

Course Name: Introduction to Nanotechnology

Program : B.Tech

Date: 25-JAN-2023

Time: 01:00PM – 04:00 PM

Max Marks: 100

Weightage: 50%

Instructions:

- (i) Read the all questions carefully and answer accordingly.
(ii) Use of Non-Programmable calculators is permitted

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries TWO marks. (15Qx 2M= 30M)

- What ratio decides the efficiency of nanosubstances? **(C.O.No.1) [Knowledge]**
A. Weight/ Volume B. Surface area / Volume C. Volume/ Weight D. Pressure/ Volume
- The properties possessed by the nanoparticles include **(C.O.No.1) [Knowledge]**
A. Small size B. High surface area C. Ease to suspend in liquids D. All the above
- "The bulk properties of any material are merely the average of all the _____ forces affecting all the atoms that make up the material"
A. vander waal's B. Bonding C. Quantum D. None of the above **(C.O.No.1) [Knowledge]**
- "Although particles measuring only a few nanometers in diameter lie far below the wavelength range of visible light (380 to 780 nm), they can _____ light of specific wavelengths"
A. Scatter B. Transmit C. Diffract D. Absorb **(C.O.No.1) [Knowledge]**
- " Because the mass of nanoscale objects is so small, _____ becomes negligible
A. Gravity B. force C. pressure D. Volume **(C.O.No.1) [Knowledge]**
- The Carbon based nanoparticle which is a cylindrical molecule that consist of rolled-up sheets of single-layer carbon atoms
A. Fullerene B. Bucky balls C. Graphene. D. Titanium dioxide **(C.O.No.1) [Knowledge]**
- _____ refers to the mechanical crushing of source material using a milling process
A. Pyrolysis B. Sol Gel C. Top-Down D. Bottom-up **(C.O.No.2) [Knowledge]**
- Which property of nanomaterials make them suitable to be used in elimination of pollutants
A. High purity B. Better thermal conductivity
C. Enhanced chemical reactivity D. Small size. **(C.O.No.1) [Knowledge]**

9. Electrodeposition is the application of _____ (C.O.No.2) [Knowledge]
 A. Galvanic cell B. Voltaic cell c. Electrolytic cell D. both A and B.
10. Electromagnetic force is a function of _____ and distance is not affected by mass (C.O.No.2) [Knowledge]
 A. Mass B Charge C. Volume D. None of the above
11. Nanostructured _____ could be cheaper to manufacture and easier to install, since they can use print-like manufacturing processes and can be made in flexible rolls rather than discrete panels (C.O.No.3) [Knowledge]
 A. solar cells B. composites C. catalysts D. None of the above
- 12 _____ are semiconductor nanoparticles which exhibit size and composition-dependent optical and electronic (optoelectronic) properties (C.O.No.3) [Knowledge]
 A. Nanospheres B. Fullerene C. Quantum dots D. All of the above
- 13 _____ 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]
 A. SWCNT B. Nanocomposites C. conducting polymers D. All of the above
- 14 _____ technologies are crucial in the energy, chemical process, and environmental industries, both now and in the future (C.O.No.3) [Knowledge]
 A. Catalysis B. Polymers C. Zeolites D. None of the above
- 15 _____ on a glass or plastic sheet allow manufacturers to make clear conductive panels for displays that are extremely thin (C.O.No.3) [Knowledge]
 A. Graphite B. nanomedicine C. nanocomposites D. CNT

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries EIGHT marks. (5Qx8M=40M)

16. Physical and chemical properties of the nanomaterials change significantly. Elaborate considering melting point and reactivity as example. (C.O.No.1) [Comprehension]
17. 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]
18. Explain in brief about photolithography (C.O.No.2) [Comprehension]
19. 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]
20. 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]

Part C [Problem Solving Questions]

Answer all the Questions. Question carries FIFTEEN marks.

(2Qx15M=30M)

21. 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]

22. 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]