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**Reg. No. :**

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**Question Paper Code: 99773**

B.E./B.Tech. DEGREE EXAMINATION, NOV 2022

Open Elective

Civil Engineering

19UME973 - SYNTHESIS OF NANOMATERIALS

(Common to CSE, ECE, EEE, IT, Chemical, AGRI, BME, CSBS & Biotechnology Engineering branches)

(Regulations 2019)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Question

PART A - (10 x 1 = 10 Marks)

- The size of nano particles is between \_\_\_\_\_ nm. CO1- U  
(a) 100 to 1000      (b) 0.1 to 10      (c) 1 to 100      (d) 0.01 to 1
- Solgel techniques is used to synthesis of CO1- U  
(a) Oxide nanoparticles      (b) CNT      (c) Polymer nanoparticle      (d) Carbon dot
- Which of the following does not combine with fiber to give composites? CO2- U  
(a) Metals      (b) Ceramics      (c) Non-metals      (d) Polymers
- Self assembled monolayer is a \_\_\_\_\_ process CO2- U  
(a) adsorption      (b) desorption      (c) absorption      (d) all the above
- A plasma is a hot ionized gas consisting of approximately CO3- U  
(a) Positive charges      (b) Negative charges  
(c) Equal amount of positive and negative charges      (d) None of these
- Sputtering process is only effective on CO3- U  
(a) Non conductive materials      (b) Conductive materials  
(c) Magnetic materials      (d) Crystalline materials

7. Which of the following techniques is commonly used in synthesis of zeolites? CO4 -U  
 (a) hydrothermal (b) impregnation (c) solid state reaction (d) precipitation
8. Which of the following methods can be used to produce nano-powders of oxides? CO4- U  
 (a) Plasma arching (b) Sol-gel technique  
 (c) Chemical vapour deposition (d) Mechanical crushing
9. The wavelength range of X-rays is \_\_\_\_\_ CO5- U  
 (a) 1 mm to 700 nm (b) 400 nm to 1 nm (c) 1 nm to 0.001 nm (d) 0.1 m to 1 mm
10. X-Rays are not used in \_\_\_\_\_ CO5- U  
 (a) Photographic film (b) Photocells  
 (c) Geiger tubes (d) Ionization Chamber

PART – B (5 x 2= 10Marks)

11. List out the method of synthesis of nanomaterial. CO1- U
12. Define hydrophilic. CO2 -U
13. List down the types of physical approaches CO3 -U
14. Mention few applications of Zeolites CO4 -U
15. List down the types of physical spectroscopy techniques. CO5 -U

PART – C (5 x 16= 80Marks)

16. (a) Explain bulk and nano composite materials with applications CO1 -U (16)  
 Or  
 (b) Explain Mechanical milling and alloying process with neat sketch CO1 -U (16)
17. (a) Explain the Biomimetic Approaches of polymer matrix isolation CO2- U (16)  
 Or  
 (b) Explain the Chemical Approach of self-assembly process CO2- U (16)
18. (a) Explain the Physical Approaches of Vapour deposition CO3- U (16)  
 Or  
 (b) Explain the pulsed laser deposition. CO3 -U (16)
19. (a) Explain about the formation of carbon nano tubes and list out its application? CO4 -U (16)

Or

- (b) Briefly explain about  
(i) mesoporous materials  
(ii) nanosponges with examples. CO4 -U (16)
20. (a) Explain the working principle of Scanning electron microscope with a neat sketch CO5- U (16)
- Or
- (b) Explain the Electron microscopy of TEM with a neat sketch CO5- U (16)

