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**Question Paper Code: U4303**

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2024

Professional Elective

Electronics and Communication Engineering

21ECV303- NANO ELECTRONICS

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Compare nano electronics and nanotechnology CO1-U
2. Lithium crystallizes in BCC structure. Calculate the lattice constant, given the atomic weight and density for Lithium are 6.94 gram and 530 Kg/m<sup>3</sup> respectively. CO2- App
3. The reflecting plane of lithium fluoride analyzing crystal has an interplanar distance of  $4A^0$ . Calculate the wavelength of 2<sup>nd</sup> order differential line which has a glance angle of 30. CO2- App
4. Differentiate Physical and Chemical vapour deposition. CO1-U
5. Write short notes on the Scanning electron microscopy CO1-U
6. Compare X-ray diffraction and Powder diffraction CO1-U
7. How nanotechnology is used in fuel cells? CO1-U
8. What do you mean by Carbon Clusters? How many carbon atoms are there in a bucky ball? CO1-U
9. What is the main advantage of ZnO nanoparticles that make them one of the preferred choices for drug nanocarriers? CO1-U
10. What is Bio nano Sensor? CO1-U

PART – B (5 x 16= 80 Marks)

11. (a) Apply the knowledge of the energy band structure of materials to classify the Nanomaterials with neat diagram. CO3- App (16)  
Or  
(b) Apply the knowledge of properties of crystal structure to differentiate various structures of Nanomaterials. CO3- App (16)
12. (a) Explain in detail about the Top down Approaches with Grinding and Injection molding method. CO1-U (16)  
Or  
(b) Explain the concept of photolithography techniques in the Nano materials to fabricate as a Nanofilm. CO1-U (16)
13. (a) Analyze some product form of nano material and explain in detail how it can be used in the development process of nano devices. CO4-Ana (16)  
Or  
(b) Explain how photoluminescence properties of nano materials are used in quantum dots. CO4-Ana (16)
14. (a) Explain the vibrational and mechanical properties of the CNT by applying scanning electron microscopy. CO1-U (16)  
Or  
(b) Explain about the CO1-U (16)  
(i) Carbon Clusters  
(ii) Alkali Doped C60  
(iii) Superconductivity in C60
15. (a) Illustrate the principle of Molecular and Supermolecular switches with suitable diagram and compare its results. CO1-U (16)  
Or  
(b) Explain the concept of nano-biosensors and smart dust. CO1-U (16)