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**Reg. No. :**

**Question Paper Code: 49046**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Seventh Semester

Electronics and Communication Engineering

14UEC921- NANO ELECTRONICS

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The size of nanoparticles is between \_\_\_\_\_ nm.

(a) 100 to 1000 (b) 0.1 to 10 (c) 1 to 100 (d) 0.01 to 1

2. The valley degeneracy for germanium is

(a) 6 (b) 4 (c) 8 (d) 10

3. Binding energy of Al atom is \_\_\_\_\_\_\_\_\_\_\_, when compare to bulk Al

(a) High (b) Equal (c) Low (d) Zero

4. In the below examples one is not a molecular cluster.

(a) (NH3)n+  (b) (CO2)44  (c) (C4H8)30 (d) (Cu2O)

5. Carbon atoms in diamond structure has following bonding network.

(a) 1D (b) 2D (c) 75 (d) Multidimensional

6. Kelly tyson equation used to predict the following parameter of CNT.

(a) Tensile strength (b) Raman spectra (c) Resistivity (d) Magnetic field

7. Which one is an inorganic nano crystals.

(a) CDS (b) Anthracene (c) Napthalene (d) C60

8. The basic building block of DNA is

(a) Phosphate (b) Nucleotide (c) Deoxyribose (d) Aminoacids

## 9. The efficiency of the solar cell is about (a) 25 % (b) 15 % (c) 40 % (d) 60%

10. The size of a quantum dot is \_\_\_\_ nm

(a) 5 (b) 10 (c) 50 (d) 100

PART - B (5 x 2 = 10 Marks)

11. Sketch the energy band structure of insulator, intrinsic semiconductor and conductor.

12. Distinguish between molecules, nanoparticles and bulk based on number of atoms.

13. Outline about the superconductivity in C60.

14. Give notes on conductive polymers.

15. What are the limitations of photonic band gap structures.

PART - C (5 x 16 = 80 Marks)

16. (a) Explain about crystal structure of solid state material and fermi Surfaces of

energy bands. (16)

Or

(b) Discuss about transmission electron microscopy. (16)

17. (a) Explain the theoretical modeling of nanoparticles. (16)

Or

(b) Explain in details about rare gas and molecular clusters. (16)

18. (a) Give short notes on the following:

(i) Nature of the carbon bond. (10)

(ii) New carbon structures. (6)

Or

(b) Explain in details about applications of nanotubes. (16)

19. (a) Illustrate the concepts of polymerization and size of polymers. (16)

Or

(b) Analyze the concepts of DNA double nanowire structure. (16)

20. (a) Explain the concept of deposition of thin film by CVD method. (16)

Or

(b) Write notes on quantum dots and organic solar cell. (16)