**H.T No**

**Regulations:**

**A17**



**Sreenidhi Institute of Science and Technology**

(An Autonomous Institution)

**Code No: 6H223 Date: 21-Jan-2020 (FN)**

**B.Tech I-Year II-Semester External Examination, Jan/Feb-2020 (Supplementary)**

**APPLIED PHYSICS - I(EEE,ECE & ECM)**

**Time: 3 Hours Max.Marks:75**

***Note: a****) No additional answer sheets will be provided.*

*b) All sub-parts of a question must be answered at one place only, otherwise it will not be valued.*

*c) Missing data can be assumed suitably.*

**Part - A Max.Marks:25**

**Answer all QUESTIONS.**

|  |  |  |
| --- | --- | --- |
| 1. | Define superconductivity and mention the types of superconductors. | [3M] |
| 2. | Mention the kinds of polarization. | [3M] |
| 3. | Define unit cell, coordination number and packing factor. | [3M] |
| 4. | What are direct and indirect bandgap semiconductors? | [3M] |
| 5. | Where do we use photo diodes? | [3M] |
| 6. | Name any two top-down fabrication techniques of nanomaterials. | [2M] |
| 7. | Give one example of hard and soft magnetic materials. | [2M] |
| 8. | Comment on the Fermi level in extrinsic semiconductor. | [2M] |
| 9. | What are CNT’s? | [2M] |
| 10. | Define magnetic susceptibility. Give its units. | [2M] |

**Part – B Max.Marks:50**

**ANSWER ANY FIVE QUESTIONS. EACH QUESTION CARRIES 10 MARKS.**

|  |  |  |  |
| --- | --- | --- | --- |
| 11. | a) | What is the effect of magnetic field on superconductivity? Superconductors are necessarily diamagnetic in nature? Explain. | [5M] |
|  | b) | The magnetic field intensity in a piece of ferric oxide is 106A/m. If the susceptibility of the material is 1.5×10-3, calculate magnetization of the material. | [5M] |
|  |  |  |  |
| 12. | a) | Derive the expression for electronic polarizability | [5M] |
|  | b) | What are Ferro electric materials? Give some applications. | [5M] |
|  |  |  |  |
| 13. | a) | Obtain the packing factor for simple cubic and BCC. | [5M] |
|  | b) | A unit cell has the dimensions a = b = c = 4.74A0 and α = β = γ = 600. What is the crystal structure. | [5M] |
|  |  |  |  |
| 14. | a) | State and explain Hall effect. | [5M] |
|  | b) | The Hall co-efficient of certain silicon specimen was found to be -7.35×10-5 m3C-1 from 100K to 400K.Calculate density of charge carrier. | [5M] |
|  |  |  |  |
| 15. | a) | Explain the working of PN junction diode in forward bias conditions. | [5M] |
|  | b) | What is the working principle of Solar cell | [5M] |
|  |  |  |  |
| 16. | a) | Explain why the properties of nanomaterials differ from that of the bulk materials. | [5M] |
|  | b) | Explain briefly the sol-gel method to prepare nano particles. | [5M] |
|  |  |  |  |
| 17. | a) | Show the hysteresis curve of ferro magnetic materials. | [3M] |
|  | b) | Obtain Clausius -Mossotti equation. | [3M] |
|  | c) | Draw the (101) plane in cubic lattice. | [4M] |
|  |  |  |  |
| 18. | a) | Write a brief note on Thermistor. | [3M] |
|  | b) | Give the working principle of LED. | [3M] |
|  | c) | Mention any two techniques used in characterization of nano materials. | [4M] |

**-- 00 -- 00 –**