**H.T No**

**Regulations:**

**A17**



**Sreenidhi Institute of Science and Technology**

(An Autonomous Institution)

**Code No: 6H222 Date: 21-Jan-2020 (FN)**

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

**ENGINEERING PHYSICS - II (CSE & IT)**

**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. | What do you mean by Bravais lattice? Name any four Bravais lattices. | [3M] |
| 2. | Why do X-rays, but not light rays, are used in crystal structure determination? | [3M] |
| 3. | What are intrinsic and extrinsic semiconductors? Give examples for each type | [3M] |
| 4. | What is a PN junction diode? Explain briefly with a diagram | [3M] |
| 5. | Explain Magnetic induction and field intensity. Find a relationship between them. | [3M] |
| 6. | Write down any two important applications of nanomaterials. | [2M] |
| 7. | Distinguish between Edge and Screw dislocations. | [2M] |
| 8. | What do you mean by superconductivity? | [2M] |
| 9. | Draw the crystal planes (001) and (021). | [2M] |
| 10. | How does a nanomaterial differ from a bulk material? | [2M] |

**Part – B Max.Marks:50**

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

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| 11. | a) | Define packing factor. Deduce packing factor for BCC, and FCC lattices. | [5M] |
|  | b) | Derive an expression for interplanar spacing for a cubic crystal. | [5M] |
|  |  |  |  |
| 12. | a) | What do you mean by point defects? Describe various types of such defects | [5M] |
|  | b) | What are X-rays? Derive an expression for Bragg’s diffraction condition | [5M] |
|  |  |  |  |
| 13. | a) | Derive expressions for electron and hole concentration of pure Si semiconductor. | [7M] |
|  | b) | For an intrinsic GaAs, electrical conductivity at room temperature is 10-6 Ω-1m-1. The electron and hole mobilities are 0.85 and 0.04 m2 V-1 s-1 respectively. Calculate the intrinsic carrier concentration | [3M] |
|  |  |  |  |
| 14. | a) | With a neat diagram explain IV characteristics of a PN junction. | [7M] |
|  | b) | Calculate the wavelength of the emitted light of an LED with an energy band of 2 eV. | [3M] |
|  |  |  |  |
| 15. | a) | Write a note on ferrimagnetic materials? Write down their applications.. | [6M] |
|  | b) | A magnetic field of 1800 Am-1 produces a magnetic flux of 3x10-5 Wb in a ferromagnet of cross section 0.2 cm2, calculate its permeability. | [4M] |
|  |  |  |  |
| 16. | a) | What is bottom-up synthesis of a nanomaterial? Explain in detail sol-gel synthesis. | [6M] |
|  | b) | Write down a short note on carbon nano tubes. | [4M] |
|  |  |  |  |
| 17. | a) | Write down the steps for finding crystal planes using miller indices | [3M] |
|  | b) | Describe Burger’s vector. | [3M] |
|  | c) | What are direct and indirect band gap semiconductors? Give example for each. | [4M] |
|  |  |  |  |
| 18. | a) | Describe type-I and type-II superconductors | [3M] |
|  | b) | Explain principle and working of a LED. | [3M] |
|  | c) | Explain how do surface and volume affect different properties in a nanomaterial? | [4M] |

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