

**M.Sc. IV Semester Degree Examination, Sept./Oct. - 2024****PHYSICS****Semiconductor Physics****(NEP)**

Time : 3 Hours

Maximum Marks : 70

Note : Answer **any five** of the following questions with **Question No.1 (Q1) Compulsory**, each question carries **equal** marks.

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| 1. | (a) | Explain the band structure of silicon. | 6 |
| | (b) | Obtain the expression for density of electrons in conduction band assuming the width of bands is comparable to forbidden gap. | 8 |
| 2. | (a) | Explain the impurity and exciton absorption in semiconductors. | 8 |
| | (b) | What is Hall effect ? Explain the experimental determination of Hall coefficient. | 6 |
| 3. | (a) | Describe the band structure GaAs semiconductor. | 7 |
| | (b) | Explain the electronic conduction in amorphous semiconductors. | 7 |
| 4. | (a) | Describe the working principle of semiconductor laser. | 7 |
| | (b) | Discuss the working principle of junction transistor. | 7 |
| 5. | (a) | Explain the general properties of heterojunctions. | 7 |
| | (b) | Explain the growth of heterostructures by molecular beam epitaxy method. | 7 |
| 6. | (a) | What is luminescence ? Explain different types of luminescence. | 7 |
| | (b) | Discuss the classification of amorphous semiconductors. | 7 |
| 7. | (a) | Explain the working principle of semiconductor lamp. | 8 |
| | (b) | Describe the tunnel barrier and quantum well with schematic. | 6 |
| 8. | (a) | Differentiate between interband and intraband transitions. | 5 |
| | (b) | Write a note on switching mechanism in amorphous semiconductors. | 5 |
| | (c) | Write a note on super lattice. | 4 |

