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**GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
(GIET UNIVERSITY)**

Ph.D. (First Semester) Examinations, December – 2024

**23SPPEPH1011 -Advanced Experimental Techniques for Materials
(Physics)**



Time: 3 hrs

Maximum: 70 Marks

The figures in the right hand margin indicate marks.

Answer ANY FIVE Questions.

(14 x 5 = 70 Marks) Marks

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| 1.a. | Discuss kinetic molecular theory and find the expression of velocity. | 8 |
| b. | Discuss energy distribution in solids. | 6 |
| 2. | What are different types of crystal defects? Discuss with diagrams. | 14 |
| 3.a. | Mention different types of bonding in solids. | 7 |
| b. | What are Piezoelectricity, Ferro electricity, and Pyro-electricity? Mention examples and their applications | 7 |
| 4. | Discuss properties of dielectric materials and applications.
What are Piezoelectricity, Ferro electricity, and Pyro-electricity? | 14 |
| 5.a. | Write short notes on dielectric strength and insulation breakdown. | 7 |
| b. | What is Spectroscopy? Discuss light absorption phenomena in different materials. | 7 |
| 6.a. | Compare between Phosphorescence and Luminescence with examples. | 7 |
| b. | Define atomic emission spectroscopy with diagram. | 7 |
| 7. | Write short notes on (i) UV-vis-NIR absorption spectroscopy and (ii) Raman spectroscopy. | 14 |
| 8.a. | What is the basic difference between STM and SEM? | 7 |
| b. | What is the principle of STM? Discuss its working and application. | 7 |

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