 **D.Y. PATIL COLLEGE OF ENGINEERING & TECHNOLOGY**

**Set-III**

**Q. Paper Code:**

**23FY102102**

**KASABA BAWADA KOLHAPUR-416006**

**(An Autonomous Institute)**

F. Y. B. Tech, Sem-I

**END SEMESTER EXAMINATION, March - 2023**

**Course Name: Applied Physics, Course Code: 221FYL102**

Seat No:

**Day and Date: Friday, 03.03.2023**

**Time: 10.00 am to 12.00 pm Max. Marks- 50**

***Instructions:***

1. Figure to the right indicate **full marks**.
2. **Assume standard data**, whenever necessary
3. Use of **non-programmable** calculator isallowed
4. **Given**: - Charge on electron (e)= 1.6 x 10-19 C, Mass of proton= 1.67 x10-27 Kg

| **BT** | **CO’s** | **Q. No.** | **Statement of Question** | **Marks** |
| --- | --- | --- | --- | --- |
|  |  | **Q.1** | **Attempt the following questions. (20 Marks)** |  |
| L2 | 103.1 | **a** | Derive an Expression for resolving Power Plane transmission grating | 6 |
| L2 | 103.2 | **b** | Derive a differential equation for Damped Harmonic Oscillator and also find solution for it. | 7 |
| L3 | 103.3 | **c** | Define hall effect. Find the hall coefficient when semiconductor wafer is placed in transverse magnetic field | 7 |
|  |  | **Q.2** | **Attempt the following questions.** (10 Marks) |  |
| L2 | 103.3 | **a** | Derive an expression for de Broglie matter waves and express it in two different forms.  **OR**  Derive an equation for Schrodinger time in dependent wave equation. | 6 |
| L3 | 103.3 | **b** | Calculate the energy difference between the ground state and the first exited state for an electron in one dimensional box of length 10-8 cm (Mass of electron = 9.1 x10-31 kg and h = 6.63 x 10-34Js) | 4 |
|  |  | **Q.3** | **Attempt the following questions. (10 Marks)** |  |
| L2 | 103.4 | **a** | Discuss the construction and working of Ruby LASER with neat labelled energy level diagram  **OR**  Explain the construction and working of He-Ne gas LASER with neat labelled energy level diagram | 6 |
| L2 | 103.4 | **b** | Discuss various applications of LASER in detail. | 4 |
|  |  | **Q.4** | **Attempt following questions (10 Marks)** |  |
| L2 | 103.4 | **a** | Describe the Colloidal method used for the preparation of nanoparticles. | 6 |
| L1, L2 | 103.4 | **b** | Discuss the various applications of nanomaterials in science and technology  **OR**  Discuss in brief, the properties of nanomaterials. | 4 |

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