

**BE-201 (GS)**  
**B.E. I & II Semester Examination, June 2020**  
**Grading System (GS)**  
**Engineering Physics**  
*Time : Three Hours*

**Maximum Marks : 70**

- Note:** i) Answer any five questions.  
ii) All questions carry equal marks.

1. Find out the relationship between group velocity ( $v_g$ ) and wave velocity ( $v_p$ ).
2. State Heisenberg's Uncertainty Principle. Prove that  $\Delta x \cdot \Delta p \geq \frac{\hbar}{2}$ .

OR

Derive energy Eigen values and wave function for a particle trapped in a one dimensional square potential well.

3. Write a note on:
  - a) Michelson's interferometer.
  - b) Newton's rings.
4. Write the construction and working of He-Ne laser with diagram.
5. Explain in detail the following process.
  - a) Spontaneous and stimulated Emission.
  - b) Population inversion.

OR

Obtain energy level expression for particle trapped in infinitely deep square well potential.

6. Derive an expression for time independent Schrodinger wave equation to particle trap in a one dimensional square potential well.

OR

What is double refraction? Explain principle, construction and working of Nicol prism.

7. What is a carbon-dioxide ( $\text{CO}_2$ ) laser? Explain its setup along with vibrational modes of  $\text{CO}_2$  molecule.

OR

Describe five applications of Laser in our daily life.

8. Write short note (any two)
  - a) Brewster's law
  - b) Diffraction
  - c) Einstein's A and B Co-efficients
  - d) Semi-Empirical Mass

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