Paper Code: OE-043/EOE-033 **Roll No.** | | | | | | | | | | |

B.Tech
(SEM IV) EVEN SEMESTER EXAMINATIONS, 2015-16
LASER SYSTEMS & APPLICATIONS

[Time: 3 hours] **[Max. Marks: 100]**

Note: - Attempt all questions. All questions carry equal marks.

1. Answer any two parts of the following:- **[10x2=20]**

   (a) What are De-broglie waves? How do they help in the interpretation of Bohr's quantization rule?
   (b) Develop the time-independent Schrodinger wave equation. What are the conditions that must be satisfied by the solution of the above wave equation.
   (c) Calculate the kinetic energy needed by an electron to be confined in hydrogen atom of radius .5 A^0.

2. Answer any two parts of the following:- **[10x2=20]**

   (a) What are Einstein's coefficients A and B? Derive Einstein's relation between them.
   (b) Define the gain of a laser. Calculate the population ratio of two states in He-Ne laser that produces light of wavelength 6000 A^0.
   (c) Explain different types of optical resonators. What role does it play in laser?

3. Answer any two parts of the following:- **[10x2=20]**

   (a) Explain the various principles used in describing laser action.
   (b) Describe the principle and working of CW laser. Give an example of He-Ne laser.
   (c) What are different methods by which Q-switch can be incorporated in a laser?

4. Answer any two parts of the following:- **[10x2=20]**

   (a) What are Neodymium laser? Explain construction and working of Nd-YAG laser.
   (b) What are Excimer laser? Describe its properties and applications.
   (c) Describe short pulse generation and measurements giving one example of a practical device.

5. Answer any two parts of the following:- **[10x2=20]**

   (a) Explain the laser application in medicine and surgery? Discuss laser in ophthalmology.
   (b) What is LIDAR technology? How it is different from a microwave RADAR.
   (c) What is Holography? How laser is important in construction and reconstruction of image.