Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JUN 2023

Semester : Semester VI - 2020
Course Code : ECE3022
Course Name : Sem VI - ECE3022 - Fundamentals of Photonics
Program : ECI&ECM

Date : 12-JUN-2023
Time : 9.30AM - 12.30PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **(5 X 2 = 10M)**

1. Differentiate between thermal and photon devices.

(CO3) [Knowledge]

2. Define modulation and its need.

(CO4) [Knowledge]

3. List out the requirements for the performance of the photo detector.

(CO3) [Knowledge]

4. State Keer effect.

(CO4) [Knowledge]

5. Compare coherent and non-coherent sources of light in interference.

(CO1) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **(2 X 15 = 30M)**

6. Explain the equation in quantum mechanics which allows to find the wave function for a given situation and describe its time independent equation.

(CO1) [Comprehension]

7. Find out the optoelectronic semiconductor device that works on the Electro-luminance principle and explain its principle, working, characteristics, and applications in detail.

(CO2) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS **(3 X 20 = 60M)**

8. (a) Illustrate the working principle of the linear electro-optic modulator along with QCSE with relevant diagram and expression.

(b) In telecommunications, fiber optic technology has virtually replaced copper wire in long-distance telephone lines, and it is used to link computers within local area networks. Explain the block diagram of the optical fiber communication system in detail.

(CO4) [Application]

9. (a) Draw the circuit diagram of the MQW-HBT threshold gate and explain the tunable operation along with its output characteristics.

(b) Explain the concept of optical crossbar switches along with the operational parameters of switching devices.

(CO4) [Application]

10. (a) The heating of one junction between two dissimilar metals causes current to flow which is proportional to the temperature difference between the junctions. With this effect explain the concept of thermoelectric effect in detail.

(b) Explain the concept that converts light energy to electricity along with different configurations.

(CO3) [Application]