

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
 Seventh Semester B.Tech Degree Supplementary Examination August 2021

**Course Code: EC469****Course Name: OPTO ELECTRONIC DEVICES**

Max. Marks: 100

Duration: 3 Hours

PART A*Answer any two full questions, each carries 15 marks.*

Marks

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| 1 | a) | Explain Auger recombination in semiconductors with necessary diagram. | (7) |
| | b) | Draw the structure of Distributed Bragg Reflector laser and explain its working. | (8) |
| 2 | a) | Calculate the radiative life time τ_r in GaAs with the coefficient of band to band recombination $B_r = 8 \times 10^{-10} \text{ cm}^3/\text{s}$ and carrier concentration $n_i = 2 \times 10^{18} \text{ cm}^{-3}$ under low-level injection. | (7) |
| | b) | Derive the expression for threshold condition for lasing. | (8) |
| 3 | a) | Explain Franz-Keldysh effect. | (7) |
| | b) | If the wavelength of separation between different modes of a laser is 20nm in a medium with refractive index $n_r = 4$, calculate the length of the laser cavity. | (8) |

PART B*Answer any two full questions, each carries 15 marks.*

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| 4 | a) | Explain the structure and working of InGaN/GaN light emitting diode. | (8) |
| | b) | Explain Raman-Nath modulator with suitable diagram. | (7) |
| 5 | a) | Describe the generation of white light by trichromatic sources and explain its temperature dependence. | (7) |
| | b) | Distinguish between Kerr and Pockels effect. | (8) |
| 6 | a) | Describe the white light sources based on wavelength converters with an example. | (7) |
| | b) | Explain the structure and working of Self-Electro-Optic Effect Device (SEED) for optical switching. | (8) |

PART C*Answer any two full questions, each carries 20 marks.*

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| 7 | a) | Compare the structure and working of Schottky Barrier Photodiode and modulated barrier photodiode. | (10) |
| | b) | Distinguish between Y and STAR optical directional couplers. | (10) |

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- 8 a) Explain the construction and working of liquid crystal display (LCD). Name any two applications of LCD. (10)
- b) What are optical bistable devices? Explain the working of any two optical bistable device with diagrams. (10)
- 9 a) Explain the working and applications of polymer LED. What are its advantages and disadvantages? (10)
- b) Explain any three different types of tunable optical filters. (10)
