VIT
Vellore Institute of Technology

Continuous Assessment Test – I

B. Tech & ECE

Optoelectronics & ECE1007

Class Number: VL2019201001526 Slot: C1+TC1 Exam Duration: 90 Minutes Maximum Marks:50

General instruction(s):

Explain every question with proper diagram and required equations while responding to questions.

Answer all the questions

Section – A			
S.No.	Question	Marks	CO
1.(a)	Compare and contrast between coaxial cable and fiber-optic cable based on different parameters. (a) Frequency Range (b) Typical Attenuation (c) Structure (d) Repeater Spacing and (e) Bandwidth	5	CO_01
1.(b)	Discuss direct band gap and indirect semiconductors with example.	5	CO_01
2.(a)	A particular $Ga_{1-x}Al_xAs$ laser is constructed with material ratio of x=0.08 having empirical equation E_g=1.424+1.266x+0.266x^2 eV, estimate the (i) the band gap of the material and (ii) the peak emission wavelength	5	CO_01
2 (b)	Explain band to band recombination with example? Calculate τ_r in GaAs having $n_0 = 10^{14} cm$ under high and low level injection for $B_r = 7x10^{-10} cm^3/s$. Assume $\Delta n=10^{-18} cm^3$ for high level injection.	5	CO_02
3.	Discuss with diagram about the photon assisted tunneling process. Explain the electric field dependent absorption coefficients with its parameters.	10	CO_02
4.	Explain about the nonradiative recombination process with respect to electron trap and hole trap with a neat diagram . Derive the suitable equation for getting higher quantum efficiency with its parameters.	10	CO_02
5	Illustrate how third electron are generated with a diagram and also explain how Radiative efficiency is degraded due to electron/photon interaction.	10	CO_03