Code No: **R1641044** **R16** **Set No. 1**

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

OPTICAL COMMUNICATIONS

(Electronics & Communication Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B

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PART–A *(14 Marks)*

1. a) Listout the components required to design an optical Communication system? [2]
   b) If OF cable offers the attenuation loss is $2dbkm^{-1}$,and the overall length is 10km Splices loss per km is 1 dB. Calculate the overall signal attenuation? [3]
   c) List out the types of mis-alignment when joining optical fibers? [2]
   d) Discuss the major advantages with LED as a source in optical Fibre communication? [3]
   e) Define thermal noise? How can it suppress? [2]
   f) List out the basic Parameters of WDM? [2]

PART–B *(4x14 = 56 Marks)*

2. a) Write a short notes on effective refractive index? [7]
   b) A silica optical fiber with a core diameter large enough to be considered by ray Theory analysis has a core refractive index of 1.50 and a cladding Refractive index of 1.47 Determine (i)The critical angle at the core-cladding interface (ii)The NA for the fiber (iii)the acceptance angle in air for the fiber [7]

3. a) Explain the properties of a Halide and Active glass materials? [7]
   b) Explain about material absorption in silica glass fiber? [7]

4. a) Explain the working of Expanded beam connectors? [7]
   b) A Graded index fiber has parabolic refractive index profile (α=1.5) and core Diameter of 100µm. Estimate the insertion loss due to a 5µm lateral misalignment at a fiber joint when there is index matching and assuming there is uniform illumination of all guided modes only [7]

5. a) Explain the external quantum efficiency in laser diode? [7]
   b) Explain the modulation of an LED system? [7]

6. a) Explain the working principle of receiver configuration? [7]
   b) Explain the function of digital signal transmission? [7]

7. Explain about i)Link power budget ii)Attenuation measurement [14]