

**R16**

Code No: 138DY

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year II Semester Examinations, December - 2020**

**OPTICAL COMMUNICATIONS**  
(Electronics and Communication Engineering)

**Max.Marks:75**

**Time: 2 Hours**

**Answer any Five Questions**  
**All Questions Carry Equal Marks**

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1. Explain the following terms with respect to optical fiber:  
a) Numerical Aperture  
b) Refractive index  
c) Acceptance angle  
d) Critical angle  
e) Snell's law. [3+3+3+3+3]
- 2.a) Draw the schematic of conventional silica fiber structure and explain it. [7+8]  
b) What are the different modes of fiber and explain them with neat diagrams.
- 3.a) Explain signal loss or attenuation mechanism in optical fiber.  
b) A 50km optical fiber has an attenuation of 0.25dB/km at 1550nm. If 100μW of optical power launched into the power, show that the emerging power at the fiber output is 0.56μW. [9+6]
- 4.a) What are the different types of optical fiber connectors? Explain their functions. [8+7]  
b) How pulse is spread due to group delay in optical fiber?
- 5.a) Explain the V-groove splicing of optical fiber with neat diagram. [9+6]  
b) Why losses occur at joints of optical fiber? How to avoid them?
- 6.a) Draw the structure of surface emitting LED and explain its working. [8+7]  
b) Derive the Laser diode rate equation and explain its different modes of operation.
- 7.a) Draw the structure of APD and explain its operation. [8+7]  
b) What are the different performance parameters of digital receiver? Explain them.
- 8.a) Draw point to point optical link and explain function of each block. [8+7]  
b) What is WDM? How it is used in single mode optical fiber communication?

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