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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Fifth Semester, B.E. - Electronics and Communication Engineering
Semester End Examination; Feb. - 2021
Optical Communication Systems and Networks

Time: 3 hrs   *Max. Marks: 100*

Course Outcomes

The Students will be able to:

CO1: Apply the knowledge of physics to explain basic optical laws, various optoelectronic devices and its structures.

CO2: Analyze the causes for different losses in an optical communication link.

CO3: Develop a solution for optical communication systems for specified characteristics.

CO4: Examine the methods to improve coupling efficiency and signal to noise ratio of the communication system.

CO5: To Enrich the knowledge about optical communication systems and networks.

<u>*Note:*</u> *I) PART - A is compulsory. **Two** marks for each question.*

*II) PART - B: Answer any <u>**Two**</u> sub questions (from a, b, c) for Maximum of **18 marks** from each unit.*

Q. No.	Questions	Marks	BLs	COs	POs
	I : PART - A	**10**			
I a.	RI of core is 1.48, RI of cladding is 1.46. Calculate; i) Critical angle ii) Acceptance angle	2	L1	CO1	PO1
b.	An optical source with RI of 3.6 is coupled to an optical fiber that has RI of 1.48. Calculate the reflection loss.	2	L1	CO3	PO2
c.	List the advantages of trans-impedance amplifier.	2	L1	CO1	PO1
d.	What is the function of ; i) Local Exchange Carrier (LEC)? ii) Inter Exchange Carrier (IXC)?	2	L1	CO5	PO2
e.	Draw the block diagram of optical line terminal.	2	L1	CO5	PO2
	II : PART - B	**90**			
	UNIT - I	**18**			
1 a.	Derive an expression for numerical aperture of a step index fiber by using Snell's law.	9	L3	CO3	PO3
b.	With a neat diagram, explain fiber-drawing apparatus for preparing fibers.	9	L2	CO1	PO1
c.	Explain different mechanisms which cause absorption losses in optical fibers.	9	L2	CO2	PO2
	UNIT - II	**18**			
2 a.	Describe the fiber splicing techniques with relevant diagrams.	9	L2	CO1	PO1
b.	With a neat block diagram, explain simplex point-to-point link.	9	L2	CO1	PO1
c.	With a neat diagram, explain the working of reach through photodiode structure.	9	L2	CO1	PO1

UNIT - III	**18**			
3 a. Explain the configuration of an eye diagram showing all key performance parameters.	9	L2	CO4	PO1
b. With a neat diagram, explain signal path through an optical data link.	9	L2	CO1	PO1
c. Discuss the following with neat diagram: i) Subcarrier multiplexing ii) RF over fiber	9	L2	CO1	PO1
UNIT - IV	**18**			
4 a. Discuss the optical layers in optical networks by showing its classical layered hierarchy.	9	L3	CO5	PO2
b. Explain circuit switched and packet switched network with relevant multiplexing types used in both the cases.	9	L3	CO5	PO2
c. Write a note on; i) Simulated emission ii) Spontaneous emission	9	L1	CO1	PO1
UNIT - V	**18**			
5 a. Explain two types of frame structures used in SONET.	9	L2	CO5	PO2
b. With a neat diagram, explain different types of OADM architectures.	9	L2	CO5	PO2
c. Briefly discuss the network management functions by showing overview of network management in optical network.	9	L3	CO5	PO2

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