

Model Question Paper-1/2 with effect from 2021(CBCS Scheme)

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7th Semester B.E. Degree Examination OPTICAL AND WIRELESS COMMUNICATION

TIME: 03 Hours

Max. Marks: 100

- Note: 01. 02. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.
03.
04.

Module -1			*Bloom's Taxonomy Level	COs	Marks
Q.01	a	Explain with necessary diagram the different type of fiber structure.	L2	1	6
	b	In a step index fiber if refractive index of core is 1.4 with Numerical aperture (NA) is 1.3, $v=65$, operating at 750nm. Calculate core size and cladding index.	L3	1	6
	c	What are the advantages, disadvantages and applications of optical fiber as compared to copper cable.	L1	1	8
OR					
Q.02	a	Explain Intermodal dispersion for multimode step index fiber	L2	1	6
	b	Explain the three different mechanism that causes absorption of optical energy in optical fiber	L2	1	8
	c	A continuous 12km long optical fiber link has a loss of 1.5 dB/km, What is the minimum optical power level that must be launch into the fiber to maintain as optical power level of $0.3\mu\text{w}$ at the receiving end, and what is the required input power if the fiber has a loss of 2.5 dB/km.	L3	1	6
Module-2					
Q. 03	a	An LED operating at 850nm has a spectral width of 45nm. What is the pulse spreading in ns/km due to material dispersion.	L3	2	6
	b	With a neat diagram, explain the working of an edge emitting LED. Also mention its special features and usage.	L2	2	8
	c	Explain the operation of DFB and DBR LASER	L2	2	6
OR					
Q.04	a	Write a shot note on Avalanche photodiode.	L2	2	6
	b	With the schematic representation and energy band diagram. Explain the working of the PIN photodiode.	L2	2	8
	c	A given APD has the quantum efficiency of 65% at wavelength of 900nm. If $0.5\mu\text{watt}$ of optical power produced a multiplied photo current of $10\mu\text{A}$. Find the multiplication factor of M	L3	2	6
Module-3					
Q. 05	a	Explain the evolution of wireless network	L2	3	6
	b	What are the different basic propagation mechanism used in wireless communication.Explain them briefly.	L2	3	6
	c	Define fading. Explain different types of fading in mobile radio channel.	L2	3	8
OR					
Q. 06	a	Explain cell structure in case of wireless communication. Which type of shapes are most preferred in cell structure and why?	L2	3	6
	b	Explain Frequency reuse in detail.	L2	3	6

	c	A geographical service area of a cellular system is 4200km ² . A total of 1001 radio channels are available for handling traffic for the area of a cell is 12km ² a) How many times would the cluster of size 7 have to be replicated in order to cover the entire service area? Calculate the number of channel per cell and the system capacity. b) If the cluster size is reduced from 7 to 4 , then dose it result into increase in system capacity	L3	3	8
Module-4					
Q. 07	a	What do mean by multiple access. State the different types of multiple access scheme.	L1	4	6
	b	Explain FDMA with neat diagram	L2	4	6
	c	Discuss TDMA systems. Mention some salient features of TDMA	L2	4	8
OR					
Q. 08	a	Mention and Explain different components of cellular PSTN Network	L2	4	10
	b	Explain the operation of cellular communication system	L2	4	10
Module-5					
Q. 09	a	Explain GSM architecture in detail. Mention some salient features of GSM.	L2	5	6
	b	Discuss GSM signaling protocol in details.	L2	5	6
	c	Define physical and logical channel. Explain different channel used in GSM.	L2	5	8
OR					
Q. 10	a	Define Handoff. Discuss different types of handoff in GSM	L2	5	6
	b	Explain GSM frame structure with neat diagram	L2	5	6
	c	What are the different services and features offered by GSM	L2	5	8

*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.

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Module -1			*Bloom's Taxonomy Level	COs	Marks
Q.01	a	Explain with necessary diagram the different type of fiber structure.	L2	CO 1– PO1,2,3	6
	b	In a step index fiber if refractive index of core is 1.4 with Numerical aperture (NA) is 1.3, $v=65$, operating at 750nm. Calculate core size and cladding index.	L3	CO 1– PO1,2,3	6
	c	What are the advantages, disadvantages and applications of optical fiber as compared to copper cable.	L1	CO 1– PO1,2,3	8
OR					
Q.02	a	Explain Intermodal dispersion for multimode step index fiber.	L2	CO 1– PO1,2,3	6
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	c	A continuous 12km long optical fiber link has a loss of 1.5 dB/km, What is the minimum optical power level that must be launch into the fiber to maintain as optical power level of $0.3\mu\text{w}$ at the receiving end, and what is the required input power if the fiber has a loss of 2.5 dB/km.	L3	CO 1– PO1,2,3	6
Module-2					
Q. 03	a	An LED operating at 850nm has a spectral width of 45nm. What is the pulse spreading in ns/km due to material dispersion.	L3	CO 2– PO1,2,3	6
	b	With a neat diagram, explain the working of an edge emitting LED. Also mention its special features and usage.	L2	CO 2– PO1,2,3	8
	c	Explain the operation of DFB and DBR LASER.	L2	CO 2– PO1,2,3	6
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Module-3					
Q. 05	a	Explain the evolution of wireless network	L2	CO 3– PO1,2,3	6
	b	What are the different basic propagation mechanism used in wireless	L2	CO 3–	6

		communication. Explain them briefly.		PO1,2,3	
	c	Define fading. Explain different types of fading in mobile radio channel.	L2	CO 3– PO1,2,3	8
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	b	Explain Frequency reuse in detail.	L2	CO 3– PO1,2,3	6
	c	A geographical service area of a cellular system is 4200km ² . A total of 1001 radio channels are available for handling traffic for the area of a cell is 12km ² a) How many times would the cluster of size 7 have to be replicated in order to cover the entire service area? Calculate the number of channel per cell and the system capacity. b) If the cluster size is reduced from 7 to 4 , then dose it result into increase in system capacity.	L3	CO 3– PO1,2,3	8
Module-4					
Q. 07	a	What do mean by multiple access. State the different types of multiple access scheme.	L1	CO 4– PO1,2,3	6
	b	Explain FDMA with neat diagram.	L2	CO 4– PO1,2,3	6
	c	Discuss TDMA systems. Mention some salient features of TDMA.	L2	CO 4– PO1,2,3	8
OR					
Q. 08	a	Mention and Explain different components of cellular PSTN Network.	L2	CO 4– PO1,2,3	10
	b	Explain the operation of cellular communication system.	L2	CO 4– PO1,2,3	10
Module-5					
Q. 09	a	Explain GSM architecture in detail. Mention some salient features of GSM.	L2	CO 5– PO1,2,3	6
	b	Discuss GSM signaling protocol in details.	L2	CO 5– PO1,2,3	6
	c	Define physical and logical channel. Explain different channel used in GSM.	L2	CO 5– PO1,2,3	8
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Q. 10	a	Define Handoff. Discuss different types of handoff in GSM.	L2	CO 5– PO1,2,3	6
	b	Explain GSM frame structure with neat diagram.	L2	CO 5– PO1,2,3	6
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