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DAYANANDA SAGAR COLLEGE OF ENGINEERING

(An Autonomous Institute Affiliated to VTU, Belagavi)

ShavigeMalleshwara Hills, Kumaraswamy Layout, Bengaluru-560078

Department of Telecommunication Engineering

Internal Assessment Test – CIE-2-ONLINE

Course: Optical communication and Networks — Maximum marks: **50**

Course Code**:** 17TE7GCOCN — Duration :90 min

Semester: VII SEM A &B — Date:9/11/2020

	Note: Maximum of 4 sub questions are allowed.	Marks
1	a) Which are the two main sources of noise in photodiodes without internal gain? (i) Gaussian noise and Quantum noise. [ii) Internal noise and external noise (iii) Dark current noise & Quantum noise (iv) Gaussian noise and dark current noise b) In a 100ns pulse, 6 X10^6 photons at a wavelength of 1300nm fall on an InGaAs Photodetectors. On the average, 5.4 X10^6 electron hole pairs are generated. The quantum-efficiency is (i) 70% (ii) 90% (iii) 80% (iv) None of the above c) If 10 μW of optical power incidents on the protector and what is photo current generated if the Responsivity is 0.65 A/W (i) 9.6μA (ii) 6.5 μA (iii) 9.3mA (iv)None of the above. d) The Shot noise current in Photodetector noise sources is (i) $2qI_LBe$ (ii) $2qIpBeM^2$ F(M) iii) $2qI_DBeM^2$ F(M) (iv) None of the above. e) If a 0.5μw of optical power produces a multiplied photocurrent of 10 μA and primary photocurrent is Ip is 0.235μA the Multiplication M for all carriers generated in the photodiode is given by (i) 63 (ii) 43 (iii) 83 (iv) None of the above f) The noise resulting from the random intensity fluctuations is called (i) Shot noise in photodector (ii) Thermal noise (iii) Amplifier noise (iv) RIN g) The following noise sources at the optical detector is given by (i)Shot noise (ii) Thermal noise (iii) both (i) & (ii) iv) RIN h) Which method determines the dispersion limitation of an optical link? (i) Link power budget [ii). Rise time budget [iii). Both i) and ii] iv. None of the above. i) If the transmitter rise time (t_{tr}) is 15ns, modal dispersion rise time (t_{mod})of the fiber is 21ns, group velocity dispersion(t_{GVD}) rise time is 3.9ns and receiver rise time (t_{rx}) the total system rise time is given by …….. (i) 50ns (ii) 30ns (iii) 90ns (iv) none of the above. j) Which feature of an eye-diagram assists in the measurement of additive noise in the signal? (i) Eye opening (height, peak to peak) [ii) Eye overshoot/undershoot (iii) Eye width [iv] None of the above	10 M
2	Describe briefly signal to noise ratio at the output of an optical receiver with expressions and describe the different types of noise sources in the case of Photodetectors with	10

	expressions. Write its equivalent circuit and a simple model of Photodetector receiver.	
3	Describe the signal path through an optical digital signal transmission with diagrams and basic sections of an optical receiver.	10
4	Describe briefly the Eye diagram showing the key performance parameters and fundamental measurement parameters with diagrams.	10
	(OR)	
5	Describe the Basic elements of an analog link and the Major noise contributors at each stage with diagrams.	10
6	i) Discuss the operation of Multichannel amplitude modulation standard technique for frequency division multiplexing of N independent information bearing signals. ii) With Relevant diagram discuss the subcarrier multiplexing.	10
	(OR)	
7	Discuss with equations Rise time budget. Derive an expression for total rise or total system rise time.	10

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