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Reg. No. : | | | | | | | | | | |

Question Paper Code: 97402

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Seventh Semester

Electronics and Communication Engineering

19UEC702 - OPTICAL COMMUNICATION AND NETWORKS

(Regulation 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. In an optical fiber, the inner core is _____ the cladding. CO1- U

   (a) Denser than (b) less dense than (c) The same density (d) medium thin

2. In the fiber optic link, power transfer from one fiber to another and from fiber to detector must take place with _____coupling efficiency. CO1- U

   (a) maximum (b) stable (c)minimum (d) unpredictable

3. Magnetron is an _____ CO2- U

   (a) Amplifier (b) Oscillator

   (c) Phase shifter (d) Both phase shifter & amplifier

4. For the capacitors used in MMICs, the insulating dielectric films used are: CO2- U

   (a) Air (b) SiO (c) Titanium (d) GaAs

5. A modern device that replaces a slotted line is CO2- U

   (a) Digital CRO (b) Generators (c) Network analyzers (d) Computers

PART – B (5 x 3= 15 Marks)

6. Calculate the critical angle of incidence between two substances with different refractive indices where n1 = 1.5 and n2 = 1.46 with the knowledge of the total internal reflection. CO4 -App

7. How will scattering losses arises in optical fibers? CO1-U

8. Mention the applications of E-Plane Tee and H-Plane Tee CO2-U

9.		Mention the criteria for the choice of substrate material	CO4-U	
10.		Differentiate slotted line and reflectometer method	CO2-U	

PART – C (5 x 16= 80 Marks)

11.	(a)	Describe the construction and working of Edge emitting LED.	CO1- U	(16)
		Or		
	(b)	Explain working principle of Avalanche photo detector	CO1- U	(16)
12.	(a)	Describe various kinds of losses that an optical signal might suffer while propagating throughfiber. Which is most important one? What is the effect of these losses on light power and pulseshape?	CO1- U	(16)
		Or		
	(b)	Explain in detail about the Fundamental receiver operation in detail.	CO1- U	(16)
13.	(a)	A two cavity klystron operates at 5 GHZ with dc beam voltage 10KV, cavity gap 2mm.For a given input RF voltage, the magnitude of the gap voltage is 100V.Calculate the transit time at the cavity gap, the transit angle and velocity of electrons leaving the gap.	CO5- App	(16)
		Or		
	(b)	A reflex klystron is operated at 8GHz with dc beam voltage of 600 V for1.75 mode, repeller space length of 1mm and dc beam current of 9mA.The beam coupling coefficient is assumed to be 1.Calculate the repeller voltage electronic efficiency and output power Vo =600V, L=1 mm, Io = 9mA βo =1, f=8 GHz, n=2 or 1 ¾ mode.	CO5- App	(16)
14.	(a)	Explain the different types of materials used in MMIC and list their characteristics	CO2- U	(16)
		Or		
	(b)	Explain in detail with suitable diagrams, the fabrication techniques of a Monolithic Microwave Integrated Circuit.	CO2- U	(16)
15.	(a)	Analyze in detail with block diagram about the measurement of VSWR through return loss measurement, Justify the suitable measurement technique.	CO6- Ana	(16)
		Or		
	(b)	Analyze the measurement of VSWR through slotted line method, Justify the suitable measurement technique	CO6- Ana	(16)