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Seventh Semester B.E. Degree Examination, June/July 2017

Optical Fiber Communication

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

1.
 - a. Summarize the inherent advantages of optical fiber over conventional copper cables. (06 Marks)
 - b. Describe with neat diagram different types of optical fiber waveguides. Using ray theory, explain the propagation of light inside the fiber. (08 Marks)
 - c. A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.5. A light ray is incident at the core-cladding interface with a critical angle of 78.5° . Estimate:
 - i) Refractive index of cladding
 - ii) Numerical aperture
 - iii) The acceptance angle in air for the fiber (06 Marks)
2.
 - a. Illustrate the different types of scattering losses in optical fiber with suitable equations. (08 Marks)
 - b. Explain what is meant by the critical bending radius for an optical fiber. Write equation of critical radius of curvature for multimode and single mode fibers. (06 Marks)
 - c. A multimode fiber with a core refractive index of 1.5, a relative refractive index difference of 3% and an operating wavelength of $0.82 \mu\text{m}$. Estimate the critical radius of curvature at which large bending losses occur. (06 Marks)
3.
 - a. Draw and explain the cross-sectional view of a typical AlGaAs double heterojunction LED, along with the energy diagram. (08 Marks)
 - b. Sketch and explain the GaAs homojunction injection laser with a Fabry-Perot cavity. (06 Marks)
 - c. A planar LED is fabricated from Gallium Arsenide which has a refractive index of 3.6,
 - i) Calculate the optical power emitted into air as a percentage of the internal optical power for the device when the transmission factor at the crystal-air interface is 0.68.
 - ii) When the optical power generated internally is 50% of the electric power, determine the external power efficiency. (06 Marks)
4.
 - a. With the aid of simple sketches, outline optical fiber coupler types and their functions. (08 Marks)
 - b. Discuss different types of fiber misalignment and the factors which causes the losses due to those misalignment. (06 Marks)
 - c. A single mode fiber has the following parameters:
 - Normalised frequency (V) = 2.40
 - Core refractive index (n_1) = 1.46
 - Core diameter ($2a$) = $8 \mu\text{m}$
 - Numerical aperture (NA) = 0.1
 - Normalised spot size (w) = $3.12 \mu\text{m}$.
 Estimate the total insertion loss of a fiber joint with a lateral misalignment (Y) of $1 \mu\text{m}$ and an angular misalignment (θ) of 1° . (06 Marks)

Optical Fiber Communication Question Paper Gtu

Rosina Ehmann



Optical Fiber Communication Question Paper Gtu:

Optical Fiber Communication ,1982 *Optical Fiber Communication* ,1985 *Optical Fiber Communication Postdeadline Paper Book* ,2011-01-01 *Optical Fiber Communication Topical Meeting on Optical Fiber Communication, Technical digest* Conference on Optical Fiber Communication,2001 *Digest of Technical Papers - International Conference On Integrated Optics and Optical Fiber Communication* ,1987 *Optical Fiber Communication* ,1979 *Optical Fiber Communication Conference Postdeadline Papers 2019* ,2018 *Technical Digest* Conference on Optical Fiber Communication,1993 *Optical Fiber Communication Conference Postdeadline Papers* ,2016 **Optical Fiber Communications** Optical Society of America, Institute of Electrical and Electronics Engineers, **Fiber Optic Communications** Shiva Kumar, M. Jamal Deen, 2014-06-12 Fiber optic communication systems have advanced dramatically over the last four decades since the era of copper cables resulting in low cost and high bandwidth transmission. Fiber optics is now the backbone of the internet and long distance telecommunication. Without it we would not enjoy the benefits of high speed internet or low rate international telephone calls. This book introduces the basic concepts of fiber optic communication in a pedagogical way. The important mathematical results are derived by first principles rather than citing research articles. In addition, physical interpretations and real world analogies are provided to help students grasp the fundamental concepts. Key Features: Lucid explanation of key topics such as fibers, lasers, and photodetectors. Includes recent developments such as coherent communication and digital signal processing. Comprehensive treatment of fiber nonlinear transmission. Worked examples, exercises, and answers. Accompanying website with PowerPoint slides and numerical experiments in MATLAB. Intended primarily for senior undergraduates and graduates studying fiber optic communications, the book is also suitable as a professional resource for researchers working in the field of fiber optic communications. *OPTICAL FIBER COMMUNICATION* Dr. M. Satyanarayana, Dr. V. N. Lakshmana Kumar, Dr. P. Ujjvala Kanthi Prabha, 2022-03-15 *OPTICAL FIBER COMMUNICATION* book was written by Dr. M. Satyanarayana, Dr. V. N. Lakshmana Kumar, Dr. P. Ujjvala Kanthi Prabha.

Optical Fiber Communication ,1984 **Mastering Heat Transfer** Prof. Alpesh V. Mehta, 2025-06-06 Unlock the secrets to scoring high in Gujarat Technological University GTU exams with this comprehensive guide tailored specifically for undergraduate mechanical engineering students. *Mastering Heat Transfer 5 GTU Solved Papers* brings clarity, confidence, and a solid grasp of core concepts by offering detailed step-by-step solutions to five carefully selected GTU question papers. Designed with the student in mind, this book doesn't just provide answers; it builds understanding. Each solution is crafted to reflect the methodical approach expected in university exams, making it easier for students to learn the logic, apply the formulas correctly, and avoid common mistakes. Whether you're revising before finals or seeking extra practice, this book is your personal tutor. Ideal for self-study, classroom support, or exam crash prep, this book is an essential resource for mastering one of the most challenging subjects in the mechanical engineering curriculum. With clear explanations, structured problem

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FUNDAMENTALS OF OPTICAL FIBRE COMMUNICATION M.

SATHISH KUMAR, 2014-02-11 Optical fibre communication is fast extending the boundaries of research laboratories and attaining the threshold of real life applicability The book attempts to provide a thorough understanding of the fundamentals of optical fibre communication Organized into nine chapters this book begins with a discussion of planar dielectric waveguide and proceeds to discuss optical fibre and the propagation of light through it It also covers Erbium Doped Fibre Amplifier EDFA semiconductor optical sources and detectors fibre optic communication systems and fibre optic measurements In the Second Edition lucid presentation of the text has been maintained without compromising on the comprehension of the subject Two new chapters on advanced modulation formats for fibre optic communication systems and surface plasmon polaritons and photonic crystals have been included which discuss topics such as fibre optic coupler coherent optical communication BER performance of coherent optical communication systems differential phase modulation schemes with direct detection surface plasmon polariton and photonic crystal Besides a number of chapters have been significantly revised This book is primarily intended as a text for undergraduate students of Electrical Engineering Electronics and Communication Engineering and Telecommunication Engineering The book would also prove to be of immense benefit to postgraduate students of Physics and those preparing for AMIE and AMIETE exams Key features Lucid discussion of concepts ensuring easy comprehensibility of even advanced topics to undergraduate students Numerical problems forming an integral part of the book making it application oriented Solutions to chapter end numerical problems provided at the end of the book

Optical Fiber Communication IEEE Quantum Electronics and Applications Society, Optical Society of America. Laser and Electro-Optics Technical Group, American Ceramic Society, *Optical Fiber Communication Conference Postdeadline Papers 2020*, 2020

Integrated Optics and Optical Fiber Communication, 1977 *Integrated Optics and Optical Fiber Communication* Chinese University of Hong Kong, 1995

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