V.S.B. ENGINEERING COLLEGE, KARUR

Department of Electronics and Communication Engineering

Academic Year: 2018-2019 (ODD Semester)

RF & Microwave Engineering

Assignment Questions

1 RF diodes & applications of diodes
2 PIN diode & applications of diodes
3 Schotky diode & applications of diodes
4 Varactor diode & applications of diodes
5 Gunn diode & applications of diodes
6 Attenuator
7 Phase shifter
8 BJTs in Microwave Active devices
9 FET in Microwave Active devices
10 MOSFETS in Microwave Active devices
11 MESFETS in Microwave Active devices
12 HEMTs in Microwave Active devices
13 HBT in Microwave Active devices
14 Device Models
15 Device Characterization
16 Device technologies.
17 General analysis of RF oscillators
18 Transistor oscillators
19 Voltage-controlled oscillators
20 Dielectric resonator oscillators
21 Frequency synthesis methods
22 Analysis of first order phase-locked loop
23 Analysis of second order phase-locked loop
24 Oscillator noise and its effect on receiver performance
25 BJT Biasing
26 FET Biasing
27 Impedance matching
28 Small Signal Amplifier Design
29 Large signal amplifier design
30 Multistage amplifier design
31 Broadband amplifier design
32 Mixer characteristics: Image frequency, conversion loss, noise figure
33 p-n junctions mixer
34 Schottky barrier diode mixer
35 FETs mixer
36 Small-signal characteristics of diode
37 Single-ended mixer
38 Large-signal model
39 Switching model
40 FET Mixers
41 Single-ended mixer
42 Balanced mixers
43 Image reject mixers
44 Basic properties of Couplers and Power dividers
45 Types of Couplers and Power dividers

46 Power combining efficiency in Couplers and Power dividers
47 Wilkinson Power divider- equal and unequal types
48 90° Hybrids
49 Branch line couplers
50 N-way combiners
51 Travelling wave tube
52 Cavity klystron
53 Rectangular Magnetron
54 Circular Magnetron
55 Measurement of Attenuation
56 Measurement of power
57 Measurement of Impedance
58 Measurement of Frequency
59 Spectrum Analyzer
60 Network Analyzer
61 VSWR
62 Power Meter
63 Linear Voltage tunable Magnetrons
64 Coaxial Voltage tunable Magnetrons
65 Backward wave Crossed field amplifier and oscillator.
66 Two cavity Klystron Amplifier
67 Reflex Klystron oscillator
68 IMPATT diode oscillator and amplifier
69 MIC

V.S.B. ENGINEERING COLLEGE, KARUR

Department of Electronics and Communication Engineering
Academic Year: 2018-2019 (ODD Semester)
VII SEMESTER

ASSIGNMENT QUESTIONS
OPTICALCOMMUNICATION AND NETWORKS

1	A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and a cladding refractive index of 1.47. Determine: (a) The critical angle at the core-cladding interface. (b) The numerical aperture for the fiber. (c) The acceptance angle in air for the fiber. Write a brief note on fiber alignment and joint loss.
2	Discuss briefly about the structure of graded index fiber. Explain any two injection laser structures with neat diagrams.
3	A graded index fiber with a parabolic refractive index profile core has a refractive index at the core axis of 1.5 and a refractive index difference of 1%. Estimate the maximum possible core diameter which allows single mode operation at a wavelength of 1.3μm. Discuss the noise and disturbances affecting the optical detection systems.
4	With the neat block diagram, explain the fundamental blocks of optical fiber communication. Distinguish step index fiber from graded index fibers.
5	Explain in detail about the scattering and the bending losses that occur in an optical fiber with relevant diagrams and expressions. Compare LED with a Laser diodes.
6	When the mean optical power launched into an 8km length of fiber is 120μW. The mean optical power at the fiber output is 3μW. Determine: (a) The overall signal attenuation or loss in decibels through the fiber assuming there are no connectors or splices; (b) The signal attenuation per kilometer for the fiber. (c) The overall signal attenuation for a 10km optical link using the same fiber with splices at 1km intervals, each giving an attenuation of 1dB; (d) The numerical input/output power ratio in (c).
7	Discuss material and waveguide dispersion mechanisms with necessary mathematical expressions.
8	A multimode graded index fiber exhibits total pulse broadening of 0.1μs over a distance of 15km. Estimate (a) The maximum possible bandwidth on the link assuming no inter-symbol interference; (b) The pulse dispersion per unit length (c) The bandwidth-length product for the fiber.
9	A Planar LED is fabricated from gallium arsenide which has a refractive index of 3.6. (a) 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. (b) When the optical power generated internally is 50% of the electric power supplied, determine the external power efficiency.
10	Illustrate the different lensing schemes available to improve the power coupling efficiency.
11	Give a brief account on the resonant frequencies of Laser Diodes.
12	Explain about the various fiber splicing techniques with necessary diagrams.
13	Measurements are made using a calorimeter and thermocouple experimental arrangement. Initially a high absorption fiber is utilized to obtain a plot of $(T_\infty - T_t)$ on a logarithmic scale against t. It is found from the plot that the readings of $(T_\infty - T_t)$ after 10 and 100 seconds are 0.525 and 0.021μV respectively. The test fiber is then inserted in the calorimeter and gives a maximum temperature rise of $4.3 \times 10^{-4}\,°C$ with a constant measured optical power of 98mW at a wavelength of 0.75μm. The thermal capacity per kilometer of the silica capillary and fluid is calculated to be $1.64 \times 10^4\ J°\ C^{-1}$. Determine the absorption loss in dB km^{-1}, at

	a wavelength of 0.75μm, for the fiber under test.
14	With a typical experimental arrangement, brief the measurement process of diameter of the fiber.
15	Discuss the different structures of receiver in the optical fiber communication with neat diagram.
16	A He-Ne laser operating at a wavelength of 0.63μm was used with a solar cell cube to measure the scattering loss in a multimode fiber sample. With a constant optical output power the reading from the solar cell cube was 6.14nV. the optical power measurement at the cube without scattering was 153.38μV. The length of the fiber in the cube was 2.92cm. determine the loss due to scattering in dB km^{-1} for the fiber at a wavelength of 0.63μm.
17	A trigonometrical measurement is performed in order to determine the numerical of a step index fiber. The screen is positioned 10.0cm from the fiber end face. When illuminated from a wide-angled visible source the measured output pattern size is 6.2cm. Calculate the approximate numerical aperture of the fiber.
18	What is optical power budgeting? Determine the optical power budget for the below system and hence determine its viability. Components are chosen for a digital optical fiber link of overall length 7cm and operating at 20Mbits/s using an RZ code. It is decided
19	Explain the ray propagation in the optical fiber based on the ray theory analysis.
20	Derive the numerical aperture of an optical fiber.
21	Determine the normalized frequency at 820nm for a step index fiber having a 25μm core radius $n_1 = 1.48\ and\ n_2 = 1.46.$ (a) How many modes propagate in this fiber at 820nm? (b) How many modes propagate in this fiber at 1320nm? (c) How many modes propagate in this fiber at 1550nm? (d) What percent of the optical power flows in the cladding in each case?
22	Using Maxwell's equations derive the expression for electric and magnetic field components and also arrive boundary condition of the circular waveguide.
23	Explain in detail with necessary mathematical expression the various attenuation mechanisms in optical fiber.
24	A fiber has a core radius of 25mmm, core refractive index of 1.48 and relative refractive index difference (Δ) is 0.01. If the operating wavelength is 0.84mm, find the value of normalized frequency and the number of guided modes. Determine the number of guided modes if Δ is reduced to 0.003.
25	Draw and explain the refractive index profile and ray transmission is single mode and multimode step index fibers and graded index fibers. Write the expressions for the numerical aperture and number of guided modes for a graded index fiber.
26	A step index fiber has a core diameter on 7μm and core refractive index of 1.49. Estimate the short wavelength of light which allows single mode operation when the relative refractive index difference for the fiber is 1%.
27	Explain the following with necessary diagram and expressions. (i) Non-linear scattering loss and fiber bend loss. (ii) Material Dispersion in Optical Fiber.
28	Explain mechanical splices with neat diagrams. Explain the fiber optic receiver operation using a simple model and its equivalent circuit.
29	Write a brief note on fiber alignment and joint loss.
30	Draw and explain surface and edge emitting LEDs.
31	Explain any two injection laser structures with neat diagrams.
32	Explain the operation of APD with neat diagram.
33	Define the normalized frequency for an optical fiber and explain its use.
34	Discuss on the transmission of light through graded index fiber.
35	Explain the features of multimode and single mode step index fiber and compose them.

36	A single mode step index fiber has a core diameter of 7μm and a core refractive index of 1.49. Estimate the shortest wavelength of light which allows single mode operation when the relative refractive index difference for the fiber is 1%
37	What is meant by critical bending radius of optical fibers? Explain.
38	Explain the following in single mode fiber: Modal birefringence and beat length.
39	Describe the three types of fiber misalignment that contribute to insertion loss at an optical fiber joint.
40	Outline the major categories of multiport fiber optic coupler.
41	Describe the operation of a injection laser.
42	Compare the optical sources LED and ILD.
43	What are the possible noise sources that contribute the photo detector noise?
44	What is meant by detector response time? Explain.
45	Draw the block diagram of fundamental optical receiver. Explain each block.
46	With diagrams explain the following: (i) Measurement of NA of a fiber. (ii) Measurement of refractive index profile.
47	Draw the block diagram of OTDR. Explain the measurement of any two fiber optic measurement with this.
48	Discuss the following: (i) WDM networks (ii) Ultra high capacity networks
49	With diagram, explain acceptance angle and Numerical Aperture of fibers.
50	Classify fibers and explain them.
51	Describe and derive the modes in planner guide.
52	With necessary diagrams, explain the causes and types of fiber attenuation loss.
53	With diagram, derive the expression for intra modal dispersion.
54	Describe about fiber connectors, splices and couplers.
55	Draw and compare LED and Injection Laser Diode structures.
56	Discuss about optical detection noise.
57	Derive the probability of error for fiber optic receiver.
58	Explain how attenuation and dispersion measurements could be done.
59	Explain SONET layers and frame structure with diagram.
60	Discuss the performance improvement of WDM and EDFA systems.
61	What are the loss or signal attenuation mechanisms in a fiber? Explain.
62	What are the primary requirements of a good fiber connector design?
63	With neat sketch, explain the working of a light emitting diode.
64	A photodiode is constructed of GaAs which has band gap energy of 1.43eV at 300K. Find the long wavelength. Write a note on response time. Derive an expression for the mean square photo detector noise current.
65	Explain the attenuation and dispersion measurements in detail. Explain the principle of WDM networks and their advantages.
66	Discuss the non linear effects on optical network performance. Explain the features of ultra high capacity networks. Explain OTDR and its applications.
67	Describe a step index and graded index cable. Contrast the advantages and disadvantages of step index and graded index single mode and multimode propagation. Discuss in details about fiber splicing.
68	Discuss on the transmission of light through graded index fiber. Define normalized frequency for an optical fiber and explain its use.
69	Discuss the attenuation encountered in optical fiber communication due to bending, scattering and absorption.

V.S.B. ENGINEERING COLLEGE, KARUR
Academic Year: 2018-2019 (ODD Semester)
Department of Electronics and Communication Engineering
(2013 Regulations)

Name of Subject: Embedded and Real Time Systems

Assignment Question

Explain the origin of embedded computers.
Explain in detail embedded system design process.
Explain the formalism for system design.
Describe in detail the requirements of model train controller.
Explain about conceptual specification of model train controller.
Explain about detailed specification of model train controller.
Discuss about various instruction set preliminaries.
Explain about the architecture of ARM processor.
How data operations are performed in ARM processor.
How programming I/O done in microprocessors
Discuss in detail about supervisor mode, exceptions and traps of ARM processor.
Discuss the functions of co-processors.
How address translation done in ARM processor.
How to analyze the CPU performance and how CPU power consumption is reduced.
How memory devices are organized in ARM processor.
Explain in detail about component interfacing.
Discuss about debugging techniques and debugging tools.
Discuss in detail about system level performance analysis.
Explain the components of embedded programs.
Explain the concepts of assembly, linking and loading.
Explain about basic compilation techniques.
Explain the scheduling process.
Explain about program validation and testing.
Explain in detail about multiple tasks and multiple processes.
Explain in detail about preemptive real time operating systems.
Explain in detail about priority based scheduling.
Explain in detail about interprocess communication mechanism.
How to evaluate operating system performance.
How power management and optimization is done for processes.
Explain in detail about consumer electronics architecture.
Explain in detail about distributed embedded architecture.
Discuss in detail about internet enabled systems.
Explain in detail about POSIX.
Explain in detail about Windows CE.
Explain in detail about design methodologies.
How the requirement analysis is done? Explain in detail.

Assignment Question

Explain in detail about quality assurance techniques.
Explain in detail about MPSoCs.
Explain in detail about shared memory multiprocessors.
Describe in detail the requirements of data compressor.
Explain about conceptual specification of data compressor.
Explain about detailed specification of data compressor.
Describe in detail the requirements of alarm clock.
Explain about conceptual specification of alarm clock.
Explain about detailed specification of alarm clock.
Describe in detail the requirements of audio player.
Explain about conceptual specification of audio player.
Explain about detailed specification of audio player.
Describe in detail the requirements of software modem.
Explain about conceptual specification of software modem.
Explain about detailed specification of software modem.
Describe in detail the requirements of digital still camera.
Explain about conceptual specification of digital still camera.
Explain about detailed specification of digital still camera.
Describe in detail the requirements of telephone answering machine.
Explain about conceptual specification of telephone answering machine.
Explain about detailed specification of telephone answering machine.
Describe in detail the requirements of engine control unit.
Explain about conceptual specification of engine control unit.
Explain about detailed specification of engine control unit.
Describe in detail the requirements of video accelerator.
Explain about conceptual specification of video accelerator.
Explain about detailed specification of video accelerator.
Describe in detail the requirements of washing machine.
Explain about conceptual specification of washing machine.
Explain about detailed specification of washing machine.
Describe in detail the requirements of microwave oven.
Explain about conceptual specification of microwave oven.
Explain about detailed specification of microwave oven.
Explain the origin of embedded computers.
Explain in detail embedded system design process.
Explain the formalism for system design.
Describe in detail the requirements of model train controller.
Explain about conceptual specification of model train controller.
Explain about detailed specification of model train controller.
Discuss about various instruction set preliminaries.
Explain about the architecture of ARM processor.

Assignment Question

How data operations are performed in ARM processor.
How programming I/O done in microprocessors
Discuss in detail about supervisor mode, exceptions and traps of ARM processor.
Discuss the functions of co-processors.
How address translation done in ARM processor.
How to analyze the CPU performance and how CPU power consumption is reduced.
How memory devices are organized in ARM processor.
Explain in detail about component interfacing.
Discuss about debugging techniques and debugging tools.
Discuss in detail about system level performance analysis.
Explain the components of embedded programs.
Explain the concepts of assembly, linking and loading.
Explain about basic compilation techniques.
Explain the scheduling process.
Explain about program validation and testing.
Explain in detail about multiple tasks and multiple processes.
Explain in detail about preemptive real time operating systems.
Explain in detail about priority based scheduling.
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How to evaluate operating system performance.
How power management and optimization is done for processes.
Explain in detail about consumer electronics architecture.
Explain in detail about distributed embedded architecture.
Discuss in detail about internet enabled systems.
Explain in detail about POSIX.
Explain in detail about Windows CE.
Explain in detail about design methodologies.
How the requirement analysis is done? Explain in detail.
Explain in detail about quality assurance techniques.
Explain in detail about MPSoCs.
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Explain about detailed specification of alarm clock.
Describe in detail the requirements of audio player.
Explain about conceptual specification of audio player.
Explain about detailed specification of audio player.
Describe in detail the requirements of software modem.

Assignment Question

Explain about conceptual specification of software modem.
Explain about detailed specification of software modem.
Describe in detail the requirements of digital still camera.
Explain about conceptual specification of digital still camera.
Explain about detailed specification of digital still camera.
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Describe in detail the requirements of video accelerator.
Explain about conceptual specification of video accelerator.
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Describe in detail the requirements of washing machine.
Explain about conceptual specification of washing machine.
Explain about detailed specification of washing machine.
Describe in detail the requirements of microwave oven.
Explain about conceptual specification of microwave oven.
Explain about detailed specification of microwave oven.

V.S.B. ENGINEERING COLLEGE, KARUR

Department of Electronics and Communication Engineering
Academic Year: 2018-2019(ODD Semester)
ADVANCED COMPUTER ARCHITECTURE

Assignment Question

1 Classes of parallelism
2 Quantitative principle of computer design
3 Multithreading architectures
4 Classes of computers, trends in technology, power energy and cost
5 Compiler Technique for exposing ILP
6 Dynamic Scheduling
7 Hardware based speculation
8 Dynamic branch prediction
9 Vector architecture
10 Graphics processing units
11 SIMD instruction set
12 Symmetric an distributed shared memory architectures
13 Model of memory consistency & interconnection
14 Cache coherence, performance synchronization issues
15 Cache memory
16 Memory Technologies
17 Types of memory
18 RAID
19 Classes of parallelism
20 Quantitative principle of computer design
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60 Multithreading architectures
61 SIMD instruction set
62 Dynamic branch prediction
63 Cache memory
64 Memory Technologies
65 Types of memory
66 RAID
67 Model of memory consistency & interconnection
68 Symmetric an distributed shared memory architectures
69 Model of memory consistency & interconnection

V.S.B ENGINEERING COLLEGE, KARUR.
DEPARTMENT OF ECE
DIGITAL IMAGE PROCESSING
VII SEMESTER
ASSIGNMENT QUESTIONS

1. Consider the two images subsets, S1 and S2, shown in the following figure. For V={1}, determine whether these two subsets are (a) 4-adjacent, (b) 8-adjacent, or (c) m-adjacent.

	0 0 0 0 0		0 0 1 1 0
	1 0 0 1 0		0 1 0 0 1
[s1]	1 0 0 1 0	[S2}	1 1 0 0 0
	0 0 1 1 1		0 0 0 0 0
	0 0 1 1 1		0 0 1 1 1

2. Consider the image segment shown. (a) Let V = {0, 1} and compute the lengths of the shortest 4-, 8-, and m-path between p and q. If a particular path does not exist between these two points, explain why. (b) Repeat for V = {1, 2}.

   3 1 2 1 (q)
   2 2 0 2
   1 2 1 1
   (p)1 0 1 2

3. A CCD camera chip of dimensions 7 × 7 mm, and having 1024 × 1024 elements is focused on a
   square, flat area, located 0.5 m away. How many line pairs per mm will this camera be able to resolve? The camera is equipped with a 35-mm lens.
4. Download the image processing tutorial (the users' guide) from Math works (http://www.mathworks.com/access/helpdesk/help/toolbox/images/), read the tutorials and make the practice according to the tutorials.
5. Implement the noise reduction for the noisy image submit your code and the denoised image. You can get the original noisy image from the class website.
6. Write a coding for Spatial Transforms and Filtering by using any input image and take output printout
7. Write a coding for Morphological Image Processing by using any input image and take output
   Printout
8. Frequency Domain Enhancement and Interactive Restoration
9. Write the coding for Wiener Filtering by using mat lab.
10. Explain about Image processing service for developers.
11. Explain about Rescaling Image(Digital Zoom)
12. Implement in matlab for Correcting illumination
13. Write about Detecting Edges
14. Explain about Mathematical Morphology
15. Illustrate about Evaluation and Ranking of Segmentation Algorithms
16. Describe about Removing Straight Lines
17. With an example explain Separating Aggregate of Objects
18. Detecting License Plate

19. Scanning Whiteboard Contents
20. Detecting Text in Still Images
21. Enhancing X-Ray Images
22. Removing Moiré Pattern from Scanned Photos
23. Extracting Urban Areas in Google Maps Aerial Images
24. Extracting Forest Areas in Google Maps Aerial Images
25. Extracting Agricultural Fields in Google Maps Aerial Images
26. Extracting Serous Cell Nuclei
27. Detecting Template in Image
28. Detecting Racing bib number
29. MATLAB functions and M-files
30. Equivalent MIPS and MATLAB functions
31. Bilateral Filtering
32. Grey Level Quantization
33. Histogram Computation
34. Background Modeling and Subtraction
35. Virtual Lab in Image processing
36. Write MATLAB coding for reading, displaying, converting, and exporting images and videos
37. Write a brief report including the images that you took as well as a frame of the video sequences taken. Include the MATLAB scripts that you coded to read, save, and display the images and videos.
38. Identify the number of black and white dice and their value
39. Point tracking in a movie
40. Hand tracking in a movie
41. Identify the maximum number of wood pieces using edge detection
42. Color Image Manipulation and Still Image Compression
43. Take any image and reduce the number of gray levels from 256 to 128, 64, 32, ... up to 2
44. Take an image and produce the negative of the image.
45. Write MATLAB function to increase contrast of a low contrast images.
46. Take an 8-bit image and generate eight bit planes of the image.
47. Write MATLAB functions for Histogram equalization
48. Write MATLAB functions to enhance an image by histogram specification.
49. Implement FFT for one-dimensional function. Use it to implement two-dimensional FFT.
50. Write a function to perform spatial domain smoothing(averaging) filter using user-supplied mask size.
51. Write a function to perform spatial domain smoothing(weighted average) filter of size 3 X 3with user-supplied weights
52. Implement a unsharp masking and high-boost filter in spatial domain.
53. Implement the following low-pass filters in frequency domain.
    a. Ideal
    b. Butterworth
    c. Gaussian

54. Implement the following high-pass frequency domain filters.
    a. Ideal

b. Butterworth
c. Gaussian

55. Implement a function in MATLAB for image segmentation.
56. Implement a function in MATLAB for image morphology that analyze the form and shape detail of image structures.
57. Implement a function in MATLAB for Image Restoration.
58. Models for representing the color and methods of processing the color plane.
59. Implement the spatial image enhancement functions on a bitmap image –Mirroring (Inversion) using matlab
60. Implement the spatial image enhancement functions on a bitmap image –Rotation (Clockwise) using matlab
61. Implement the spatial image enhancement functions on a bitmap image –Enlargement (Double Size) using matlab
62. Implement (a) Low Pass Filter (b) High Pass Filter using matlab
63. Implement (a) Arithmetic Mean Filter (b) Geometric Mean Filter using matlab
64. Implement Smoothing and Sharpening of an eight bit color image using matlab
65. Implement (a) Boundary Extraction Algorithm (b) Graham's Scan Algorithm using matlab
66. Implement (a) Edge Detection (b) Line Detection using matlab
67. Denoising for Astrophotography
68. Assuming your kernel size is an odd number, the center value of the kernel corresponds to (u,v) = (0,0). Thus, in computing the coefficients, your (u,v) pairs should loop through the range: -floor(size/2) to floor(size/2). Check your coefficients to make sure they sum up to zero. If they do not sum to zero, you must fix them so they do; otherwise, your kernel will produce a response in homogeneous regions. Store the results of the computation in logKernel.
69. Implement a Gaussian smoothing filter in C++, using Matlab's MEX functionality

V.S.B. ENGINEERING COLLEGE, KARUR

Department of Electronics and Communication Engineering
Academic Year: 2018-2019(ODD Semester)
VII Semester

Opto Electronic Devices

Assignment Question

1. Derive the electron energy in one electron atom using wave equation

2. Derive and explain in detail the Schrödinger's wave equation

3. Describe in detail the position of Fermi level in semiconductor at equilibrium.

4. Explain in detail about Hall Effect

5. Explain the various parameters and characteristics of semiconductor heterojunction.

6. Derive the electron energy in one electron atom using wave function

7. Describe in detail the position of Fermi level in semiconductor at equilibrium.

8. Derive Braggs law in X-Ray diffraction.

9. Discuss the powder method of crystal structure analysis.

10. Describe the crystal structure of silicon and GaAs?

11. Explain the energy values of electrons in a metal.

12. How does the electrical conductivity of extrinsic semiconductors vary with temperature?

13. Explain the frequency response of silicon photodiode using suitable graph?

14. Derive the De Broglie wave equation.

15. Describe with the setup,the Davvisson-Germer experiment to prove the wave nature

16. Derive the expressions for concentration of electrons and holes in an intrinsic semiconductor.

17. Explain the principle of superposition and hence derive an expression for maximum irradiance resulting from four coherent sources sousources

18. Explain the interference effects in athin film of refractive index “n”

19. Discuss about drift and diffusion of carriers with relevant expressions.

20. Explain about optical confinement factor in detail.

21. Determine the density of states of a 3D system at a energy of 0.1 ev if the effective mass is mo

22. Explain detail abouot the absorption and radiation of Laser

23. Explain the construction and working of various display devices.

24. Write short notes on mode locking of semiconductor laser.

25. Describe in detail about application of Laser.

26. Discuss about the various classification of Laser

27. Explain the operation of LED and derive an expression for the frequency response and bandwidth of LED.

28. Derive the expressions for gain in a Laser level medium.

29. Explain the transient response of LED.

30. Discuss the different types of hetro-S structure LEDs along with the diagram

31. Describe the operation of semiconductor Lasers.

32. Draw the common cathode LED seven segment display and explain its working

33. Explain the basic principle of electro optic modulators

34. Describe the electro optic amplitude modulation with neat sketch

35. Explain the quantum confined stark effect

36. Explain the self electro optic devices

37. Discuss the different types of noises in the photo diodes

38. Give an account on the high speed and long wavelength photodiodes

39. Derive expressions for the gain of a photo conductor with dc excitation at different level of increasing applied bias

40. Discuss the characteristics of PIN photodiode with energy band diagram

41. Compare the noise performance of photodiode and PIN photodiode

42. Discuss in detail about the construction and working of PIN photodiode

43. Write a note on Hetro junction diode

44. Write a note on avalanche photo diode

45. Explain the structure and and operation of thermal detector

46. Explain the various detector performance parameters.

47. Describe about the energy band diagram of a NPN hetro junction in detail

48. Discuss about the analog and digital modulation techniques

49. What is electro optic effect? and explain how this is suitable for electro optic phase modulation

50. Explain Quadratic electro optic effect with suitable diagram

51. Explain the operation of self electro optic device with necessary diagram

52. Write a short notes on Bipolar controller modulator

53. Write a short notes on programmable memory devices

54. Write a short notes about tunable threshold logic gates

55. Discuss in detail the principle operation of photonic switch based on self electro optic devices

56. Explain the concept of Bipolar Controller modulator

57. Explain the concept of Birefringence in uni axial crystal with necessary diagram

58. Discuss in detail the principle and operation of QCSE based optical

59. With the neat diagram, Explain the performance of front end photo receivers

60. Explain the noise and bandwidth considerations of photo receivers

61. Discuss the different types of noises in the photodiodes

62. Give an account on the high speed and long wavelength photodiodes

63. Derive expression for the gain of photo conductor with dc excitation at different ,levels of increasing applied bias

64. Discuss the characteristics of PIN photo diode with energy band diagram

65. Compare the noise performance of photo conductor and PIN photodiode

66. Explain the structure and operation of thermal detector.

67. Explain the various detector performance parameters

68. Write a short notes on Hetro junction diode

69. Describe the energy band diagram of NPN hetro junction modulated barrier photo diode under baised condition and arrive at
the expression for resposivity