Code No.: **50432**

MR15-(2015-16 Batch)

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)

Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2019

Subject: **MICROWAVE ENGINEERING**

Branch: **ECE**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2M=10 M**

1. Name different electromagnetic frequency spectrum region and microwave band designations for IEEE military bands.
2. Write short notes on posts and tuning screws.
3. List the limitations of conventional tubes at microwave frequencies.
4. What is transferred electron effect?
5. Define the method for measuring VSWR <10.

PART-B

Answer any FIVE questions of the following **5x10 M= 50M**

1. a) Calculate the resonant frequency of a rectangular cavity resonator of dimensions 3x2x4cm, when the mode of operation is TE_{101}.
   b) Explain the losses in micro strip lines
2. Derive the scattering matrix of the Magic Tee.
3. a) A directional coupling has the scattering matrix given below. Calculate the directivity, coupling and isolation

$$\begin{pmatrix} 0.05<30 & 0.96<0 & 0.1<90 & 0.05<90 \\ 0.96<0 & 0.05<30 & 0.05<90 & 0.1<90 \\ 0.1<90 & 0.05<90 & 0.04<30 & 0.96<0 \\ 0.05<90 & 0.1<90 & 0.96<0 & 0.05<30 \end{pmatrix}$$

   b) What is directional coupler? Draw and explain all its properties and parameters.
4. a) What is velocity modulation? Derive the expression of velocity modulation for two cavity klystron.
   b) Discuss the performance characteristics of magnetrons and list the applications.
5. a) Explain about the Gunn diode oscillating modes.
   b) An n-type Ga As Gunn diode has the following parameters: Electron drift velocity (u_d)=2.5 X 10^5 m/s, Negative electron mobility($|\mu n|$) = 0.015 m2/V.s , Relative Dielectric constant ϵ_r=13.1.Determine the criterion for classifying the modes of operation.
6. Write short notes on i) Precision attenuators ii) Wave meters iii) VSWR meter.
7. a) Explain the operation, construction and applications of BARITT diode.
   b) Differentiate between MMIC and HMIC.
8. Write short notes on any two of the following
   a) Irises
   b) Cut of frequency and cut of wave length in rectangular wave guide.
   c) Performance measurement parameters of Directional coupler.

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2019

Subject: **VLSI DESIGN**

Branch: **ECE**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2M=10 M**

1. What are the advantages of IC Technology?
2. What is the significance of Figure of merit?
3. Write the design rules for wires.
4. Derive the expression for sheet resistance of a square.
5. Difference between PAL &PLA?

PART-B

Answer any FIVE questions of the following **5x10 M= 50M**

1. a) Explain the Thermal oxidation technique.
   b) Explain the Kinetics of thermal oxidation.
2. a) Explain the different aspects of MOS transistor threshold voltage with necessary equations.
   b) Explain about the BiCMOS inverters with neat diagrams.
3. a) Draw the I_{ds} vs V_{ds} characteristics of Enhancement and depletion mode transistors.
   b) Derive the expression for transit time of MOS transistor.
4. a) Explain about butting contacts with diagram.
   b) Draw the spacing rules for various contacts.
5. a) Find the on resistance and off resistance of CMOS inverter having L=2λ and W=2λ having R_s=2.5X10^4 for PMOS and R_s=10^4 for NMOS.
   b) What is meant by fan in explain with examples?
6. a) Implement 2 input multiplexer using CMOS Transmission gate.
   b) Discuss about CMOS Domino logic with an example.
7. Briefly explain about ALU subsystem design with diagram.
8. Write short notes on any two of the following
   a) Basic steps of Bi-CMOS that has been added in CMOS fabrication
   b) SRAM based routing technique
   c) Classification table of IC

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MR15

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2019

Subject: **DIGITAL IMAGE PROCESSING**

Branch: ECE

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2M=10 M**

1. Define Image.
2. Write the transform pair equation of 2D-DFT.
3. Compare local and global histogram processing.
4. Define circulant matrix.
5. Compare any 2 image compression models.

PART-B

Answer ANY FIVE questions of the following **5x10 M= 50M**

1. Explain fundamental steps in digital image processing with the help of block diagram.

2. a) Explain the labeling of connected components.
   b) Define spatial and gray level resolution and draw backs of the spatial and gray level resolution .

3. a) Determine the Kernel coefficient of 2D walsh transform for N=4. **7M**
   b) List the properties of Walsh transform. **3M**

4. Explain homomorphic filtering in frequency domain with the help of block diagram.

5. What is meant by inverse filtering? Derive an expression for inverse filtering and what are the draw backs of this method in the presence of noise.

6. Explain about Pseudo color image processing.

7. Explain edge linking and boundary detection using global processing via graph theoretic technique.

8. What are the various types of redundancies and explain.

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IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2019

Subject: **OPTICAL COMMUNICATIONS**

Branch: **ECE**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2M=10 M**

1. Draw the block diagram of OFC system.
2. Distinguish between intermodal dispersion and material dispersion.
3. Write about different splicing techniques.
4. Define detector response time.
5. Write the significance of WDM.

PART-B

Answer any FIVE questions of the following **5x10 M= 50M**

1. Describe with the aid of simple ray diagram: (a) the multimode step index fiber; (b) the single-mode step index fiber. Compare the advantages and disadvantages of these two types of fiber for use as an optical channel.
2. a) Explain ray theory transmission in an optical fiber.
   b) Explain about the plastic optical fiber.
3. a) Explain about information capacity determination.
   b) Explain about single mode fiber connectors.
4. a) Explain in detail about the Injection Laser Diode.
   b) Differentiate between single mode and multimode fiber joint.
5. Draw *p-i-n* photo diode and explain its working. A silicon *p-i-n* photodiode has an intrinsic region with a width of 20μm and a diameter of 500μm in which the drift velocity of electrons is 10^5 m/s. When the permittivity if the device material is 10.5×10^{-13} F /cm. Calculate (i) the drift time of the carriers across the depletion region; (b) the junction capacitance of the photodiode.
6. a) What is the effect of temperature on Avalanche gain?
   b) Compare various photo detectors.
7. a) Discuss various methods of line coding techniques used in optical links.
   b) Explain the different types of WDM techniques.
8. Write short notes on any two of the following
   i. Step index fibers
   ii. Optical fiber connectors and their types
   iii. Fiber dispersion in multimode and single mode fiber