

**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-2018**Subject: VLSI DESIGN

Branch: Common to EEE &amp; ECE

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. Write the equation for  $I_{DS}$  in non saturation region ?
2. What are the different MOS layers used in fabrication?
3. What is wiring capacitance?
4. What are the advantages of serial access memory?
5. Difference between PAL & PLA?

**II. Answer ALL questions of the following****10x2Mark=20 Marks**

1. What is Lithography?
2. What are the steps involved in IC fabrication?
3. What is Pass Transistor?
4. Sketch the stick diagram for 2 input NOR gate?
5. What is Fan in & Fan Out?
6. Explain about Inverter delays?
7. What is function of logical shifter?
8. Explain about SRAM?
9. What is Stuck-at –Fault?
10. Draw the structure of CPLD?

**PART-B****Answer ALL questions of the following****5x10 Marks= 50Marks**

1. With neat sketches explain BICMOS fabrication process in a P well.?

**OR**

2. Discuss different forms of Pull Up, mentioning Merits and Demerits of each form?
3. Draw the NMOS Enhancement and Depletion transistors using lambda based design rules?

**OR**

4. Discuss about the scaling of MOS Circuits in detail.
5. Design a layout diagram for two input NMOS NAND gate?

**OR**

6. Derive the expression for Propagation Delay  $\tau_D$  in the case of Cascaded Pass Transistors?
7. Draw the circuit and layout for ROM and explain how the dynamic power dissipation is minimized?

**OR**

8. Explain how the partial products are independently computed in Parallel Multiplier?
9. Explain the architecture of FPGA with neat diagram.

**OR**

10. Explain the Gate level and function level of Testing?



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**IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018**Subject: Optical Communications

Branch: ECE

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. What is the difference between acceptance angle, critical angle and numerical aperture?
2. Define bending losses that occur in an optical fiber.
3. What is meant by 'fiber splicing'?
4. What is detector Response Time?
5. Draw the Optical power loss model for a point-to-point link.

**II. Answer ALL questions of the following****10x2Mark=20 Marks**

1. Calculate NA of silica fiber with its core refractive index ( $n_1$ ) of 1.48 and cladding refractive index of 1.46. What should be the new value of 'n' in order to change the NA to 0.23?
2. Distinguish step index from graded index fibers.
3. What do you mean by pulse broadening?
4. Write the principal requirement of a good connector design.
5. Compare LED with a LASER diode.
6. What do you mean by equilibrium numerical aperture?
7. Write the comparison of Photo Detectors.
8. A silicon p-i-n photodiode incorporated into an optical receiver has a quantum efficiency of 60% at a wavelength of  $0.9\mu\text{m}$ . The dark current is 3 nA and load resistance is 4 K $\Omega$ . The incident optical power is 200 nW and the receiver bandwidth is 5 Mhz. Determine mean square quantum noise current.
9. Write the system considerations to design the simplex point-to-point link.
10. Draw the simplified eye diagram showing key performance parameters.

## **PART-B**

**Answer ALL questions of the following**

**5x10 Marks= 50Marks**

1. Derive an expression for numerical aperture of a step index fiber.

**OR**

2. Discuss the fiber materials and explain comparisons.

3. Explain the effects of signal distortion in optical waveguide.

**OR**

4. Explain expanded beam fiber connector with a neat schematic.

5. Explain the basic LED configurations used as optical source. Derive the expression for quantum efficiency and optical power generated in LED's.

**OR**

6. Explain the step involved in splicing the fiber. Discuss the various splicing techniques employed between two fibers..

7. Draw schematic diagram of a typical optical receiver and briefly describe its configuration in detail.

**OR**

8. Discuss the sources of errors in optical receivers.

9. Explain the significance of link power budget and rise time budget with one illustration for each.

**OR**

10. Describe the eye pattern with basic equipment setup and explain key performance parameters.

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**IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018**Subject: Embedded System Design

Branch: Common to EEE &amp; ECE

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. What is an embedded system?
2. What is actuator?
3. What is the role of a processor reset and system reset?
4. What is an operating system
5. What are various embedded system designs?

**II. Answer ALL questions of the following****10x2Mark=20 Marks**

1. Explain the quality attribute Response in embedded system design.
2. What is meant by Quality attribute
3. What are the domain specific processors?
4. What are the advantages of memory shadowing?
5. What is embedded firmware?
6. Why RTC is required in an embedded system.
7. What is Super loop based design approach in embedded systems.
8. What is role of RTC in Embedded system?
9. What is critical section?
10. What is Non-Preemptive Scheduling

**PART-B****Answer ALL questions of the following****5x10 Marks= 50Marks**

1. What is embedded system, write the differences between embedded system and general computing system.

OR

2. Write short notes on . (i) Testability and Debug ability (ii) Per unit cost and total cost.

3. What is processor architecture? What is the different processor architectures available processor/controller design? Give an example?

OR

4. Discuss briefly Memory hierarchy and cache.

5. Explain the role of Brown out protection circuit in embedded system?

OR

6. Explain Programmable Peripheral Interfaces with block diagram.

7. Explain how multithreading can improve the performance of an application with an illustrative example?

OR

8. Explain multiprocessing, multitasking and multiprogramming and different multitasking models.

9. Explain the synchronous and asynchronous messaging mechanisms for IPC under windows kernel?

OR

10. State the task synchronization issues and explain how to overcome those problems

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**IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018**Subject: **DIGITAL IMAGE PROCESSING**

Branch: ECE

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer ALL questions of the following****5x1Mark=5 Marks**

- 1 Define sampling.
- 2 List the properties of Walsh transform.
- 3 Classify the spatial filtering techniques.
- 4 Write the advantage of color image processing.
- 5 Differentiate between edges and boundaries.

**II. Answer ALL questions of the following****10x2Mark=20 Marks**

- 1 What are various applications of Digital Image Processing?
- 2 What are the applications of arithmetic and logical operations.
- 3 Write the Hadamard Transform pair.
- 4 List the advantages of Slant Transform.
- 5 Mention various point operators used in image enhancement.
- 6 Explain thresholding without back ground for in image enhancement.
- 7 What is meant by noise model based on Distribution?
- 8 Write the important color features.
- 9 Classify the redundancies occur in image processing and explain.
- 10 List the edge operators.

**PART-B****Answer ALL questions of the following****5x10 Marks= 50Marks**

Q1. Explain different types of distance measures with an example.

**OR**

Q2. (a) Explain the components of an image processing system.

(b) Write short notes on relation between pixels.

Q3. (a) Obtain Slant transform for 4\*4 image.

(b) Discuss about the KL transform.

**OR**

Q4. (a) State and explain the properties of discrete walsh transform.

(b) Explain the properties of hadmard transform.

Q5. (a) Perform the histogram equalization on a given 8\*8 image in the following table.

Gray level( $r_K$ )	0	1	2	3	4	5	6	7
No. of pixels( $p_K$ )	8	10	10	2	12	16	4	2

(b) Discuss about the image smoothing in frequency domain, in detail.

**OR**

Q6. (a) Explain the smoothing spatial filtering techniques.

(b) Describe non linear filtering used in image enhancement.

Q7. (a) a) Explain about the HSV color model in detail.

(b) Write short notes on full color image processing.

**OR**

Q8. (a) Describe the Wiener filtering used for image restoration.

(b) Write short notes on order-static filters used in restoration.

Q9. (a) Develop arithmetic encoding and decoding for the given data stream a,e,i,o,u.

symble	probability
a	0.2
e	0.3
i	0.1
o	0.2
u	0.1
!	0.1

(b) Explain about various redundancies associated with image compression with example.

**OR**

Q10 (a) Describe the Split and Merge algorithm, in detail.

(b) Write short notes on Hough transform used for edge detection.



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Branch: ECE

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. List any two applications of Microwaves.
2. Distinguish between an Isolator and Gyrator.
3. What is IFC?
4. Explain the principle of operation of BARITT diode.
5. How Quality factor is measured using bench.

**II. Answer ALL questions of the following****10x2Mark=20 Marks**

1. Write  $V_p$  in terms of Cutoff frequency.
2. Determine the cut-off frequency of the dominant mode for an air filled rectangular waveguide when  $a/b = 2$  with  $a=4\text{cm}$ .
3. What are ferrites? Give their properties .
4. A 40dB directional coupler is having 30dB directivity. Determine the Isolation of Directional coupler.
5. Differentiate between O-type and M-type tubes.
6. List any two differences between klystron and TWT.
7. Why magnetron is a M-type device.
8. Write a short note on "LSA mode in GUNN diode".
9. Explain the working of Hybrid ring.
10. Define the method for measuring  $VSWR < 10$ .

**PART-B****Answer ALL questions of the following****5x10 Marks= 50Marks**

1. a). Show that the product of  $Z_{TM}$  and  $Z_{TE}$  gives square of free space impedance in rectangular wave guide. (6M)
- b). List the advantages of Microwave signal compared with low frequency signals. (4M)

**OR**

2. a). A  $TE_{11}$  mode in propagating through a circular waveguide . the radius of the guide is 5cm and the guide contains air as di-electric. Determine
  - (i). the cut-off frequency
  - (ii). Guide wavelength  $\lambda_g$  at the operating frequency 3GHZ.
  - (iii). Wave impedance in the guide. (5M)
- b). Write about power transmission in rectangular wave guide. (5M)

3. Explain the operation of directional coupler. Derive the scattering matrix for directional coupler and explain its applications.

**OR**

4. a). Discuss the applications of cavity resonators. (3M+7M)  
b). Sketch 4 port hybrid junction and justify that it is basically a 3dB directional coupler.
5. Explain the construction and working of TWT.

**OR**

6. a) Show that maximum electronic efficiency of a two cavity klystron amplifier is about 58%.  
b) Derive the expression for velocity modulation equation for two cavity klystron amplifier.
7. a). Explain Hatree conditions. (3M)  
b). How is bunching effect achieved in cavity magnetron. (7M)

**OR**

8. a) Explain Gunn effect using two valley theory.  
b) Describe the principle of operation of IMPATT diode.
9. Explain the techniques of measuring low power and high power using microwave Bench.

**OR**

10. a). Explain the measurement of high VSWR.  
b). Explain the power ratio method of measurement of attenuation