MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)
(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Maisammaguda, Dhulapally, (Post Via kompally), Secunderabad-500 100.

IV B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, APRIL – 2017
SUBJECT: DIGITAL IMAGE PROCESSING
(BRANCH: ECE)

Time: **3 Hours**   **Max Marks:75**

Answer any 5 questions   **5 x15M =75M**

1. A) What are the advantages and drawbacks of digital images?   5M

   B) State and prove any four properties of 2-D DFT.   10M

2. A) Justify the statement "Median filter is an effective tool to minimize salt and pepper noise"

   through simple illustration.   7M

   B) What is meant by histogram equalization? Explain.   8M

3. A) What is the difference between a high pass filter and a high frequency emphasis filter?

   How does the difference affect the resultant image?   7M

   B) Explain the separable and non-separable filter masks with filter functions. 8M

4. A) Give and explain the image degradation model.   7M

   B) How the least square filtering restores the original image from degraded image? Explain.   8M

5. A) What are the filters which are used to detect the lines present in an image? Explain.   7M

   B) What is meant by thresholding? Explain hard and soft thresholding techniques.   8M

6. A) Give the block diagram of image compression model. Explain.   7M

   B) Explain any one lossy image compression method with an example.   8M

7. Explain the implementation of Discrete Wavelet Transform using filter banks in detail.   15M

8. A) What is meant by Morphological image processing? Explain.   5M

   B) Explain Dilation and Erosion in detail.   10M

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IV B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, APRIL - 2017
SUBJECT: <u>VLSI DESIGN</u>
(BRANCH: ECE)

Time: **3 Hours**   Max Marks:75

Answer any **Five** Questions   5x15=75

1. a) Explain the various steps involved in the N-well CMOS fabrication process with the help of neat diagrams. [10]
   b) Why ion-implantation is preferred over diffusion for impurity doping? Explain briefly ion- implantation technique. [5]

2. a) Explain about the BiCMOS inverters with neat diagrams. [7]
   b) Derive the drain current and drain voltage relationship for an N-channel Enhancement MOSFET for different regions of operation. [8]

3. a) Mention the scaling factors for device parameters . Explain the limitations of scaling? [8]
   b) Draw the schematic and physical design of 2 input CMOS NAND gate. [7]

4. a) Explain Dynamic CMOS logic and Clocked CMOS logic with neat sketches. [8]
   b) Quantity the area capacitance of the layer. [7]

5. a) Explain the 3 transistor DRAM cell operation. Draw the stick diagram and Mask layout.
   b) Explain how a comparator for two n-bit numbers is carried out. [8+7]

6. a) Implement the following Boolean functions using PLA. [8]
   F1(A,B, 1,2,4,6)
   F2(A,B,C)=$\sum$(0,1,6,7)
   F3(A,B,C)=$\sum$(2,4,5,6,7)

   b) Draw and explain architecture of CPLD with neat sketches. [7]

7. a) Write short notes on [9]
   i) Simulation   ii) Circuit Synthesis   iii) VHDL Operators
   b) Write the VHDL code for a 4-bit subtractor using a full subtractor as a component. [6]

8. a) Explain Scan based strategies for testability. [8]
   b) Explain the procedure for testing sequential logic circuits. [7]

Code No.: **20422**

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IV B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, APRIL – 2017

SUBJECT: MICROWAVE ENGINEERING

(BRANCH: ECE)

Time: **3 Hours**   Max Marks:75

Answer any **Five** Questions   5x15=75

1. a) Explain the following in rectangular waveguide   (8+7)
        i) TE wave solutions
        ii) TM wave solutions
    b) Determine the the cut-off wavelength for the dominant mode in a rectangular wave guide of breath of 10 cms. For a 2.5 GHz signal propagation in the this wave guide in the dominant mode; calculate the guide wave length, the group and phase velocities

2. a) Explain the types of losses in micro strip losses   (6+9)
    b) A lossless parallel strip line has conducting strip width w. The substrate dielectric separating the two conducting strips has a relative constant ε of 6 and thickness d of 4 mm. Calculate
    i) The required width w of the conducting strip in order to have a characteristics impedance of 50Ω.
    ii) The strip line impedance.   iii) The strip line inductance.

3   a) Explain the types of microwave attenuators?   (8+7)
    b) Explain the microwave posts and tuning screws?

4   a) What is the significance of scattering matrix? State its properties.   (6+9)
    b) Derive the scattering matrix for Directional coupler

5   a) explain the limitations of conventional tubes at micro wave frequencies   (5+10)
    b) explain the following in klystron amplifier
    i) Velocity modulation processes   ii) Bunching processes

6   a)Explain the amplification process of helix travelling wave tube   (7+8)
    b) A TWT operates under the following parameters
        Beam current=50Ma
        Beam voltage=2.5Kv
        Characteristics impedance of helix =6.75Ω
        Circuit length=45
        Frequency =8GHz
Determine :
i)The gain parameter C   ii) The output power gain in decibels   iii) All four propagation constants
iv) The wave equations for all four modes in exponential form

7 a) Explain the two valley model theory in gunn diode   (5+5+5)

b) A typical n type GaAs gunn diode has the following parameters

Electron density=10^{18}cm^{-3}

Electron density at lower valley=10^{10}cm^{-3}

Electron density at upper valley=108cm^{-3}

Temperature =300^{0}k

Determine the conductivity of the diode

c) A typical n type GaAs gunn diode has the following parameters

(5)

Threshold field=2800V/cm

Applied field=3200V/cm

Device length=10µm

Doping concentration=$2x10^{14}$cm^{-1}

Operating frequency=10GHz

Calculate

i) Compute the electron drift velocity

ii) Calculate the current density

iii) Estimate the negative electron mobility.

8 a) Explain the general setup of microwave bench   (5+10)

b)Explain the measurement of attenuation

i) Power ratio method

ii)RF substitution method

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IV B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, APRIL – 2017
SUBJECT <u>ELECTRONICS MEASUREMENT & INSTRUMENTATION</u>
(BRANCH: ECE)

Time: **3 Hours**   Max Marks:75

Answer any 5 questions   **5 x15=75M**

1. a) Discuss about principle and operation of electro dynamo meter   [8M]

   b) Discuss about various static characteristics of a system   [7M]

2. a) What are the precautionary measures to be taken in a signal generator [6M]

   b) Explain the principle and working of Ramp Type DVM   [9M]

3. a) What is the role of active filter heterodyne wave analyzer   [7M+8M]

   b) With the help of block diagram. Explain the spectrum Analyzer of sweep receiver design

4. Which type of bride circuit is used to determine L having Q factor in the range of 1 to 10?

   Draw the circuit and derive the equation for unknown inductance   [15M]

5. a) What are the applications of CRO   [8M]

   b) Explain in detail the sweep generator in CRO.   [7M]

6. a) Distinguish between digital storage oscilloscope & conventional storage oscilloscope   [5M]

   b) Discuss about working principle of dual beam CRO with the help of neat block diagram.

   What are the advantages and disadvantages of it   [10M]

7. a) Draw and explain the capacitance transducers arrangement to measure angular velocity

   and what are its limitations   [8M]

   b) Explain how pressure is measured using Pizeo electric transducers   [7M]

8. What are the different types of accelerometers? How mechanical shocks and vibrations are

   measured by means of potentiometric accelerometer ? Explain it with a neat sketch   [15M]