Code No.: 304B2 MR13

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: **OPTICAL COMMUNICATIONS**

(BRANCH: **ECE**)

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

PART-A

I. Answer all the questions **5 x1=5M**

1. What is the numerical aperture of an optical fiber?
2. What is pulse broadening?
3. What is meant by fibre splicing?
4. What is detector Response Time?
5. Mention key system requirements needed in analyzing a link.

II Answer all the questions **10 x 2=20M**

1. Define cut-off wavelength.
2. An Optical fiber has the following data n1=1.5, n2=1.45.calculate (i) critical angle (ii) Numerical Aperture
3. Explain material dispersion.
4. Write the principal requirement of a good connector design.
5. Write the reliability considerations of LED.
6. Define threshold current.
7. Give the advantages of PIN photodiodes.
8. Write the sources of errors in optical receivers.
9. Draw the simplified eye diagram showing key performance parameters.
10. Define Cutback technique in Attenuation measurements.

PART-B

Answer all the questions **5 x 10=50M**

1. What are the major elements present in optical fibre transmission link with neat sketch?

OR

2. a) Explain about chalenide glass fibers with neat diagram.
   b) Describe the basic block diagram of a optical communication system.

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

OR

4. Briefly mention about Laser diode rate equations in detail.

5. Describe for a fabry perot resonator laser diode and obtain its rate equations for steady state output.

OR

6. Derive the expressions for the power coupled from a surface emitting LED into step index and graded index fibers.

7. a) Discuss the possible sources of noise in optical receiver.
   b) Compare PIN diode and APD in all aspects.

OR

8. Derive the expression for signal- to- noise ratio obtained at the output of an optical receiver.

9. a) Describe the principle of WDM for optical communication links.
   b) Describe eye patterns technique to assess the performance of digital fiber optic link.

OR

10. Explain about link power budget and rise time budget.

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

SUBJECT: **CELLULAR AND MOBILE COMMUNICATIONS**

(BRANCH: ECE)

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

PART-A

I. Answer all the questions **5 x1=5M**

1. Define Coherence Bandwidth.
2. List the demerits, in a cellular system if the cluster size is greater than 7.
3. Define incident angle.
4. What is the importance of channel sharing?
5. What is meant by forced handoff?

II Answer all the questions **10 x 2=20M**

1. What are the different standards in second generation's cellular systems?
2. Explain the concept of frequency reuse.
3. List the effects of cell site components on cellular communications.
4. Differentiate co-channel and non co-channel interferences.
5. Write the expression for Phase Difference between Direct and Reflected Paths.
6. Explain about foliage loss.
7. Explain about paging channels
8. What is non fixed channel assignment?
9. Draw two –level handoff scheme diagram.
10. What are the advantages of delayed handoff?

PART-B

Answer all the questions **5 x 10=50M**

1. Derive the C/I for normal case in an Omni directional antenna system.

(OR)

2. a) Derive the expression for co-channel interference reduction factor. [6+4]
   b) Justify how do the cell splitting used to improve the utilization of spectrum efficiency in a cellular system.

3. Explain about how are the co-channel and adjacent channel interference reductions done in mobile communication system.

(OR)

4. a) Explain the antenna parameters and its effects on the cell interferers. [6+4]
   b) Explain about the space diversity scheme in detail.

5. What are the different types of antennas used at cell site? Explain them in detail.

(OR)

6. Discuss Lee model of point to point propagation.

7. Write about non fixed channel assignment.

(OR)

8. Write notes on setup channels.

9. How the dropped call rate is related to the capacity and voice quality.

(OR)

10. What type of handoff is used when a call initiated in one cellular system enters another system before terminating? Explain how it works?

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

SUBJECT: DIGITAL IMAGE PROCESSING

(BRANCH: **ECE**)

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

PART-A

I. Answer all the questions **5 x1=5M**

1. Write the expression to find the number of bits required to store a digital image.
2. List the advantages of Walsh transform.
3. What is the purpose of image averaging?
4. Write the advantage of color image processing.
5. What is point detection.

II Answer all the questions **10 x 2=20M**

1. Write short notes on neighbors of a pixel.
2. What are the applications of arithematic and logical operations?
3. Write the Hadamard Transform matrix H_N for N=4.
4. Express Discrete fourier transform and its inverse mathematically.
5. What is meant by masking?
6. Write the importance of gray level slicing technique.
7. What is the principle of inverse filtering?
8. Write about RGB color model.
9. Write briefly about Prewitt operator used in image segmentation.
10. Define Psychovisual Redundancy.

PART-B

Answer all the questions **5 x 10=50M**

1. Briefly discuss about the elements of a digital image processing system. [10M]

OR

2. Explain Translation, Scaling and Rotation Techniques in Imaging geometry [10 M]

3. a) Explain the hotelling transform. [5 M]

   b) Define 2-D Fourier Transform and state its properties. [5 M]

OR

4. (a) State and prove the seperability property and translation properties of 2D-DFT. [5 M]

   (b) Obtain the 2D Walsh transform kernel for N=4 [5 M]

5. (a) Explain the smoothing spatial filtering techniques. [5 M]

(b) Describe non linear filtering used in image enhancement. [5 M]

OR

6. Explain in detail about spatial filtering. [10M]

7. (a) Explain about the HSV color model in detail. [5 M]

(b) Write short notes on full color image processing. [5 M]

OR

8. a) Define image restoration. Describe various noise models used for restoration. [5 M]
b) Explain about gray level to color transformation in Pseudo-color Image processing [5 M]

9. Explain in detail edge detection and edge linking. [10M]

OR

10. a) What are the various types of Redundancies and explain them briefly? [5M]

b) Explain Arithmetic coding with an example. [5M]

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

SUBJECT: **MANAGEMENT SCIENCE**

BRANCH: **ECE**

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

PART-A

I. Answer all the questions **5 x 1 = 5 Marks**

1. Name the leadership styles.
2. Explain Facilities Location.
3. Discuss about Collective Bargaining.
4. What is the rule for drawing Network?
5. Explain mission and goal in strategic management.

II. Answer all the questions **10 x 2 = 20 Marks**

1. State the functions of management.
2. Give brief account of division of lab our and job specialization
3. Define Batch Production.
4. Explain Process layout?
5. What do you mean by Recruitment and selection?
6. Point out the Interview Methods.
7. Write a note on Network Analysis.
8. Write about project crashing.
9. Explain Vision and Mission of organization.
10. Write mission statements for any company.

PART-B

Answer all the questions **5 x 10 = 50 Marks**

1. Can you consider management either as an art or science? Justify your answer?

(OR)

2. Briefly explain about Theory X and Y
3. What do you understand by TQM? How does this concept differ from quality control techniques?

(OR)

4. What do you mean by productivity? What technique can be implemented to increase productivity?
5. Discuss the meaning and objective of industrial relations?

(OR)

6. A) Explain how HR planning process can be formulated.

   B) What is recruitment? Evaluate different source of recruitment?

7. Write the steps involved in network diagram with an example.

(OR)

8. Differentiate between PERT and CPM.

9. How will you conduct SWOT analysis? Illustrate with an example?

(OR)

10. Explain in brief the value chain analysis.

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

SUBJECT: **MICROWAVE ENGINEERING**

(BRANCH: **ECE**)

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

PART-A

I. Answer all questions. **5 x1=5M**

1. Write frequency range of L, X-Band
2. What is RAT RACE Junction?
3. What are the losses of conventional tubes at high frequencies?
4. What is strapping in magnetron.
5. What is bolometer method?

II. Answer all questions **10 x 2=20M**

1. Write applications of Microwave frequency range.
2. Why ohmic losses occurs in micro strip lines.
3. List the Waveguide Attenuators and Waveguide Phase Shifters?
4. What are ferrites? Give their properties .
5. What are the limitations of conventional tubes at microwave frequency range?
6. What is current modulation in two cavity klystron?
7. Explain different modes of operation of Gunn diode?
8. What are avalanche transit time devices? Compare them with TED's.
9. Define the method for measuring VSWR<10.
10. Write s-matrix of a two port network. Write relation between incident and reflected powers.

PART-B

Answer any 5 questions. **5 x 10=50M**

1. a) Derive the general solutions for TEM and TE waves? (7M)
   b) Explain about Group velocity with an Example? (3M)

(OR)

2. (a) What is microwave frequency range? Write Microwave band designation according to IEEE standards. (5M)
   b) An air filled rectangular wave guide of dimensions 7 X 3.5 cm operates in the dominant TE_{10} mode.
   (i) Find the cutoff frequency
   (ii) Find the phase velocity of the wave in the guide at the frequency of 3.5 GHz.
   (iii) Determine the guided wave length at the same frequency. (5M)

3. With construction diagram explain the operation of any two ferrite devices (10M)

(OR)

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

5. What are slow wave structures? Explain how a helical TWT achieves amplification. (10M)

(OR)

6. Explain the bunching process in drift space of two cavity klystron amplifier with neat diagram and derive the expression for velocity modulation. (10M)

7. Explain the function of magnetron with a neat diagram. What is π-mode? How it is different from other modes. (10M)

(OR)

8. (a) A Ku-band IMPATT diode has a pulse operating voltage of 100v and a pulse operating current of 0.9 A. The efficiency is about 10%. (4M)
   Calculate
   i. The output power
   ii. The duty cycle if the pulse width is 0.01ns and frequency is 16 GHz.
   (b) Describe the principle of operation of IMPATT diode. (6M)

9. a) Calculate the standing wave ratio of a transmission system operating at 8Ghz. The distance between twice minimum power points is 0.9mm on a slotted line whose velocity factor is unity. (4M)
   b) Explain the Bolometer technique for micro wave power measurement (6M)

(OR)

10. (a) In order to sample incident and reflected power in a waveguide, two identical 30-dB directional couplers are used. If VSWR = 2 and output of the directional coupler sampling incident power = 4.5mW, determine the value of the reflected power. (4M)
    (b) What is a two-port device in which port 1 to 2 exhibits zero attenuation and port 2 to 1 exhibit maximum attenuation, Derive its S-matrix. (6M)

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MR13

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

SUBJECT: **VLSI Design**

(BRANCH: ECE)

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

PART-A

I. Answer all the questions **5 x1=5M**

1. Compare CMOS and BICMOS technology.
2. Write the equation for I_{DS} in non saturation region ?
3. What are the different MOS layers used in fabrication?
4. Define carry-skip?
5. Abbreviation of LUT.

II Answer all the questions **10 x 2=20M**

1. What is pass transistor?
2. What are the remedies for the latch-up problem.
3. Sketch the stick diagram for 2 input NOR gate?
4. What are design rules? Why is metal-metal spacing larger than poly-poly spacing.
5. Differentiate between gate logic and switch logic.
6. Explain about Delay unit?
7. What is function of logical shifter?
8. Explain the operation of Comparator?
9. Explain the Need for testing.
10. Define Controllability and Observability ?

PART-B

Answer all the questions **5 x 10=50 Marks**

1. Discuss different forms of Pull Up, mentioning Merits and Demerits of each form?

(OR)

2. Explain the fabrication process of BICMOS.

3. Draw the CMOS representation Stick diagram and Layout for a two Input EX-NOR gate?

(OR)

4. Write a short notes on VLSI design flow.

5. Explain the effect of wiring capacitance on the performance of a VLSI circuit.

(OR)

6. Describe three sources of wiring capacitances. Explain the effect of wiring capacitance on the performance of a VLSI circuit?

7. Design a magnitude comparator based on the data path operation?

(OR)

8. Explain the operation of 6-Transistor SRAM with neat timing diagrams.

9. Explain the architecture of FPGA with neat diagram.

(OR)

10. Explain about the different sources of capacitances in MOS ?