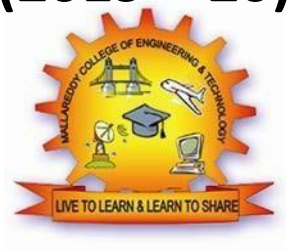
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

QUESTION BANK

FOR

(R17) III B.TECH II SEM
(2019 – 20)



MALLA REDDY COLLEGE OF ENGINEERING &TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade, ISO 9001:2008 Certified)

Maisammaguda, Dhulapally, Secunderabad – 500100.

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R17

Code No: **R17A0416**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester

Antennas and Wave Propagation

(ECE)

MODEL PAPER-I

Time: 3 hours **Max. Marks: 70**

This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION – I

1. Prove that the radiation resistance of half wave dipole antenna is 73ohm . [14M]

(OR)

2. Discuss in detail about the Far – Fields and patterns of thin Linear centre fed antennas of different lengths. [14M]

SECTION – II

3. What are 'Microstrip antennas'? Discuss in detail about its features, advantages and limitations. [14M]

(OR)

4. List out all the steps involved in design considerations of pyramidal Horns. [14M]

SECTION – III

5. Bring out the differences between Broadside arrays and Binomial arrays. Explain in detail about binomial array including radiation pattern. [14M]

(OR)

6. Discuss in detail, about Antenna Gain measurement with respect to various methods. [14M]

SECTION – IV

7.What is line of sight propagation? Elaborate LOS using neat labeled diagram and derive the expression for the same. [14M]

(OR)

8.With a neat diagram, explain in detail the principle involved in Tropospheric Propagation its advantages, limitations and applications. [14M]

SECTION – V

9.Enumerate the concept involved in "Multihop Propagation'. Also give its advantages and limitations. [14M]

(OR)

10.Discuss in detail about the Reflection of sky waves by Ionosphere virtual height and skip distance. [14M]

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester

Antennas and Wave Propagation

(ECE)

MODEL PAPER-II

Time: 3 hours **Max. Marks: 70**

This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION – I

1. Discuss in detail about the concepts involved in Fields from Oscillating Dipole and Field Zones . [14M]

(OR)

2. Explain in detail about Retarded Potentials and Helmholtz theorem. [14M]

SECTION – II

3. Discuss in detail about the Geometry of Non Metallic dielectric lenses and zoning. [14M]

(OR)

4. Explain about the operating principle of helical antenna in normal mode. [14M]

SECTION – III

5. Explain in detail about the features, advantages and limitations of Uniform Linear Arrays. [14M]

(OR)

6. Explain in detail about the measurement of radiation pattern with neat diagram. [14M]

SECTION – IV

7. What do you understand by 'Super Refraction' Also, explain in detail about Scattering phenomena and Wave tilt. [14M]

(OR)

8. Derive an expression for the variation of field strength of a space wave, with antenna heights and distance involved. [14M]

SECTION – V

9.With neat diagram, explain about Refraction of Sky wave by Ionosphere. [14M]

(OR)

10.Derive the relation between MUF and Skip distance. [14M]

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R17

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester

Antennas and Wave Propagation

(ECE)

MODEL PAPER-III

Time: 3 hours **Max. Marks: 70**

This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION – I

1. Write short notes on patterns, radiation intensity, beam efficiency and front to back ratio . [14M]

(OR)

2. Define radiation resistance and find the radiation resistance for half wave dipole antenna. [14M]

SECTION – II

3. Discuss different types of horn antennas with neat sketches. [14M]

(OR)

4. Write short notes on Yagi-Uda array Antenna and its applications, advantages and drawbacks. [14M]

SECTION – III

5. a) Explain about end fire array. [7M]
   b) Explain the principal of operation of linear array patterns. [7M]

(OR)

6. Explain the gain measurements by comparison absolute and 3- antenna methods. [14M]

SECTION – IV

7. a) Explain the different modes of Propagation. [7M]
   b) Explain wave tilt of surface wave [7M]

(OR)

8. Describe the troposphere and explain how ducts can be used for microwave Propagation. [14M]

SECTION – V

9. a) Explain critical frequency and virtual height. [7M]
   b) What is the critical frequency for reflection at vertical incidence if the maximum value of electron density is 1.24*10^6/cm^3 [7M]

(OR)

10. Explain the Structure of Atmosphere. [14M]

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.Tech III Year II Semester Examinations

DIGTIAL COMMUNICATIONS

(Electronics and Communication Engineering)

Model Question Paper-1

Time: 3 hours Max. Marks: 70

Note: Paper consists of 5 Sections. Answer any one full question from each Section. Each question carries 14 marks and may have a, b, c, as sub Questions

SECTION-I

1. (a) Explain DPCM transmitter & receiver with a neat block diagram & necessary equations.
   (b) A voice frequency signal band limited to 3 KHz is transmitted with the use of DM system. The pulse repetition frequency is 30,000 pulses/sec and the step size is 40 mV. Determine the permissible speech signal amplitude to avoid slope overload distortion.

(OR)

2. (a) Derive an expression for Signal to Quantization noise in PCM system.
   (b) Explain the concept of Companding.

SECTION-II

3. (a) Explain the operation of DPSK transmitter and receiver.
   (b) The bit stream 1011100011 is to be transmitted using DPSK. Determine the encoded sequence and transmitted phase sequence.

(OR)

4. Explain coherent detection of FSK and also derive the expression for probability of error.

SECTION-III

5. (a) Explain the bandwidth and signal to noise tradeoff.
   (b)Define conditional entropy. Explain how it is related to mutual information.

(OR)

6. (a) Given six messages $x_1, x_2, x_3, x_4, x_5, x_6$ with probabilities, $P(x1) = 1/3$, $P(x2)=1/4$, $P(x3)= 1/8$, $P(x4)=1/8$, $P(x5)= 1/12$ $P(x6) = 1/12$. Find the Shannon-Fano code. Evaluate the coding efficiency.
   (b) Repeat the problem using Huffman coding & evaluate the code efficiency.

SECTION-IV

7. a. What are linear codes? Describe the various methods of error control with their advantages and disadvantages.
   b. An error control code has the following parity check matrix

$$H = \begin{bmatrix} 1 & 0 & 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$$

(i) Determine the generator matrix 'G'

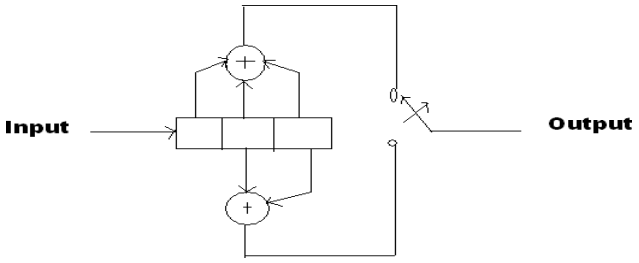
(ii) Decode the received code word 110110. Comment on error detection capability of this code.

(OR)

8. a. Describe the encoding, syndrome & decoding of cyclic codes in detail with neat sketches.
   b. List out the advantages & disadvantages of cyclic codes.

SECTION-V

9. The encoder for a convolution code is as shown below.



a) What are the connection vectors?
b) What are the polynomials?
c) What is the impulse response?
d) Draw the state diagram
e) Write the output for an input of {1 1 0 1 0 0 1 0 0}
f) Draw the Trellis diagram up to depth '4'

(OR)

10. A convolutional encoder is described by the polynomials

$g1(x) = 1+x+x^2$
$g2(x) = x+x^2$
For this encoder

a. Find the connection vectors
b. Draw the state diagram
c. Find the output for message input 1010

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.Tech III Year II Semester Examinations

DIGTIAL COMMUNICATIONS

(Electronics and Communication Engineering)

Model Question Paper-2

Time: 3 hours Max. Marks: 70

Note: Paper consists of 5 Sections. Answer any one full question from each Section. Each question carries 14 marks and may have a, b, c, as sub Questions

SECTION-I

1. a. Explain DM transmitter & receiver.

   b. Explain the drawbacks of Delta Modulation.

(OR)

2. a. Discuss the advantages and disadvantages of digital communication system.
   b. State and prove sampling theorem in time domain.

SECTION-II

3. a. Draw the block diagram of QPSK system (modulator & detector) and explain its working.

   b. Derive the expression for the probability of error of QPSK.

(OR)

4. a. Explain non- coherent ASK detector in detail.
   b. Explain detection of FSK using PLL

SECTION-III

5. Define the concept of information. List its properties and prove them
6. a. State and prove properties of mutual information and entropy.

   b. Prove that H(X, Y) = H(X) + H(Y/X) = H(Y) + H(X/Y).

SECTION-IV

7. a. State and explain the properties of cyclic codes

   b. The generator polynomial of a (7, 4) cyclic code is $x^3 + x + 1$. Construct the generator matrix for a systematic cyclic code and find the code word for the message (1101) using the generated matrix.

(OR)

8. a. Explain the principle and operation of encoder for Hamming code.

   b. A generator matrix for generating linear codes is as follows

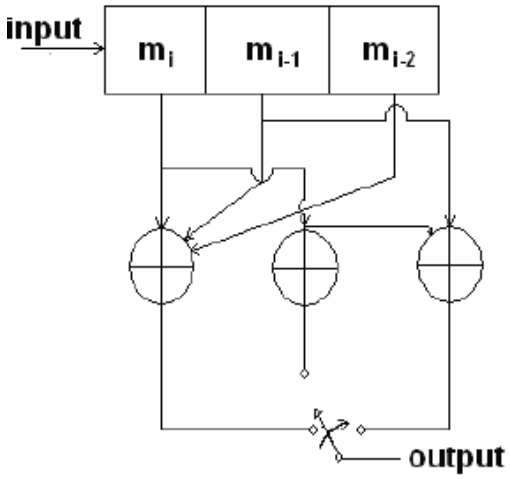
$$G=\left(\begin{array}{cccc:ccc} 1 & 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 & 1 & 1 & 1 \end{array}\right)$$

i) What is the message length for which this code generated may be used, the code word length, code rate and redundancy rate

ii) Find the code words for the possible messages

SECTION-V

9. a. For the convolutional encoder shown below, draw the state diagram and the trellis diagram



b. What is a convolutional code? Compare Trellis & Code Tree.

(OR)

10. Explain the Viterbi decoding of convolutional code.

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B.Tech III Year II Semester Examinations

DIGTIAL COMMUNICATIONS

(Electronics and Communication Engineering)

Model Question Paper-3

Time: 3 hours Max. Marks: 70

Note: Paper consists of 5 Sections. Answer any one full question from each Section. Each question carries 14 marks and may have a, b, c, as sub Questions

SECTION-I

1. a. A TV signal with a bandwidth of 4.2 MHz is transmitted using binary PCM. The number of representation level is 512. Calculate:
   i) Code word length
   ii) Final bit rate
   iii) Transmission bandwidth.
   b. Describe delta modulation with a neat sketch.

(OR)

2. a) Derive an expression for signal to quantization noise ratio of a PCM encoder using uniform quantizer when the input signal is uniformly distributed.
   b) What is companding? Explain the compression laws A-law and μ- law.

SECTION-II

3. Explain BPSK modulation and coherent reception of BPSK signal

(OR)

4. a. What is a matched filter?
   b. Derive the Probability of error of ASK.

SECTION-III

5. a. Explain why information measure is logarithmic & inversely proportional to the probability. What are the units of information measure?
   b. State the significance of H(Y/X) and H(X/Y).

(OR)

6. A source emits different symbols a,b,c,d,e with respective probabilities 0.1, 0.2,0.1,0.1,0.5. Obtain the code words using Huffman coding and also calculate entropy.

SECTION-IV

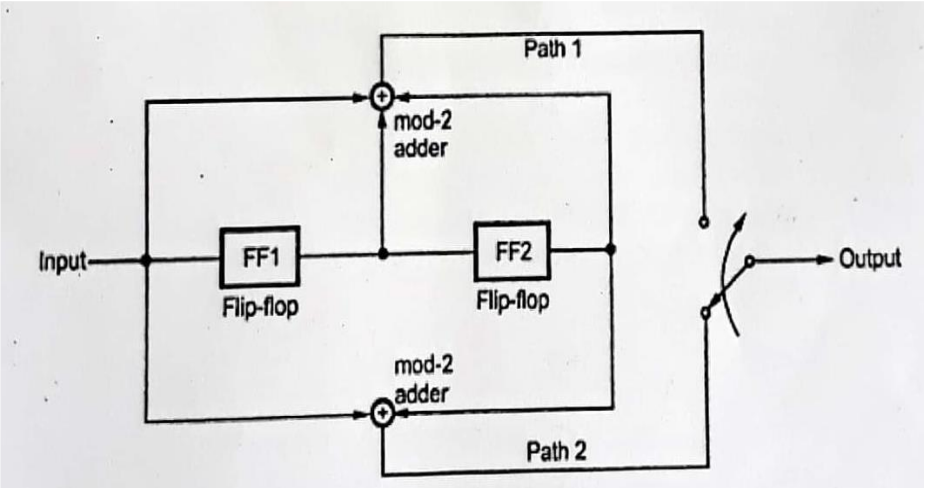
7. Consider the (15,9) cyclic code generated by $G(p)=p^6+p^5+p^4+p^3+1$, draw the encoder & Syndrome calculator.

(OR)

8. (a) Briefly discuss about a linear block code error control technique.
   (b) Briefly discuss about parity check bit error control technique.

SECTION-V

9. For the convolutional encoder shown in the figure, determine the following:
   a. Dimension of the code
   b. Constraint length
   c. Generating sequences (impulse responses)
   d. Output sequence for the message sequence of m=(1 0 0 1 1)



(OR)

10. Explain generation of convolutional code using an example. Also explain the term constraint length and its significance in convolutional code.

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B.Tech III Year II Semester Examinations

DIGTIAL COMMUNICATIONS

(Electronics and Communication Engineering)

Model Question Paper-4

Time: 3 hours Max. Marks: 70

Note: Paper consists of 5 Sections. Answer any one full question from each Section. Each question carries 14 marks and may have a, b, c, as sub Questions

SECTION-I

1. a. Explain the elements of digital communications system with the help of a neat block diagram.
   b. Consider a DM system used to transmit a voice signal, which is uniformly sampled at the rate of 64KHz. Assume the following specifications voice signal bandwidth=3.1 KHz, Maximum signal amplitude=10 volts, to avoid slope overload distortion, what is the minimum permissible value of the step size Δ used in the system?

(OR)

2. (a) Explain PCM generation and Receiver.
   (b) In a binary PCM system, the output signal to quantizing noise ratio is to held to be 40dB. Determine the number of required levels.

SECTION-II

3. (a). Explain the FSK Spectrum with equations and Calculate BW of FSK.
   (b) Determine the Probability of error of FSK.

(OR)

4. (a) Derive the expression of probability of error of matched filter.
   (b) Explain the realization of optimum filter using correlator.

SECTION-III

5. (a) Show that if there are M numbers of equally likely messages then entropy of the source is $\log_2 M$.
   (b) Define Mutual Information. List its properties.

(OR)

6. A DMS has a alphabet of seven symbols with probability for its output as described here

Symbol	S0	S1	S2	S3	S4	S5
Probability	0.25	0.0625	0.0625	0.125	0.375	0.125

   Compute the Huffman code for this source and explain why the computed source code has an efficiency of 100%. Calculate H.

SECTION-IV

7. (a) Explain the matrix description of Linear Block codes.

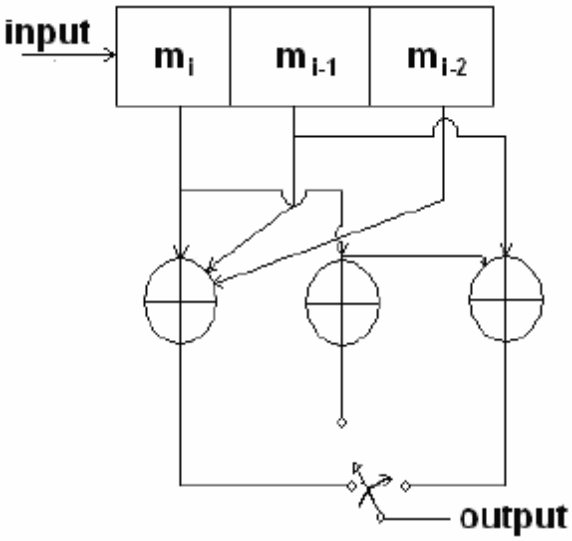
(b) Write short notes on Hamming codes. Explain about the error detection & correction capabilities.

(OR)

8. (a) Define cyclic codes. List the properties of cyclic codes.
(b) Design a Syndrome Calculator for a (7,4) cyclic Hamming code generated by the polynomial $G(p)=p^3+p+1$. Calculate the syndrome for Y= (1001101).

SECTION-V

9. For the convolutional encoder shown below, draw the state diagram and the trellis diagram and calculate Constraint Length, Dimension of the code, Generating sequence.



(OR)

10. Draw the state diagram, tree diagram and trellis diagram for K=3, rate=1/3 code generated by $g_1(x)=1+x^2$ (or){1 0 1}, $g_2(x)=1+x$ (or){1 1 0}, $g_3(x)=1+x+x^2$ (or){1 1 1}.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.Tech III Year II Semester Examinations

DIGTIAL COMMUNICATIONS

(Electronics and Communication Engineering)

Model Question Paper-5

Time: 3 hours Max. Marks: 70

Note: Paper consists of 5 Sections. Answer any one full question from each Section. Each question carries 14 marks and may have a, b, c, as sub Questions

SECTION-I

1. (a) Explain about the noise in PCM systems
   (b) Write the comparison between PCM, DPCM, DM & ADM systems.

(OR)

2. (a) Explain the process of Sampling & Quantization in digital communication systems.
   (b) Explain the need for non-uniform quantization in digital communication systems.
   (c) What is the need for ADM? Explain ADM Transmitter and Receiver.

SECTION-II

3. (a) Draw the block diagram of a baseband signal receiver and explain.
   (b) Obtain the optimum filter transfer function.

(OR)

4. Derive the probability of error of BPSK

SECTION-III

5. (a) State and prove Shannon-Hartley theorem.
   (b) Calculate the channel capacity with bandwidth 1MHz and Signal to noise ratio of 3000.

(OR)

6. Explain the procedure for Huffman coding with an example.

SECTION-IV

7. a. Describe the algebraic structure of cyclic codes.
   b. Explain how to encode cyclic codes.

(OR)

8. The parity check bits of a (8,4) block code are given by

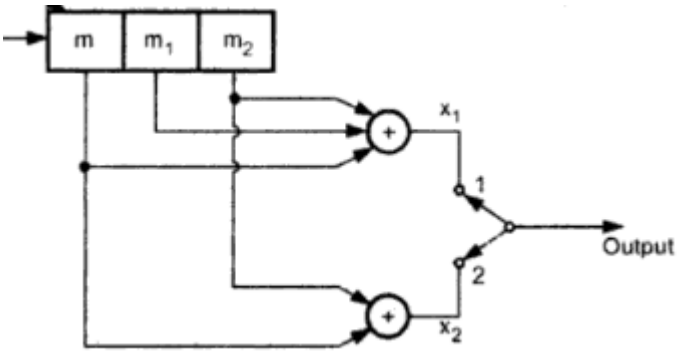
   c1=m1+m2+m4
   c2=m1+m2+m3
   c3=m1+m3+m4
   c4=m2+m3+m4

   Here m1, m2, m3 and m4 are the message bits
   (a) Find the generator matrix and parity check matrix for this code.
   (b) Find minimum weight of this code

(c) Find error detecting capabilities of this code.

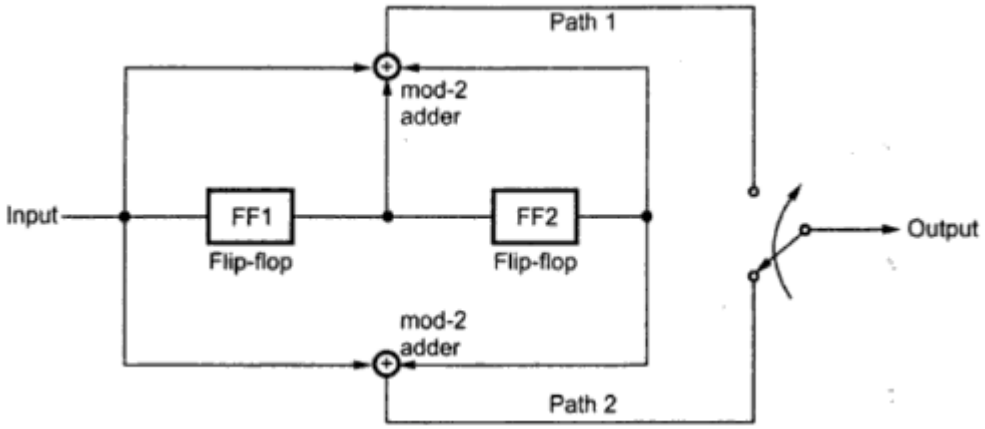
SECTION-V

9. Find the convolutional code for the message sequence m=(1 0 0 1 1) using the following encoder using Transform domain approach.



(OR)

10. For convolutional encoder with constraint length of 3and rate ½ shown below, draw the state diagram, Trellis diagram and by using Viterbi algorithm decode sequence 01 00 01 00 00



R17

Code No: R17A0414

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III B.Tech II Semester Model Paper-1

Microprocessors and Microcontrollers

(ECE)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION – I

1. a) Explain the register organization of 8086 microprocessor. [7M]
   b. What is memory segmentation? Explain the use of segmentation in different applications. [7M]

(OR)

2.a)With a neat sketch describe the Minimum and Maximum mode of operation of 8086. [7M]
b. Discuss in detail the various signals of 8086. [7M]

SECTION – II

3.a) Write an 8086 assembly language program to sort an array of data in descending order. [7M]
b.) Discuss about the different Address Modes of 8086. Give Example for each type. [7M]

(OR)

4.a) Write an 8086 assembly language program to multiply two 8 bit binary numbers. [7M]
b.) Explain in detail about the Stack Structure of 8086. Write a sample program to illustrate the concept of programming the stack. [7M]

SECTION – III

5.a) Explain about I/O Interfacing and Memory Interfacing with 8086 with an example? [7M]
b.) Draw the Block diagram and explain the operations of 8251 serial communication interface? [7M]

(OR)

6.a) Draw the Block diagram of 8255 and explain the functions of each block. [7M]
b.) Draw the Block diagram of 8257 DMA controller and explain its operations. [7M]

SECTION – IV

7.a) With the functional block diagram, explain the architecture of 8051 microcontroller. [7M]
b.) Write an Assembly Language Program using 8051,
i) Addition of two 8 bit Numbers ii). Multiplication of two 8 bit Numbers [7M]

(OR)

8.a) Draw the Pin diagram of 8051 Microcontroller and explain the functions of each pin. [7M]
b.) Discuss in detail about the Addressing Modes of 8051 Microcontroller. [7M]

SECTION – V

9.a) Explain about the Timers of 8051 with its Modes of Operation, and the Registers used for 8051 Timers. [7M]
b.) What are the interrupts available in 8051? Explain about the Interrupt Structure. [7M]

(OR)

10. Explain about the Serial data communication of 8051 with its registers. Also explain about the Modes of operation of the same. [14M]

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R17

Code No: R17A0414

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III B.Tech II Semester Model Paper-2

Microprocessors and Microcontrollers

(ECE)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION – I

1.a) Draw and explain the each bit of flag register of 8086 family microprocessor.
b) Describe the implementation of pipelined process of 8086. [7+7]

OR

2.a) Draw and explain the read and write cycle timing diagrams of 8086 in maximum mode.
b) Explain the physical memory organization of 8086 system. [8+6]

SECTION – II

3. Enlist the addressing modes of 8086 and describe briefly each addressing mode with one example. [14]

OR

4. Explain the all assembler directives of 8086 with suitable examples. [14]

SECTION – III

5.a) Interface Eight 8K RAM chips and Four 8K×4 EPROM chips with 8086 so as to form a completely working system configuration.
b) Explain the interfacing procedure of an 8-bit ADC with 8086 microprocessor. [7+7]

OR

6.a) Explain the briefly the different modes operation of 8255 PPI.
b) Draw and explain the synchronous mode transmitter and receiver data formats of 8251. [7+7]

SECTION – IV

7. Draw and explain the internal architecture of 8051 family microcontroller and explain each block of it. [14]

OR

8.a) Describe briefly the register set of 8051 microcontroller.
b) Explain the importance of data transfer type instructions of 8051. [7+7]

SECTION – V

9. Draw and explain the following SFRs. [7+7]
a) IE b) IP

OR

10.a) Write and explain the instructions to read the SBUF eight times with an interval of 0.33ms and save the results between the R0 and R7 of the register bank 0.
b) How does the timer overflow interrupt differ from real time clocked interrupts? Discuss in detailed. [7+7]

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R17

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III B.Tech II Semester Model Paper-3

Microprocessors and Microcontrollers

(ECE)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION – I

1. Explain the architecture of 8086 with neat diagram. (14M)

(OR)

2. Explain the function of following registers 8086 microprocessor. a) AX,BX,CX,DX b) CS,DS,SS, ES c) BP,SP, SI& DI d) IP and instruction queue (14M)

SECTION – II

3. Explain the instructions of 8086 with examples. (14M)

(OR)

4. .a) Write an 8086 assembly language program to convert Binary to BCD number? (7M)
5. b.) Describe in detail about the Procedures with suitable syntax and example. (7M)

SECTION – III

6. Draw the Block diagram and explain the operations of 8255 PPI. (14M)

(OR)

6. Explain the architecture of 8251A with neat diagram. (14M)

SECTION – IV

7. a) Explain the architecture of 8051 microcontroller. (7M)
b.) Explain in detail about Ports of 8051. (7M)

(OR)

8. a)Explain about the Memory Structure of 8051. (7M)
b.)Write an Assembly Language Program using 8051,
i)Addition of two 8 bit Numbers ii). Addition of two 16 bit Numbers? (7M)

SECTION – V

9. Describe the various timers/ counters of 8051. (14M)

(OR)

10.(a) Explain about the CPSR register of ARM processor (7M)
(b). Explain about data flow model of ARM processor. (7M)

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R17

Code No: R17A0414

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III B.Tech II Semester Model Paper-4

Microprocessors and Microcontrollers

(ECE)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

1. Explain the architecture of 8086 with neat diagram. **[14M]**

(OR)

2.a) Evaluate the physical address of the top of the stack? If the stack segment register contains 3000H and SP=1005H. **[7M]**

b) List the advantages of memory segmentation. **[7M]**

SECTION-II

3. a) Write an 8086 assembly language program to convert Binary to BCD number? **[7M]**

b.) Describe in detail about the Procedures with suitable syntax and example. **[7M]**

(OR)

4. a) Describe the assembler directives of 8086 microprocessor. **[8M]**
(i) ASSUME (ii) EQU (iii) OFFSET

b) Explain the following instructions: (i) IMUL (ii) ROR **[6M]**

SECTION-III

5. Draw the Block diagram and explain the operations of 8255 PPI. **[14M]**

(OR)

6. Discuss in detail the architecture of 8259. **[14M]**

SECTION-IV

7. a) Describe about the timer mode 0 with a neat sketch in 8051 microcontroller. **[7M]**

b) Write short notes on external hardware interrupts of 8051 microcontroller. **[7M]**

(OR)

8. a) Explain the architecture of 8051 microcontroller. **[7M]**

b.) Explain in detail about Ports of 8051. **[7M]**

SECTION-V

9. Describe the various timers/ counters of 8051. **[14M]**

(OR)

10. a) Describe the Software Interrupt instructions in ARM. **[7M]**

b) Mention about the program status register instructions in ARM processor. **[7M]**

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R17

Code No: R17A0418

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Regular Examinations, May 2020

FIBER OPTICAL COMMUNICATIONS

ECE

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

***

SECTION-I

1 a. Explain the function of each block with a help of neat block diagram of a digital optical fiber communication system? **[10+4]**

b. List the applications of optical communication

OR

2 a. Explain Classification of Optical Fibers. **[7+7]**

b. Explain fiber optic cables.

SECTION-II

3 a. Describe any two types of Losses in Optical Fiber Communication System. **[7+7]**

b. Explain about Wave-guide dispersion, Polarization mode dispersion.

OR

4. a. Explain Single mode fiber connectors. **[7+7]**

b. Discuss about Optical Fibers splicing.

SECTION-III

5. a. Explain LED Structure with neat sketch. **[7+7]**

b. Illustrate the factors involved in launching optical power from a light source to fiber.

OR

6.a. Draw neat diagram of stripe geometry DH LASER and give its advantages over broad area LASER. **[7+7]**

b. Write the three modes of the cavity of LASER diode.

SECTION-IV

7. a. Explain Physical principles of PIN and APD. **[7+7]**

b. Write Comparison of Photo detectors.

OR

8. a. Explain in Detail Fundamental receiver operation. **[7+7]**

b. Explain the digital signal transmission for an optical receiver?

SECTION-V

9	**a.**	Analyze the Power Budget of Optical Fibre Communication in terms of analog system design.	**[7+7]**
	b.	Describe in detail about Rise time Budget of Optical Fibre Communication in-terms of digital system design.	

OR

10.	**a.**	What is significance of system consideration in point-to-point fiber links? Explain?	**[7+7]**
	b.	Explain Elements of optical networks.	

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R17

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Regular Examinations, May 2020

FIBER OPTICAL COMMUNICATIONS

ECE

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

***

SECTION-I

1 a.	Explain the Optical fiber wave guides.	**[10+4]**
b.	List the advantages of optical communication?	
	OR	
2 a.	Explain Fiber fabrication techniques.	**[7+7]**
b.	Compare step index & graded index fiber?	

SECTION-II

3 a.	Distinguish between intrinsic & extrinsic Absorption?	**[7+7]**
b.	Explain about Material dispersion, Intermodal dispersion.	
	OR	
4. a.	Explain the various connectors used in fiber optics?	**[7+7]**
b.	Discuss about Connector return loss.	

SECTION-III

5. a.	Derive an expression for power coupling from a large surface emitting LED into smaller step index fiber.	**[7+7]**
b.	List out the advantages and disadvantages of pig tailing either as fiber optic source or as fiber optic detector.	
	OR	
6.a.	Derive rate equation for LASER diode.	**[7+7]**
b.	Derive the expression for lasing and threshold condition of LASER.	

SECTION-IV

7. a.	Explain Temperature effect on Avalanche gain.	**[7+7]**
b.	Explain Detector response time.	
	OR	
8. a.	Explain in Detail Error sources in optical receiver.	**[7+7]**
b.	Explain the Receiver configuration for an optical receiver?	

SECTION-V

9 a. Analyze the system performance using link power budget of analog systems. **[7+7]**

b. Describe in detail about Rise time Budget of Optical Fibre Communication in-terms of digital system design.

OR

10. a. Explain WDM concepts? **[7+7]**

b. Explain SONET/SDH.

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R17

Code No: **R17A0415**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Digital Signal Processing

MODEL PAPER 1

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

****

SECTION – I

1. Check the Stability of the following systems **(14M)**

$a) y(n) = x(n) + \frac{1}{2}x(n-1) + \frac{1}{4}x(n-2)$

$b) h(n) = 2^n u(n)$

(OR)

2. Realize the system described by the following difference equation in cascade and parallel form.

$$y(n) = -\frac{13}{12}y(n-1) - \frac{9}{24}y(n-2) - \frac{1}{24}y(n-3) + x(n) + 4x(n-1) + 3x(n-2)$$ **(14M)**

SECTION – II

3. a) State and Prove any four properties of DFT.
   b) List the differences between linear convolution and circular convolution. **(7+7M)**

(OR)

4. Find the IDFT of the sequence X(k)={7, -0.707-j0.707, -j, 0.707-j0.707, 1, 0.707+j0.707, j, -0.707+j0.707} using DIT algorithm. **(14M)**

SECTION – III

5. Design a digital Butterworth filter for the following specifications using impulse invariant method. **(14M)**

$$0.8 \le |H(w)| \le 1 \qquad 0 \le w \le 0.2\pi$$
$$|H(w)| \le 0.2 \qquad 0.32\pi \le w \le \pi$$

(OR)

6. Design a digital Chebyshev filter for the following specifications using bilinear transformation method. **(14M)**

$$0.707 \le |H(w)| \le 1 \qquad 0 \le w \le 0.2\pi$$
$$|H(w)| \le 0.1 \qquad 0.5\pi \le w \le \pi$$

SECTION – IV

7. Explain in detail about Fourier Series Method of design of FIR filters. **(14M)**

(OR)

8. Design a five stage lowpass FIR filter with Sampling time 1ms and f_c=200Hz. Also find frequency response of the filter. **(14M)**

SECTION – V

9. Let x(n)={1,3,2,5,-1,-2,2,3,2,1},find
   (a)Up sample by 2 times and down sample by 4 times
   (b) Down sample by 4 times and up sample by 2 times **(7+7M)**

(OR)

10. Explain the applications of Multi Rate Signal Processing. **(14M)**

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R17

Code No: **R17A0415**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Digital Signal Processing

MODEL PAPER 2

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

****

SECTION – I

1. Describe the Digital Signal Processing System and write the applications? **(14 M)**

(OR)

2. Realize the system described by the following difference equation in direct form I, Direct form – II. **(14 M)**

$$y(n) = \frac{3}{4}y(n-1) - \frac{1}{8}y(n-2) + x(n) + \frac{1}{3}x(n-1)$$

SECTION – II

3. a) Find the 4-point DFT of x(n)= {1,-2,3,2}
   b) Find the IDFT of X(k)= {4,-2+j4, 4, -2-j4 } **(7+7M)**

(OR)

4. Find the IDFT of the sequence X (k) = {4, 1-j2.414, 0, 1-j0.414, 0, 1+j0.414, 0, 1+j2.414) using DIF algorithm. **(14M)**

SECTION – III

5. Design a digital Chebyshev filter for the following specifications using bilinear transformation method. **(14M)**

$$0.707 \le |H(w)| \le 1 \qquad 0 \le w \le 0.2\pi$$

$$|H(w)| \le 0.1 \qquad 0.5\pi \le w \le \pi$$

(OR)

6. Design a Butterworth digital filter using the bilinear transformation. The specification of the desired low pass filter are: **(14M)**

$0.9 \le |H(\omega)| \le 1;\ 0 \le \omega \le \frac{\pi}{2}$

$|H(\omega)| \le 0.2;\ \frac{3\pi}{4} \le \omega \le \pi$

SECTION – IV

7. Design a five stage low pass FIR filter with Sampling time 1ms and f_c=200Hz. Also find frequency response of the filter. **(14M)**

(OR)

8. Explain in detail about design of IIR digital filters using Window Techniques. **(14M)**

SECTION – V

9. Explain in detail the spectrum of up sampling and down sampling. **(14M)**

(OR)

10. Consider the signal x(n)=nu(n) **(14M)**

i) Determine the spectrum of the signal.

ii) The signal is applied to a decimator that reduces the sampling rate by a factor 3.

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R17

Code No: **R17A0415**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Digital Signal Processing

MODEL PAPER 3

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

****

SECTION – I

1. Check whether the following systems are Linear or non-linear and also verify time invariant or time variant. **(14M)**
   i)$y(n)= n^2x(n)$
   ii)$y(n)=2x(n)+4$

(OR)

2. Solve the following difference equation
   $y(n)+2y(n-1)=x(n)$ with $x(n)=(1/3)^n u(n)$ and the initial condition $y(-1)=1$ **(14M)**

SECTION – II

3. a) Find the 4-point DFT of $x(n)= \{1,-1,2,-2\}$
   b) Find the IDFT of $X(k)= \{0, -1-j, 6, -1+j\}$ **(7+7M)**

(OR)

4. Compute the 8-point DFT of $x(n)=\{1,1,1,1,1,1,1,0\}$ by using Radix-2 DIF FFT algorithm. **(14M)**

SECTION – III

5. Design a Butterworth digital filter using the bilinear transformation. The specification of the desired low pass filter are: **(14M)**

$$0.9 \le |H(\omega)| \le 1;\ 0 \le \omega \le \frac{\pi}{2}$$

$$|H(\omega)| \le 0.2;\ \frac{3\pi}{4} \le \omega \le \pi$$

(OR)

6. Explain Design procedure of Chebyshev and Butterworth IIR filter. **(14 M)**

SECTION – IV

7. Explain in detail about design of IIR digital filters using Window Techniques. **(14 M)**

(OR)

8. A low pass filter has the desired frequency response as given by: **(14 M)**

$$H_d\left(e^{jw}\right) = e^{-j2w} \qquad -\frac{\pi}{4} \le w \le \frac{\pi}{4}$$

$$= 0 \qquad \frac{\pi}{4} \le |w| \le \pi$$

Determine the filter coefficients if the window function is used is

$w(n) = 1 \qquad 0 \le w \le 4$

$= 0 \qquad$ otherwise

Also determine the frequency response $H(e^{jw})$ of the designed filter.

SECTION – V

9. Explain the applications of Multi Rate Signal Processing. **(14 M)**

(OR)

10. Consider the signal x(n)=nu(n) **(14M)**

i) Determine the spectrum of the signal.

ii) The signal is applied to a decimator that reduces the sampling rate by a factor 3.

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R17

Code No: **R17A0415**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Digital Signal Processing

MODEL PAPER 4

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

****

SECTION – I

1. Check whether the following systems are Linear or non-linear and also verify time invariant or time variant. **(7+7M)**

   a) $y(n)=\log_{10}|x(n)|$

   $$b)\, y(n) = x^2(n) + \frac{1}{x^2(n-1)}$$

(OR)

2. A linear shift invariant system is described by the difference equation **(14M)**

   $$y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = x(n) + x(n-1)$$

   with y(-1)=0 and y(-2)=-1.
   Find a) the natural response of the system b) forced response of the system.

SECTION – II

3. Find the linear convolution of the sequence x(n) and h(n) using DFT
   x(n)={1,0,2}, h(n)={1,1} **(14M)**

(OR)

4. Determine the linear convolution of the following sequences using overlap-add and overlap save methods $x(n) = \{1,-1,,2,1,3,1,2,-1,2\}, h(n) = \{1,2,1\}$ **(14M)**

SECTION – III

5. Explain Design procedure of Chebyshev and Butterworth IIR filter. **(14M)**

(OR)

6. Determine the system function H(z) of the lowest order Chebyshev IIR digital filter with the following specifications: **(14 M)**
   3dB ripple in pass band $0 \le w \le 0.2\pi$
   25 dB attenuation in stopband $0.45\pi \le w \le \pi$

SECTION – IV

7. Design a filter with: **(14M)**

$$H_d\left(e^{jw}\right) = e^{-j3w} \qquad -\frac{\pi}{4} \le w \le \frac{\pi}{4}$$

$$= 0 \qquad \frac{\pi}{4} \le |w| \le \pi$$

using Hamming window with N = 7.

(OR)

8. Compare IIR and FIR filters in detail. **(14M)**

SECTION – V

9. Explain in detail the spectrum of up sampling and down sampling. **(14M)**

(OR)

10. Consider the signal $x(n)=a^n u(n)$, $|a| < 1$. **(14M)**

    i) Determine the spectrum of the signal.

    ii) The signal is applied to an interpolator that increases sampling rate by a factor of 2.

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R17

Code No: **R17A0415**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Digital Signal Processing

MODEL PAPER 5

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

****

SECTION – I

1. Check whether the following systems are Causal or non-causal and also verify Static or dynamic. **(14M)**
   i)y(n)= x(n)x(n-2)
   ii)$y(n)=a^n u(n)$

(OR)

2. Define various elementary discrete- time signals. Indicate them graphically. **(14M)**

SECTION – II

3. Determine the linear convolution of the following sequences using overlap-add and overlap save methods $x(n)=\{1,-2,2,-1,3,-4,4,-3\}, h(n)=\{1,-1\}$ **(14M)**

(OR)

4. Compute the 8-point DFT of x(n)={2,2,2,2,1,1,1,1} by using Radix-2 DIT FFT algorithm. **(14M)**

SECTION – III

5. Determine the system function H(z) of the lowest order Chebyshev IIR digital filter with the following specifications: **(14M)**
   3dB ripple in pass band $0 \le w \le 0.2\pi$
   25 dB attenuation in stopband $0.45\pi \le w \le \pi$

(OR)

6. Design a digital Butterworth filter for the following specifications using impulse invariant method. **(14M)**

$$0.8 \le |H(w)| \le 1 \qquad 0 \le w \le 0.2\pi$$

$$|H(w)| \le 0.2 \qquad 0.32\pi \le w \le \pi$$

SECTION – IV|

7. Design a filter with: **(14M)**

$$H_d(e^{jw}) = e^{-j3w} \qquad -\frac{\pi}{4} \le w \le \frac{\pi}{4}$$

$$= 0 \qquad \frac{\pi}{4} \le |w| \le \pi$$

using Hamming window with N = 7.

(OR)

8. Explain in detail about design of IIR digital filters using Window Techniques. **(14M)**

SECTION – V

9. Consider the signal $x(n)=a^n u(n)$, $|a|<1$. **(14M)**

   i) Determine the spectrum of the signal.

   ii) The signal is applied to an interpolator that increases sampling rate by a factor of 2.

(OR)

10. Let x(n)={1,3,2,5,-1,-2,2,3,2,1},find **(14M)**

   (a)Up sample by 2 times and down sample by 4 times

   (b) Down sample by 4 times and up sample by 2 times

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

III B. Tech II Semester

DATA STRUCTURES WITH PYTHON

Model Paper I

(ECE)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

1 a. Give brief introduction to python and its installation? [5M]

b. Write a python program to create variables in terms of integer, float and string? [9M]

(OR)

2a. Write a short note on history and features of python? [9M]

b. Show an example how precedence of operators effects an expression evaluation? [5M]

SECTION-II

3 a. Explain If _else statement in python with syntax, flowchart and example? [5M]

b. Write a python program using nested for loop to print the following pattern?

1
2 2
3 3 3
4 4 4 4
5 5 5 5 5

[9M]

(OR)

4 a. Define and explain for loop in python with syntax, flowchart and example [5M]

b. Write a python program to double the values of a given list.
List1= [11, 22, 33, 44, 55, 66] [9M]

SECTION-III

5. Write a program to create a menu with the following options

1. Area of a circle
2.Area of a triangle
3.area of a rectangle
4.area of a sqare
5.Area of pyramid. Accepts users input and perform the operation accordingly. Use functions with arguments[14M]

(OR)

6. a.Write the difference between parameter and arguments in functions and explain with an example?

[**7+7=14M**]

b. Write a Python function that takes two lists and returns True if they have at least one common member?

SECTION-IV

7. a. Write a python program to create and access specific value of dictionary? **[10+4=14M]**

b. Explain any three methods of a list with an example each?

OR

8.a. Write a python program to create and access the elements of tuple?**[7+7=14M]**

b. Explain dictionary manipulation with an example?

SECTION-V

9.Write a python program to Bubble sort N numbers from user

[14M]

OR

10. a. Write a note on working of Linked List **[7+7=14M]**

b. Write a note on working of Stacks

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

III B. Tech II Semester

DATA STRUCTURES WITH PYTHON

Model Paper II

(ECE)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONEQuestion from each SECTION and each Question carries 14 marks.

SECTION-I

1. Write a python code to demonstrate type conversions using int (), float () and str (). [14M]

(OR)

2 a. Define variable in python and list the rules of python variables. [10M]

b. Write short note on features of python [4M]

SECTION-II

3 a. Write a python program to print "MRCET" to print 5 times. [7M]

b. Define comment and list out different types of comments with syntax?[7M]

(OR)

4 a. Briefly describe about break and continue statements?

b. Take 10 integers from keyboard using loop and print their average value on the screen [4M]

SECTION-III

5. a. Define function and write the syntax of it. [7+7M]

b. Writer a program to read one subject mark and print pass or fail use single return values function with argument.

(OR)

6. Define Recursion and python Recursive function. Write a python program to factorial using recursion? [14M]

SECTION-IV

7. a. Define list, tuple, dictionary comprehensions with an example?

b. Write a python program to iterate over keys and values of a dictionary?

[14M]

OR

8.a. Consider the following list, list1=[1,2,3,4,5,6,7,8,9,10] and perform slice operation in three different methods ?

. [7M]

b. What is tuple assignment, give an example?

SECTION-V

9.aWrite a python program to Merge sort N numbers from user

b.Write an algorithm for Insertion sort **[7+7=14M]**

OR

10.Write a note on working of Linked List and write a program to create a Linked list of N elements from user **[14M]**

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B. Tech II Semester

DATA STRUCTURES WITH PYTHON

Model Paper III

(ECE)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONEQuestion from each SECTION and each Question carries 14 marks.

SECTION-I

1. Explain Python basic Operators. Give example of any four. [14M]

(OR)

2a. List out some of the python interpreters? [9M]

b. Define and create the list to print one of its elements?[5M]

SECTION-II

3a. What are the different types of operators used to evaluate Boolean expression? [7M]

b. Write a program to create a list with computer languages. and display the same by using while loop. [7M]

(OR)

4 a. List and define different types of python iteration statements with syntax? [9M]

b. Write a python program to find biggest of two numbers using conditional if. [5M]

SECTION-III

5. Write a simple program to print “welcome to python” using return keyword with functions. . [14M]

(OR)

6. a. Define localand global scope with syntax? [6M]

b. Define string and write the syntax to get type of any string? [8M]

SECTION-IV

7. aDoes mutability support for list, if yes explain any two methods with example? **[7+7=14M]**

b.Write a python function that takes list as argument and multiplies each element in the list by 2.

OR

8. a. List out the operations and methods of dictionary?
   b. Consider the following list, list1=[1,2,3,4,5,6,7,8,9,10] and perform slice operation in three different methods ? [7+7=14M]

SECTION-V

9. Write a python program to Merge sort N numbers from user [14M]

OR

10 a. Write an algorithm forSelection sort [7+7=14M]

b. Write a note on working of Queues

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