M & M-II EXTC (old). May-June-16

TE Sem VI 10/05/16 10-5-16

Sub:- M & M-II

EXTC

(Old Course)

QP Code : 586801

(3 Hours)

[Total Marks : 100]

N.B : (1) Question No. 1 is compulsory.

(2) Solve any four questions from the remaining six questions.

(3) Figures to the right indicate full marks.

(4) Assume suitable data where necessary.

1. (a) Explain rotate instructions of PIC 18F microcontroller. 5

(b) Explain function of BIU in 8086. 5

(c) Explain Flag register of 8086. 5

(d) Explain significance of $\overline{BHE}$ in 8086 5

2. (a) Explain the following instructions of PIC 18F microcontroller. 10

(i) CLRW (ii) BTG PORT C,4,0 (iii) ANDLW 0x5F (iv) TBLRD* - (v) MULWF 0x25,0

(b) Draw and explain interfacing of 8086 with 8255. 10

3. (a) With the help of flowchart/algorithm write assembly language program for 8086 to arrange a data block of ten 8 bit numbers in ascending order. Assume the necessary data. 10

(b) Explain the instruction format of PIC 18F microcontroller. 10

4. (a) Explain interrupt structure of 8086. 10

(b) Explain addressing modes of PIC 18F microcontroller. 10

5. (a) Explain interfacing of 8259 with 8086 in minimum mode. 10

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Con. : 8129-16.

CBGS Sem VI (May-June-16)
DC(EXTC) 10/05/2016 10-5-16
Te Sem-VI
Sub:- DC
EXTC

QP Code : 31640

(3 Hours) **[Total Marks : 80**

N.B.
1) Question no.1 is compulsory
2) Attempt any three questions out of remaining five questions
3) Assumptions made should be clearly stated
4) Illustrate answers with sketches wherever required

Q.1		Attempt any four	
	a	Describe the Shanon-Hartley capacity theorem.	5
	b	Consider a binary data sequence 10100101.Draw the waveforms for the given binary data sequence, using unipolar RZ and split phase Manchester.	5
	c	State two criterin which a spread-spectrum communication system must satisfy. Justify that the spread-spectrum signals are transparent to the interfering signals, and vice versa.	5
	d	Explain the Coherent and non coherent digital modulation techniques.	5
	e	Define code rate, code efficiency, systematic and non systematic in the context of linear block code.	5
Q.2			
	a	Consider the five source symbols of a discrete memoryless source and their respective probabilities as 0.4, 0.2, 0.2, 0.1, and 0.1. i) Create a Huffman Tree for Huffman source coding technique to find the codeword and length of codewords for each source symbol. ii) Determine the average codeword length of the specified discrete memoryless source. iii) Comment on the results obtained	10
	b	Describe in convolution code, Time domain approach, and Transform-domain approach to determine encoder output.	10
Q.3			
	a	Justify that the probability of error in matched filter does not depend on the shape of input signal. Derive the relevant expression.	10
	b	For a Quadrature Phase Shift Keying (QPSK), Explain the modulator, demodulator, Bandwidth and advantages.	10
Q.4			
	a	Describe coherent detection method of binary FSK signals. Also draw power spectra for BFSK modulated signal.	10
	b	In a digital communication system, the bit rate of a bipolar NRZ data sequence is 1 Mbps and carrier frequency of transmission is 100MHz. Determine the symbol rate of transmission and the bandwidth requirement of the communications channel for i) 8-ary PSK system ii) 16-ary PSK system.	10
Q.5			
	a	The Generator matrix of (6, 3) systematic block code is given below: $G = \begin{bmatrix} 100011 \\ 010101 \\ 001110 \end{bmatrix}$ Find the code Vectors, parity check matrix, and the error syndromes.	10

	5	A (7,4) cyclic code is described by a generator polynomial $g(x) = x^3 + x + 1$ i) Find out the generator matrix ii) Parity checks matrix. iii) Draw the syndrome calculator and explain how received message is corrected?	10
Q.6		**Attempt the following (any two).**	
	a	Write short note on Intersymbol interference (ISI) and .	10
	b	Explain with the help of block dingrams and waveforms, the following techniques of spread spectrum communication. (a) Direct sequence (b) Frequency hopping.	10
	c	What are different decoding methods of convolutional codes? Explain any one in detail.	10

TE SEM VI (Rev) DTSP May-16 16/5/16.

EXTC

EXTC

Sub:- DTSP

QP Code : 31652

(3 Hours) [Total Marks :80

N.B. : (1) Question no. 1 is compulsory.
(2) Solve any three questions from remaining five questions.
(3) In all four questions to be attempted.
(4) Figures to the right indicate full marks.

1. (a) Explain multirate signal processing with applications. 20
(b) If h(n) = {1, 2, 3,4 } is impulse response of FIR Filter, Realize the filter in direct form.
(c) State and prove Parseval's Theorem.
(d) State advantage and disadvantage of digital filters.

2. (a) (i) x(n) = {1, 2, 3, 4} find DFT of x(n) 10
(ii) Using results obtained in part (i) and otherwise find DFT of following sequences
a(n = { 4, 1, 2, 3} b(n) = {2, 3, 4, 1} c(n) = {3, 4, 1, 2}
d(n) = {4, 6, 4, 6}

(b) A digital filter is describe by the following differential equation 10
y(n) = 0.9 y(n-1) + bx(n)
(i) Determine b such that |H (0)|= 1
(ii) Determine the frequency at which $|H(w)| = \frac{1}{\sqrt{2}}$
(iii) Identify the filter type based on the passband.

3. (a) If x(n) = {1 2 3 4 5 6 7 8}, Find X(K) using DITFFT. Compare computational complexity of above algorithm with DFT. 10
(b) Show the mapping from S plane to Z plane using Impulse Invariant Method and explain its limitation. Using this method, determine H(Z) if 10

$$H(s) = \frac{3}{(s+2)(s+3)} \text{ if } T = 0.1 \text{ sec}$$

4. (a) Design a Linear Phase FIR Low Pass filter of Length 7 and cut off frequency 1 rad/sec using rectangular window. 10
(b) If x(n) = {1, 2, 3, 2} and h(n) = {1, 0, 2, 0} 10
(i) Find circular convolution using time domain method.
(ii) Find linear convolution using circular convolution.

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5. (a) Design a digital Butterworth filter for following specifications using Bilinear transformation technique 10

Attenuation in Pass band = 1.93dB,
Pass band Edge frequency = 0.2π,
Attenuation in Stop band = 13.97dB,
Stop band Edge frequency = 0.6π.

(b) With a suitable block diagram describe sub-band coding of speech signals. 10

6. Attempt the following :-

(a) Short note on dual tone multifreqrency detection using Goertzel's algorithm 8
(b) Compare FIR and IIR filters. 6
(c) Finite word length effect in digital filters. 6

TE SEM VI (old) 16/5/16

TEXT QUES-
A & WP (EXTC)

QP Code : 586900

[Revised Course]

EXTC

(3 Hours) | Total Marks : 100

N.B. : (1) Question no. 1 is **compulsory**
(2) Answer **any four** questions from the remaining **six** questions.
(3) Assume any suitable data wherever required.
(4) **Figures** to the right indicate **full** marks.

1. Answer the following 20
   (a) Ground interference effects.
   (b) Polarization and polarization matching factor
   (c) Explain different types of antenna losses
   (d) Sky wave propagation

2. (a) What is the effective area of a half wave dipole operating at 500MHz. 10
   (b) Explain the significance of the term "Effective Area of an Antenna". Derive the relationship between effective area and directivity of any antenna. 10

3. (a) Derive the array factor of an N- element uniform linear array and hence deduce the condition for which the array will radiate in the broadside and end fire direction 10
   (b) Derive the expression for radiation resistance of an infinitesimal dipole. explain its significance. 10

4. (a) Draw and explain Yagi antenna. Sketch its radiation pattern. Write the applications of Yagi Antenna. 10
   (b) Explain the different types of horn antennas. Find its directivity and beamwidth. 10

5. (a) Explain with suitable diagram the working of Log Periodic Antenna. Write its practical applications. 10
   (b) Explain the different components of the ground waves. What are frequency characteristics of ground waves? 10

6. (a) Explain the principal modes of operation of helical antennas and draw its radiation pattern. 10
   (b) Explain the formation of inversion layer in the troposphere and the phenomenon of duct propagation. Which factors help in the formation of duct? 10

7. Write notes on 20
   (a) Ionospheric Propogation
   (b) Sleeve dipole
   (c) The equivalent noise temperature of an antenna
   (d) Microstrip Antenna

DC (EXTC OLD) Sem VI

20/05/16

Te sem-VI (old) may-16

EXTC

Sub:- DC

OP CODE: 58700

(3 hours)

Total marks : 100

N.B. : 1) Question no. 1 is compulsory
2) Attempt any three questions out of the remaining five questions
3) Assume suitable data if required, stating them clearly.

Q. 1 **Answer the following questions:** (20)
(a) What are the desirable properties of Line codes?explain.
(b) Compare ISI with ICI.
(c) Explain Shannon Hartley theorem on channel capacity
(d) Distinguish between systematic and non-systematic codes

Q 2 (a) A discrete memory less source emits six messages with their probabilities as shown below: (10)

Symbol	S1	S2	S3	S4	S5	S6
Probability	0.1	0.12	0.16	0.33	0.24	0.05

(i) Using Huffman Code , find the Entropy of the source. Obtain the compact binary code (ii) find the Average length of the Code, Code Efficiency and Code Redundancy (10)

(b) Distinguish between Coherent and non coherent detection. Draw the block diagrams of coherent BFSK receiver and non coherent BFSK receiver. sketch its PSD (10)

Q.3 (a) Compare the following: (any three) (12)
(i) OQPSK and MSK
(ii) Duo-binary and Modified Duo binary encoding
(iii) BFSK and BPSK
(iv) Linear block code with Convolutional code

(b) Consider a (8,4) Systematic block code whose Parity check equations are:

$$C_5 = m_1 + m_2 + m_3$$
$$C_6 = m_2 + m_3 + m_4$$
$$C_7 = m_1 + m_3 + m_4$$
$$C_8 = m_1 + m_2 + m_4$$

(i) find 'G' and 'H' matrices
(ii) find the codewords for the msg vectors : 1011, 1101
(iii) construct the syndrome look-up table.
(iv) If the received codeword is 11011100, find the error vector from the look-up table and compute the corrected codeword. (10)

[TURN OVER

Q.4 (a) With reference to Offset-QPSK, explain the following:
(i) transmitter and receiver with a neat block diagram along with mathematical expression for transmitted signal
(ii) sketch its PSD indicating the bandwidth
(iii) draw its constellation diagram and find its Euclidian distance (12)

(b) For a (7,4) cyclic code with generator Polynomial $g(x) = (1 + x^2 + x^3)$
(i) Find the systematic codeword for the message vectors: 1001 , 1101 using long division method
(ii Find the syndrome, if the received codeword is 1101010 (8)

Q.5 (a) Draw the signal constellation diagram for 16-ary QASK and determine the Euclidian distance for the same.(Take d=2a,) Compare it with that of 16-PSK .which of them has better noise immunity ? (12)

(b) Explain the working of Duobinary encoder-decoder system with precoder. What are its drawbacks? How are they overcome? (8)

Q.6 (a) Explain the need for Equalizer in digital transmission system. Explain tapped delay line Equalizer with a neat block diagram. (8)

(b) For a convolutional encoder with code rate 1/3 and constraint length 3 and generating Vectors g1= (1 0 1) , g2= (1 1 0) , g3= (1 1 1).dra w the encoder and Sketch its Trellis Diagram with minimum 4 stages. .using this diagram .find the codeword for the input sequence 10101 .Also Find its transfer function (12)

Q.7 (a) Derive the expression for the Probability of error of Matched Filter (10)
(b) write short notes on : (i) GMSK (ii) Eye pattern (10)

TV (TE Sem VII (old) EXTC))

26/05/16 May-16

Sub:- TV

EXTC

Q.P. Code : 587101

(3 Hours) [Total Marks : 100

N.B. : (1) Question No.1 is **compulsory.**
(2) Solve any **four** from remaining **six** questions.
(3) Figures to the right indicate full marks

1. (a) What is the importance of colour burst in the back porch of CVS? 5
(b) Explain chromaticity diagram with a neat sketch. 5
(c) Discuss in brief about RTCP. 5
(d) Justify the choice of modulation used for TV transmission. 5

2. (a) Explain the operation of sync separator with a neat diagram. 10
(b) Explain the working of cable television with the help of a neat diagram. 10

3. (a) What are the essential requirements to be satisfied to make a colour TV fully compatible with monochrome system? 10
(b) Describe the working of digital TV system. 10

4. (a) Draw and explain vidicon camera tube. What do you understand by dark current in vidicon? 10
(b) Draw composite video signals for two lines and explain the various components in details. 10

5. (a) Explain the difference between PAL and NTSC colour TV standards. 10
(b) Discuss in brief about television test charts used in troubleshooting. 10

6. (a) Explain frequency interleaving process in detail. 10
(b) Justify the role of interlaced scanning in determining video bandwidth. 10

7. (a) What is the basic principle of TV camera tubes. Write a short note on solid-state image scanners. 10
(b) Explain the working of horizontal deflection system and the function of EHT. 10

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TE (EXTC) Sem VI CBGS)

TE Sem-VI (CBGS) 26/05/16 May-16

Sub:-TE

EXTC

Q.P. Code : 58860i

(3 Hours) [Total Marks : 80

N.B. : 1. Question no.1 is compulsory.
2. Answer any three question out of remaining questions.
3. Assume suitable data if required.

1. (a) What are the advantages of digitization in television systems? 5
(b) Draw & illustrate the different levels of CVS and define them. 5
(c) Define aspect ratio & state standardized value of aspet ratio? Give reason for the choice. 5
(d) Define characteristics of colour: Luminance, Hue and Saturation. 5

2. (a) Draw & explain image orthicon camera tube in detail with advantages & disadvantages. 10
(b) Discuss features of the PAL system. Explain delay-line PAL method with neat diagram. 10

3. (a) Explain Chroma sub-sampling and its types in detail. 10
(b) Draw & explain block diagram of NTSC colour receiver 10

4. (a) Explain D2-MAC packet format/signal and state characteristics of D2-MAC. 10
(b) Write a note on wide high definition television and its standards. 10

5. (a) Explain in brief direct to home television. 10
(b) Explain difference between component digital video & composite video. 10

6. Write short note on (any four) : 20
(a) MUSE system
(b) Merits and Demerits of LED display
(c) VSB correction.
(d) Frequency Interleaving
(e) Displays: Plasma, LCD & LED.

OS EXTC Sem VI CBGS 01/06/2016
Te Sem-VI (CBGS) May-June-16
Sub:- OS

EXTC

Q.P. Code : 588702

(3 Hours) | Total Marks : 80

N.B. : (1) Question **No.1** is **compulsory**.
(2) Attempt **any three** questions out of remaining **five** questions.
(3) Assume suitable data whenever required but justify the same.
(4) Assumption made should be clearly stated.

1. (a) Explain different file operations in brief. 5
(b) What are the characteristics of Real Time OS? 5
(c) What is system call? Explain any five system calls. 5
(d) Differentiate between Deadlock avoidance & Deadlock prevention. 5

2. (a) Explain process-thread state transition diagram in linux. 10
(b) Explain clearly how UNIX performs file management using I-nodes. 10

3. (a) Explain clearly paging and segmentation based memory management techniques using diagram. 10
(b) What critical section of a process? Describe two solutions to achieve mutual Exclusion of critical sections in an OS. 10

4. (a) Consider the following precess 10

Process	Arrival time	Service Time
P_1	0	8
P_2	1	4
P_3	2	9
P_4	3	5

Solve the above given problem with shortest remaining time first by drawing gantt chart and also calculate the average waiting time, turnarourd time and throughput.
(b) Explain RAID with different levels. 10

5. (a) Explain the working of EDF and RMA real time scheduling algorithms. 10
(b) What is semaphore? Give an implementation of bounded buffer producer consumer problem using semaphore. 10

6. (a) Define the meaning of a race condition? Use an Execution Sequence to illustrate your answer. 10
(b) Explain different file allocation techniques in an OS. 10

Te sem - VI (old) May-June-16

IE & TR EXTC Sem VI (old) 01/06/16

May - 16

Sub: IE&TR

EXTC

QP Code : 29414

(2 Hours) [Total Marks : 50

N. B. : (1) Attempt any **five** questions.

1.	(a) What are the types of market? Explain ologopoly market with example.	5
1.	(b) What is CRR, BR? How does R.B.I. use this to control inflation?	5
2.	(a) What role do banks play in development of nation.	5
2.	(b) 'Trade develops economy'. Explain.	5
3.	(a) Explain Cleveland theory of motivation.	5
3.	(b) What are the merits and demerits of line and staff type organisational structure?	5
4.	(a) Formulate a marketing plan for a product.	5
4.	(b) Why did trade unions oppose Taylor's management theory?	5
5.	(a) What is the role of TRAI?	5
5.	(b) What are the different sources of revenue for government?	5
6.	(a) What is elasticity of demand?	5
6.	(b) What is the procedure followed for recruiting fresh talent in an industry?	5
7.	(a) Explain guidelines of DTH transmission laid down by the government?	5
7.	(b) What are the merits and demerits of centralisation?	5

TE Sem VI (old), EXTC - RADAR

Sub:- RADAR May-June-16

EXTC

7/6/16

Q.P. Code: 587501

(3 Hours) **[Total Marks : 100**

N.B.: (1) Question **No.1** is **compulsory.**
(2) Solve **any Four** question from **Q. No.2** to **Q. No.7.**
(3) Assume suitable **data if necessary.**
(4) Support your answers with **neat sketches / diagrams**, wherever **necessary.**

1. Answer the following **(any Two)** : **20**
   (a) Explain, how the following information can be obtained from processing the echoes :
      (i) Range measurement;
      (ii) Determining the Location of target;
      (iii) Measuring the Velocity of target.
   (b) Define with neat sketch; Grazing angle, Depression angle & Incident angle; for surface clutter patch.
   (c) Explain, the working of amplitude comparison mono-pulse tracking system.
   (d) What is the peak power of the Radar, whose average transmitted power is 200 watts, pulse width of 1μs and PRF of 100 Hz.

2. (a) What are the various applications of Radar? Explain. **10**
   (b) Explain, how change in PRF can resolve the range ambiguity problem ? **10**

3. (a) What is RCS of target? Describe the chief characteristic of Radar echo from target when its RCS is in; **10**
      (i) Rayleigh Region
      (ii) Resonance Region
      (iii) Optical region.
   (b) Draw and Explain the operation of simple CW Radar (Zero IF radar). **10**

4. (a) Explain the working of sweep to sweep substractor with waveform and explain the operation of single DLC with block schematic. **10**
   (b) What are the different properties of sea clutter ? **10**

TURN OVER

Q.P. Code : 587501

5. (a) How range is measured in FMCW Radar ? Explain FM-CW Radar with block schematic. 10

(b) What is the limitation of single delay line canceller ? How Double delay line canceller overcomes it ? 10

6. (a) Draw a Block diagram for [redacted] Radar and Explain the significance of STALO and COHO. 10

(b) State the classifications of Radar systems and Explain High PRF pulsed Radar system with neat sketch. 10

7. Write short notes on (**any Two**) : 20

(a) High PRF pulsed Radar

(b) Land Clutter

(c) Conical scanning, target tracking system

(d) Radar Displays

TE Sem VI EXTC (CBGS) VD

Sub:- VD

7/6/16

May-June-16

EXTC

Q.P. Code: 588801

(3 Hours) [Total Marks : 80

N.B. : (1) Question **ONE** is **compulsory**.
(2) Solve **any THREE** out of remaining **questions**.
(3) Draw **neat** and **clean diagrams**.
(4) Assume **suitable data** if **required**.

1. Attempt **any FOUR** from the following : **20**
   (a) For NMOS resistive load inverter with $R_L = 50K$ find V_{IL} and V_{OL} if $V_{DD} = 5V$, $V_{TO} = 1V$, $K_n = 100\ \mu A/V^2$, neglect body bias effect and channel length modulation.
   (b) With help of appropriate circuit diagram and waveforms, explain charge sharing problem of dynamic logic. How to overcome the same.
   (c) Explain the significance of Level - 1 MOSFET model parameters.
   (d) Implement 4: 1 MUX using Transmission gate technology.
   (e) Explain advantages and disadvantages of Pass Transistor logic in VLSI Design.

2. (a) Explain working of CMOS Inverter with help of Voltage Transfer Characteristics and derive expression for V_{IL} and V_{IH}. **10**
   (b) Implement 1 - bit full adder circuit using standard CMOS logic, dynamic logic and pseudo NMOS logic. **10**

3. (a) Draw six transistors SRAM cell and explain its read 0, read 1, write 0 and write 1 operation with the help of appropriate waveforms. **10**
   (b) What is Carry Look Ahead (CLA) adder. Write equations for carry bits of 5-bit CLA in terms of input bits only i.e carry generate and carry propagate and implement the same using domino logic. **10**

4. (a) For 2 input CMOS NAND gate find V_{OL}, V_{OH}, V_{IH} and V_{IL}. Assume that both the inputs are switching simultaneously. Consider NMOS and PMOS with following parameters. $V_{DD} = 5V$, $V_{TOn} = 1V$, $K_n = 100\mu A/V^2$, $V_{TOp} = -1V$, $K_p = 25\mu A/V^2$ **10**
   (b) Give NMOS fabrication process flow with help of neat sketches of appropriate masks and cross section at each process steps. **10**

5. (a) Implement 4x4 NAND based ROM array to store "1001", "0101", "1010" and "1100" in the memory. 5
   (b) Explain the effect of Interconnect scaling on various performance parameters of VLSI circuits. 10
   (c) Draw layout of 3 transistor (3-T) DRAM cell using lambda rules. 5

6. Write short notes on **any FOUR** : 20
   (a) Power Distribution schemes
   (b) Array Multiplier
   (c) Interconnect Delay Model
   (d) NAND Flash Memory
   (e) Column Decoders